First WHO Global Meeting on Skin NTDs

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Geneva, Switzerland

THEME:
“INTEGRATION FOR GREATER IMPACT”

Book of abstracts

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Skin NTD Framework: An overview

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On 8th June 2022, the WHO released pivotal guidance, “Ending the neglect to attain the Sustainable Development Goals: A strategic framework for integrated control and management of skin-related neglected tropical diseases”. Skin-related neglected tropical diseases, or skin NTDs, comprise a group of NTDs that produce signs and symptoms on the skin, and include at least nine diseases or disease groups. Moving away from disease-specific approaches, it is anticipated that synergies will be identified and integrated building on this shared feature, where possible, to achieve a greater health impact. An overview of the skin NTD framework will be presented and will draw attention to the prospects created by this scheme. The framework is a key basis for a proposal produced by WHO dedicated to skin NTD integration and describes the practical opportunities for this evolving strategy. It underlines the wider health benefits that will follow, thus working towards Universal Health Coverage and skin health for all.

Global Leprosy Strategy 2021-2030 and its alignment with the Skin NTD Framework

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Leprosy is one of the 20 Neglected Tropical Diseases (NTDs). The Global Leprosy Strategy 2021-2030: Towards zero leprosy was developed as part of 'Ending the neglect to attain the Sustainable Development Goals: A road map for neglected tropical diseases 2021–2030'. Leprosy along with Onchocerciasis and Human African trypanosomiasis are targeted for 'interruption of transmission' by 2030 in the NTD Roadmap.

Leprosy usually manifests as a skin lesion with loss of sensation. In fact, 12 of the 20 NTDs present with skin manifestations and thus can be grouped together as skin NTDs. Such grouping as skin NTDs helps identify common interventions and define integrated approaches with far greater impact than isolated disease-specific efforts.

It is estimated that more than one billion people are either at risk or affected by one or more skin NTDs. Geographical distribution reveals co-endemicity of more than one skin NTDs and clustering in areas poorly covered by public health interventions.

'Ending the neglect to attain the Sustainable Development Goals: a strategic framework for integrated control and management of skin-related neglected tropical diseases' was developed in 2022 as a companion document to the road map in order to overcome programmatic challenges through integrated control and management of skin NTDs.

The Global Leprosy Strategy 2021-2030 has four strategic pillars which include implementing integrated, country-owned zero leprosy roadmaps; scale up leprosy prevention alongside integrated active case detection; manage leprosy and its complications and prevent new disability and combat stigma and ensure human rights are respected. The emphasis within the Global Leprosy Strategy on 'integrated' approaches for planning and implementation of leprosy services are unmistakable.

Active case detection along with preventive chemotherapy, management of complications, mental well-being and stigma reduction are leprosy-related interventions which are applicable to other skin NTDs. Countries are therefore encouraged to adopt and adapt the Global Leprosy Strategy 2021-2030 within the skin NTD framework. Delivered through an integrated approach, provides opportunities for sharing of resources with resultant strengthened surveillance and effectiveness accelerating our efforts towards the goal of interruption of transmission.

Changing epidemiology of Buruli ulcer in Victoria, Australia 2019-2022

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Introduction

The state of Victoria in southeastern Australia with a non-tropical climate, continues to experience the highest number of Buruli Ulcer w(BU) cases on record with the exponential increase in cases since 2014 ongoing and the geographic expansion of endemic areas.

Methods

Mycobacterium ulcerans infection is a notifiable communicable disease in the state of Victoria, with all cases diagnosed by laboratories reported to the Department of Health. Enhanced surveillance is undertaken on cases with particular attention paid to the geographic locations where exposure took place.

Results

1143 incident human cases of Buruli ulcer were notified in Victoria over a 4-year period from 2019-2022, with the highest number of 341 cases recorded in 2022. While cases are still linked to towns on the Bellarine Peninsula (Point Lonsdale, Queenscliff, Ocean Grove, Barwon Heads, St Leonards), which has been an endemic area for nearly a quarter of a century, for a decade there has been a shift to the Mornington Peninsula, and the southeastern bayside suburbs of Melbourne. (Figure 1) Since 2019 several inner Melbourne non-coastal suburbs (Essendon, Moonee Ponds, Brunswick West, Pascoe Vale South and Strathmore) have been declared endemic areas, as have areas of the Surf Coast (Aireys Inlet and Anglesea), and most recently, suburbs of Geelong (Belmont, Highton, and Newtown). Possum excreta surveys have demonstrated widespread *M. ulcerans* contamination of the local environment in human outbreak areas.

Discussion and Conclusions

Buruli ulcer is now endemic in many different non-contiguous areas of Victoria. The annual case numbers have continued to climb since 2014, with only a modest reduction in 2020 when Victoria endured long periods of COVID-19 related lockdown which prevented travel and possibly reduced prolonged outdoor exposure. Public health management involves ongoing surveillance to detect new exposure areas, targeted and broad prevention-related messaging, educating clinicians to consider this diagnosis early, and collaborating with laboratories and researchers to establish whole genome sequencing of human isolates and translating research on transmission into public health management and policy.

Acknowledgments

The department of Health acknowledges the newly established local public health units that now manage the public health follow-up of BU cases.

Skin NTDs and/or integration – Keywords

Buruli ulcer, *Mycobacterium ulcerans*, epidemiology

Figure 1: Heatmap showing selected endemic areas in Victoria based on case residential address at time of notification 2019 to 2022

Very severe tungiasis in Amerindians is common and is due to the entanglement in a web of behavioral and environmental factors

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The dimensions of tungiasis in Amerindian communities in the Amazon and the Orinoco Basin remain enigmatic. The few studies hitherto performed and anecdotal observations indicate that tungiasis is frequent and that severe morbidity is common. We analyzed data from yet unpublished clinical-epidemiological studies in Brazil and records available from health services for Amerindian people in Colombia.

A total of 24 cases with very severe tungiasis were identified in whom the ectoparasitosis had developed into a debilitating, sometimes life-threatening condition. Age ranged from 7 to 83 years. The number of embedded sand fleas ranged from around 100 to approximately 1300. In almost all patients ectopic lesion clusters existed at the ankles, knees, elbows, hands, and fingers. A hitherto unknown ectopic localization of clusters of embedded sand fleas around the anus was common. Mobility was partially or totally impaired. Patients suffered from malnutrition, anemia, and cachexia. Bacterial superinfection of lesions was constant. Most patients lived alone and depended on food provided by relatives. Attitudes in the community towards the patient ranged from disregard to stigmatization based on the concept that patients with very severe tungiasis are cursed (*maldad*). Intra-domiciliary transmission was very likely in all cases. Dogs seemed to be the predominant animal reservoir.

All patients were treated with multiple topical applications of a formula containing a mixture of low viscosity dimeticone oils (NYDA®) and were cured within 2-3 weeks.

Patients with extremely severe tungiasis are caught in a complex web of causation consisting of a predisposing medical condition, continuous reinfection due to intra-domiciliary transmission, culture-associated behavior such as crouching on the heels, squatting on the ground or laying in a hammock attached such that body parts are in contact with the soil. Traditional beliefs lead to neglect by the family and exclusion from the community.

Very severe tungiasis in Amerindians is the most neglected and most important manifestation of tungiasis in the Americas. If not treated, it may end in a fatal disease course.

Acknowledgments

Local health workers in Amerindian communities affected by severe tungiasis in Brazil and Colombia who provided information on cases, risk factors, treatment, among others.

Skin NTDs and/or integration – Keywords

Very severe tungiasis, Amerindian, treatment, web of causation

Monitoring of the NTD road map 2021 – 2030: Information system, surveillance and reporting

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NTDs are formally recognized as targets for global action in target 3.3, which calls to "end the epidemics of … neglected tropical diseases" by 2030, as part of Goal 3 (Ensure healthy lives and promote well-being for all at all ages). Effective monitoring and evaluation is essential to support policy dialogue and evidence-based decision-making. High-quality monitoring and evaluation at the country level sets the foundation for assessing progress nationally, regionally and globally against the road map targets and milestones, as well as the health-related Sustainable Development Goals and health equity.

The M&E framework for tracking progress towards the NTD road map targets aligns with WHO's vision of integrating data on health into a single platform to strengthen mechanisms for evidence-based decision-making. The framework is focused on measuring impact. It presents the linkages between existing tracking of NTD indicators, which will continue under the new road map, and tracking the new road map targets, many of which are built upon the existing indicators.

The monitoring of progress towards the achievement of the road map targets will be an ongoing process over the next 10 years. Mainstreaming NTD data management into national health information systems is a key recommendation of the road map. Regular analysis and review of routine and surveillance data is paramount for evidence-based decisions and corrective actions. Country indicators relevant to the road map indicators will be reported to WHO through existing reporting processes and channels. The ability to collect, manage and use public health data is central to successful public health programmes. In this context, identifying opportunities to integrate disease-specific with existing surveillance activities at national and subnational levels is essential.

The presentation will highlight processes, available resources and data portals for use to support data collection, analysis, use and dissemination to stakeholders in support of implementation of the NTD road map 2021 - 2030.

Acknowledgments

Department of Control of Neglected Tropical Diseases, World Health Organization; Global Working Group on Monitoring, Evaluation and Research for Neglected Tropical Diseases

Skin NTDs and/or integration – Keywords

Integration

Evaluation of NTD activities integration: Lessons learned from a field observation

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Integrating Skin NTDs activities and services is one of the key recommendations of the NTD road map 2021-2030. However, the literature which records the benefit and costs of such integration remains limited. This project aims at filling this gap by testing the integration of skin NTD screening into a mass drug administration campaign in Côte d'Ivoire and collecting firsthand information on the cost and benefit of such integration.

In preparation for this integration, we carried out a country mission in February 17-28, 2023, to observe the yaws screening campaign in 3 districts in the North-East of Côte d'Ivoire: Nassian, Bondoukou and Tanda. Our observation confirmed the potential of gaining efficiency and saving costs through an integrated skin NTD screening and MDA campaign. But such integration needs thorough planning, adaptation of training, social mobilization and data collection tools, and equal consideration of all diseases that will be covered by the campaign. The next step will be to choose two districts where an MDA campaign is planned for 2023 and plan for an integrated campaign with skin NTD screening.

Acknowledgments

National programmes for NTDs receiving preventive chemotherapy and Skin NTDs, Anesvad, Centre Suisse, Institut Pasteur, WHO/AFRO and WHO Country Office, Côte d'Ivoire and authorities of Nassian, Bondoukou and Tanda districts.

Skin NTDs and/or integration – Keywords

Integration

International Alliance for Global Health Dermatology (GLODERM): A platform for international collaboration on skin NTDs

Authors: Esther Freeman, Alexis Strahan, Sidra Khan, Janet Lubov, Wingfield Rehmus, Claire Fuller, on behalf of the GLODERM Steering Committee

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Massachusetts General Hospital, Boston USA (EF, AS, and JL); University of Manchester, United Kingdom (SK), BC Children's Hospital, Vancouver Canada (WR), and International Foundation for Dermatology (CF)

The International Alliance for Global Health Dermatology, or GLODERM, was established in 2018 to connect dermatologists whose primary interests are focused on the advancement of skin health in resource-limited communities through sustainable and integrated approaches to clinical care, education, research, policy, and advocacy. Since its inception GLODERM has developed various initiatives that function to increase access and reduce the burden of skin neglected tropical diseases (NTDs) on a global scale. Its collaborative network of dermatologists worldwide leverages involvement and expertise to develop programs that aim to increase access and education on NTDs.

In 2022, GLODERM launched a first-of-its-kind mentorship program that connects early career dermatologists who have a passion for advancing skin health in low-resource settings with experienced global health dermatologists. This program supports dermatology leaders in their regions, many of whom are actively working on projects aimed at reducing the burden of NTDs. This first cohort is in the development phase of teledermatology program specifically for the recognition, diagnosis, and treatment of leprosy.

In 2020 in an effort to increase access to quality educational content for clinicians interested in dermatologic conditions worldwide, GLODERM established a Trainee Committee who hosts monthly educational webinars. These webinars are available to all audiences at no fee and have featured content including leprosy, mycetoma, and teledermatology among others.

GLODERM also offers the opportunity for the scientific global health dermatology community to come together at annual meetings, where programs include discussions of dengue, leishmaniasis, community education, the WHO strategic framework for integrated controls and management of NTDs of the skin, and others.

By creating a platform for mentorship, community building, and education, GLODERM allows for collaboration between experts and trainees around the world, to harness expertise for NTD control.

Acknowledgments

GLODERM receives support from the International League of Dermatologic Societies, CeraVe, and the Ellis Family Foundation

Skin NTDs and/or integration – Keywords

Training, mentorship, teledermatology, access

Session 2 : Integration at country level - Presentations

Monday, 27 March 2023

Chair: Rie Yotsu

Time	**Subject**	**Presenters**
14:00 – 14:20	**Keynote presentation**: Skin NTDs multi-country project in West Africa: lessons learnt and future plans	Iñigo Lasa
14:20 – 14:40	Integration of lymphatic filariasis and scabies mass drug administration in Fiji	Sarah Andersson Andrew Steer
14:40 – 15:00	Yaws eradication in three countries of Congo Basin: Lessons learned from the first rounds of mass drug administration with azithromycin (MDA)	Alphonse Um Boock
15:00 – 15:20	Tropical/Infectious Dermatology in the state of Amazonas, Brazil	Valderiza Pedrosa Silmara Pennini
15:20 – 15:40	Integrated transmission assessment survey for lymphatic filariasis, yaws and scabies in Timor-Leste, 2020-2021	Josefina João
15:40 – 16:00	A multi-method evaluation of health services integration for NTDs requiring case management in Liberia	Karsor Kollie
16:00 – 16:20	Integrating a holistic care package for podoconiosis, lymphatic filariasis and leprosy into routine health services in Ethiopia: The EnDPoINT project	Oumer Ali Asrat Mengiste
16:20 – 16:40	An integrated neglected tropical diseases survey and mass drug administration campaign in Sanma province, Vanuatu	Macklyne Katenga
16:40 – 17:00	Integrated management and control of skin-related neglected tropical diseases in Ghana in 2022	Benedict Quao

Integration of lymphatic filariasis and scabies mass drug administration in Fiji

Authors: Sarah Andersson[1], Aminiasi Tavui[1], Vinaisi Duituturaga Bechu[2], Ellice Zoumboulis[1], Matthew Parnaby[1], Lucia Romani[3], Daniel Engelman[1], John Kaldor[3], Andrew Steer PEP4LEP[1]

Affiliations

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Introduction

In Fiji, two skin neglected tropical diseases (NTD), scabies and lymphatic filariasis (LF), have been targeted for mass drug administration. Scabies is highly prevalent in all divisions of Fiji (23%),i however no national MDA for scabies had occurred before 2022. National MDAs for LF were conducted from 2002 to 2007 and in 2010 the program moved to a division specific strategy. MDA for LF is now conducted in the Northern and Eastern Divisions and other hot spots in Central and Western Divisions where prevalence is above 1%.ii

In 2019 the World Scabies Program (WSP) received funding from the Macquarie Group Foundation to implement a national MDA for scabies in Fiji. A decision was made to integrate the scabies and LF MDA programs in overlapping areas of Fiji because 1) ivermectin is common to both treatment regimens, 2) to increase cost efficiency, and 3) reduce the burden on staff and communities.

Methods

The LF Unit of the Ministry of Health and Medical Services and WSP, with additional support from Japanese International Cooperation Agency (JICA) and World Health Organization (WHO), have collaborated closely to implement an integrated MDA for LF and scabies in the Northern and Eastern Divisions of Fiji. The programs developed a joint implementation plan and cost sharing budget. Health promotion and training materials were co-designed by the program staff. MDA teams were trained on integrated community awareness messages and the two programs appeared on television and radio programs together. An integrated manual register and digital data collection tool were utilised to record coverage data.

Results/Discussion

More than 170,000 people are targeted in the Northern and Eastern Divisions for integrated MDA for LF and scabies. The Northern Division (population ≈ 138,000) was implemented during October to December 2022, and Eastern Division (population ≈ 39,000) will be implemented in early 2023. Coverage data are not yet available however any available data will be presented if is selected.

Some of the challenges of integration have included: 1) increased content of training materials; 2) ensuring staff retain key messages for all diseases and medicines; 3) increased data items to collect and coordination between programs. To ensure smooth implementation, the programs held weekly coordination meetings, jointly prepared training materials to streamline messages, integrated data collection tools, and training teams included staff from both programs.

Conclusion

This is the first time MDA for national programs for scabies and LF have been integrated. Overall, the integration between the LF Unit and Scabies program in Fiji has been successful. Teams coordinated together and health staff were able to successfully implement the MDA on the ground. Community members appreciated that the treatment regimen was treating three diseases at one time. Integration has a few challenges that can be overcome by regular coordination meetings and joint planning and preparation by the teams.

Acknowledgments

Macquarie Group Foundation 50th Year Award, Japanese International Cooperation Agency (JICA) and World Health Organization (WHO)

Skin NTDs and/or integration – Keywords

Scabies, lymphatic filariasis, mass drug administration, integration

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[i] Romani L, Koroivueta J, Steer AC, Kama M, Kaldor JM, Wand H, Hamid M, Whitfeld MJ (2015) Scabies and impetigo prevalence and risk factors in Fiji: a national survey. PLoS Negl Trop Dis. 9(3). pmid:25738499

[ii] Fiji’s Neglected Tropical Diseases (NTD) Multisectoral Action Plan 2017 – 2020 (2nd Edition)

https://www.health.gov.fj/wp-content/uploads/2020/10/Fiji-National-Multisectoral-Action-Plan-for-Neglected-Tropical-Diseases-2017-2020.pdf

Eradication of yaws in three Congo basin countries: Lessons learnt following the first three rounds of mass treatment with azithromycin (MDA-azithromycin)

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Context

The countries of the Congo basis namely Cameroon, the Republic of the Congo and the Central African Republic (CAR) are highly endemic for neglected tropical diseases (NTDs).

The results obtained in India and the proven efficacy of one dose of azithromycin in the treatment of yaws encouraged these countries to embark on a yaws eradication programme in accordance with the Morge strategy under the NTD project run by the Organization for Coordinating the Fight against Endemics in Central Africa (OCEAC).

The project trialled the very first campaign of mass treatment with azithromycin (MDA-azithromycin) for the eradication of yaws in three countries in the midst of the COVID-19 pandemic. It included aspects of integrated cross-border control of NTDs.

This article outlines the results of the first round of MDA and integrated monitoring of NTDs and discusses the lessons learnt to serve as a basis for improvement or inspiration to other countries.

Method

The first rounds of MDA took place on 18-21 December 2020 in Cameroon, 29 April-2 May 2022 in the Congo and 25-29 March 2022 in CAR.

The target population was 1 615 534 people living in the 17 districts of the three countries where yaws endemicity had previously been confirmed.

The treatment strategy was modelled on EPI. In the three countries, 2256 teams comprising 6768 trained distributors were deployed in the field in a door-to-door approach.

Data from the MDA and integrated NTD surveillance were collected on tally sheets.

Data was inputted daily to an Excel database on the basis of daily summary sheets.

Results

- 1,536,988 people were treated in the three countries, with an average therapeutic coverage rate of 95.13%;
- 815 439 children under 15 or 53% of the population was treated;
- 87 of the 102 camps inhabited by the pygmies were visited, a geographical coverage rate of 85%;
- 3003 cases of adverse effects were reported, i.e. approximately 1% of those treated;
- 2116 cases of refusal were noted;
- 5951 people tested negative for COVID-19 and several screened-for NTDs;

- 448 suspected yaws cases, 66 positive on DPP testing;
- 44 suspected cases of Buruli ulcer;
- 103 cases of leprosy (17 paucibacillary and 86 multibacillary)
- 8 cases of lymphatic filariasis;
- 208 cases of scabies.

Conclusion

The use of a door-to-door strategy with a large number of distributors has been shown to be effective in MDAs in a large population for a short period of 3 to 4 days.

The results of the first round of MDA show the value of political commitment and social mobilization as starting points for the success of a campaign.

Knowledge of basic demographic data is necessary for better campaign planning and measurement of its impact.

Our results also indicate that it is possible to integrate programmes to control NTDs and COVID-19, particularly in the area of case-finding.

Acknowledgements

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Skin NTDs and/or integration – Keywords

Eradication, yaws, mass treatment with azithromycin, lessons learnt

Tropical/Infectious Dermatology in the state of Amazonas, Brazil

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More recent data, related to the dermatological examination of 34,547 schoolchildren, carried out in Manaus, from 2013 to 2016, show that despite all the work carried out so far, there was no significant impact on the incidence of leprosy in this population. 40 new cases were detected, or 115.8/100,000. Throughout the state of Amazonas, the incidence of leprosy, despite the drop, has continued to fluctuate in recent years from 18.2 to 7.92/per 100,000 inhabitants.

Mass dermatological examinations, called “Health task force” have been regularly carried out both in the capital Manaus and in the municipalities of the countryside of the state.

In the week before World Leprosy Day, in January, they have been held regularly. On the 28th, a Saturday in 2023, 1,085 people were examined and 8 patients were diagnosed with leprosy.

In addition to other dermatological diseases: Contact Dermatitis, Scabies, Psoriasis, Skin Cancer, Seborrheic Dermatitis, Atopic Dermatitis, and Pityriasis versicolor, among others.

The epidemiological situation of the state of Amazonas in the period from 1979 to December 2022, had a drop from 80.93 to 1.21/10.000 inhabitants, showing a significant drop in prevalence, but with an incidence that remains relatively stable, even with all activities developed over the past 40 years.

In the countryside, regular examinations of dermatological patients are also carried out, always with the presence of FUHAM dermatologists, general practitioners, nurses, and nursing technicians. Supervision, recycling, and in-service training are carried out.

Integrated transmission assessment Survey for lymphatic filariasis, yaws and scabies in Timor Leste, 2020-2021

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Background

NTDs Skin Diseases commonly occur in resource-limited areas, associated with poverty since poor practice of hygiene and sanitation, and limited access to clean water. Timor Leste is also considered as a poor country that also face the same problem. In 2015, Mass Drugs Administration is implemented with the objective to eliminate LF and Yaws and also control of Soil Transmitted Helminths (STH) and since than 4 rounds of MDA were implemented with the coverage reached all the Municipalities in this country. To confirm the effectiveness of the MDA implementation, Integrated Transmission Assessment Survey was done on 2020-2021 with the target was children in first and second grade in all the selected primary school. This integrated survey was to measure the current situation of the transmission of LF, Yaws and also Scabies since in the last MDA implementation was also introduced Ivermectin.

Objectives

This study was aimed to evaluate if the multiple rounds of MDA against LF have led to reduction in LF prevalence to a level where transmission can no longer be sustained even in the absence of MDA, to identify any Yaws sero-reactor in the students of grade 1 and 2 through clinical and serologic screening and to capture national data of Scabies.

Method

This survey covered all the municipalities in Timor Leste that divided into 7 Evaluation Unit (EU), aiming to achieve as much representativeness as possible. In line with WHO's guideline, the target population was children aged 6-7 (on 1st and 2nd year Primary School students). Children were clinically screened by CHC's doctors to identify Yaws and Scabies like skin lesion. Brugia Ab and FTS Ag tests were performed for LF with Microfilaraemia as the confirmation test and for suspect case of Yaws was tested with SD Bioline with DPP and PCR test. In order to find any environmental contributing factors, information related to WASH in each school was also collected.

Result

As many as 234 schools from all the municipalities were visited from September 2020 to November 2021. A total of 16.828 students in these 234 schools were enrolled with the total participation rate was 82%. Five of the FTS test were positive and one Brugia Rapid test showed positive and all of these cases were confirmed negative with MF as the confirmation test. 64 suspicious scabies cases were found and treated with Ivermectin. More than 200 students were tested for Yaws as they had a Yaws suspicious skin lesion, papilloma, ulcer or macula and the result showed negative to all. WASH indicators gave different results among the survey school for school water supply, improved infrastructure of toilet and hand washing station.

Conclusion

The extremely low LF prevalence for Ab and Ag indicate that the MDA programs in Timor Leste have been successful with favorable drug cover and high compliance that has controlled LF transmission. The study also showed that Timor Leste is on the stage of post-zero case surveillance, the half-way to Yaws eradication. Only 64 cases of Scabies were diagnosed out of all the participants with the prevalence is less than 1%, ivermectin included in the last MDA in 2019 likely contributed to the reduction of scabies.

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7. Marta Abenia P. da C. Santos, MKes (Head of CDC Department)
8. All the staff of NTDs Program

A multi-method evaluation of health services integration for NTDs requiring case management in Liberia

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Introduction

The WHO NTD roadmap (2021-2030) emphasizes the need for integration of services for the management of NTDs requiring case management (CM) and call for their main-streaming within health services. However, the evidence base on the feasibility and impact of this approach is limited. The Liberian Ministry of Health (MoH) NTDs programme is one of the first to develop and implement an integrated approach to CM NTDs. The goal of this approach is to improve early case detection and successful case management amidst scarce resources. This paper assesses the implementation of the integrated approach and documents it's impact on NTD service provision within the context of the larger Liberian health system.

Methods

A mixed method research approach was used to evaluate the CM NTDs integration model. We sought to determine any marked changes in case detection rates, and accessibility and quality of care to NTD services across comparison counties (where no integration has taken place) and integrated counties between the baseline data of 2016 and the integration implementation years (2017, 2018 and 2019). Using the framework approach, ccomplementary qualitative research with health systems stakeholders (Key Informant Interviews n=75, Focus Group Discussions n=6 and In-Depth Interview n=12) generated deeper contextual understanding.

Results

A marked and significant increase in case detection and improved access to NTD services occurred following the adoption of the integrated approach in Liberia for all NTD diseases (lymphatic filarial lymphoedema and hydrocele, yaws and Buruli ulcer) apart from leprosy. Considering all diseases combined, a member of the population in an integrated county was four times more-likely to be detected with CM NTD compared to cases of CM NTDs from non-integrated counties (rate ratio 4.385, 95% CI 3.503 to 5.4477), a statistically significant effect (X^2 = 213.4691, df=1, $p < 0.00001$). On service access, the health system is now reporting cases from over 111 health facilities in the integrated counties compared to just few specialized health facilities in non-integrated counties. This demonstrates the feasibility and positive impact of an integrated approach on the health system's capacity to detect and respond to CM NTDs. Intensive integrated training and supportive supervision were key factors that led

to an increased and more equitable accessibility as a result of this approach. However, an analysis of the integrated approach when using proxy indicators identified areas that need strengthening, including early case detection, quality of care and sustainability strategies to ensure equitable access to specific CM NTDs services.

Discussion and Conclusions

Integrating CM NTDs into the Liberia health system is feasible, significantly improved case detection, enhanced accessibility and availability of NTD services thereby reinforcing the universal health coverage. However, assessing the impact of CM NTDs integration relies on the consideration of multiple methods and domains (case detection, access and quality of care), simultaneously. Integrated strategies need to be based on evidence, country context and government ownership .

Acknowledgements

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Skin NTDs and/or integration – Keywords

Neglected tropical diseases, main-streaming, Integration, health system strengthening, sustainability.

Integrating a holistic care package for podoconiosis, lymphatic filariasis and leprosy into routine health services in Ethiopia: The EnDPoINT project

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Introduction

Podoconiosis, lymphatic filariasis (LF) and leprosy are skin-NTDs that can cause lower-limb lymphoedema (i.e. lower leg swelling). These conditions are common in Ethiopia and pose a significant burden to affected persons, their families and communities, in terms of disability, reduced mental wellbeing, stigma and loss of economic productivity. Simple interventions to support self-care have been shown to reduce the diseases' physical impacts, but evidence is still scarce on how best to scale-up integrated cross-disease morbidity management and disability prevention (MMDP) programs within routine health systems and also how to integrate mental health and psychosocial interventions within these.

Methods

The EnDPoINT implementation research project aimed to address these knowledge gaps by integrating and scaling up a holistic package of physical health, mental health and psychosocial care for persons affected by podoconiosis, LF and leprosy into routine health services in selected districts in Awi zone in the Amhara region in North-West Ethiopia. The project was conducted over three phases: 1) formative work to inform the development of the holistic care package; 2) piloting of the care package in one sub-district in Awi zone; and 3) scaling up of the care package in three districts in Awi zone. Here we present the quantitative findings from Phase 3, in which the effectiveness of the care package was assessed comparing six-month follow-up to baseline using a pre-post design, involving a wide range of physical symptoms, disability (WHODAS 2.0), depression (measured using PHQ-9), alcohol use (FAST), discrimination (DISC), internalised stigma (ISRL), and quality of life (DLQI), at the patient-level and knowledge, stigmatising attitudes and social distance (SDS) at community-level.

Results

221 patients participated at baseline, and 192 (86.9%) at six-month follow-up. Over time, there were significant reductions in limb swelling (-1.96 cm mean circumference; 95%CI -2.23, -1.70; p<0.001), disability (-6.53 mean difference, 95%CI -7.60, -5.46; p<0.001), depression symptoms (-4.92 mean difference; 95%CI -5.87, -3.97; p<0.001), alcohol use (-1.55 mean difference; 95%CI -2.26, -0.83; p<0.001), discrimination (-3.34 mean difference; 95%CI -4.36, -2.34; p<0.001) and internalized stigma (-3.86 mean difference; 95%CI -4.86, -2.85; p<0.001), and significant improvements in patients' quality

of life (-2.03 mean difference; CI -3.42, -0.65; p=0.004). In addition, 826 participants were included in a community survey at baseline, and 821 (99.5%) at six-month follow-up. Over time, there was a significant improvement in community members' knowledge about lymphoedema (0.9 mean difference; 95%CI 0.72, 1.07; p<0.001), and significant reductions in stigmatizing attitudes (-0.69 mean difference, 95%CI -0.86, -0.52) and reported social distance (-1.38 mean difference; 95%CI -1.89, -0.88; p<0.001).

Discussion and Conclusions

This study provides strong evidence that the EnDPoINT care package is linked to improvement in a range of physical health, mental health and psychosocial outcomes in people affected by podoconiosis, LF and leprosy in Ethiopia, as well as reducing stigma in the community towards affected people. We recommend that the care package is scaled up in other contexts, thereby contributing to the improvement of care for people living with these diseases and reducing the burden that these conditions inflict on affected people and communities.

Acknowledgments

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We thank all members of the EnDPoINT Research Consortium for their input into the study, as well as all participants of the study.

Skin NTDs and/or integration – Keywords

Podoconiosis, lymphatic filariasis, leprosy, integration across multiple diseases

Integrated NTD control in Vanuatu

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Background/Introduction

Vanuatu has been implementing mass drug administration (MDA) for control and elimination of multiple neglected tropical diseases (NTDs) since 2000. The country achieved lymphatic filariasis (LF) elimination in 2016 and certified as trachoma free in October 2022.

However, NTDs such as scabies, yaws and soil transmitted helminths are still endemic and of public health importance.

In partnership with the Pacific Integrated NTD Elimination Project (PINE), we aim to conduct (i) two rounds of integrated mass drug administration targeting yaws, scabies, and soil-transmitted helminths (ii) health system strengthening through screening and referral of skin diseases to the primary health care system and (iii) implementation of integrated skin disease training for health care workers.

Methods

MDA with ivermectin and albendazole took place in Tafea (pop 37,000) in Nov 2021 and Sanma (pop. 38,000) in Sept 2022. Azithromycin was delivered to the suspected yaws cases and close contact only during this MDA given that there was insufficient supply, although it had been the plan to include it in the MDA. In Tafea there was a subsequent community MDA with azithromycin in July 2022 in the communities where confirmed yaws cases were reported during the 2021 MDA.

In both provinces we conducted an integrated NTD prevalence surveys at the time of the MDA, in a subset of communities. In those villages participants were asked to provide a stool sample and were examined for the presence of scabies.

We also linked the MDA campaigns to the health system. In parallel to MDA activities, we trained healthcare workers (HCWs) to screen participants who self-reported yaws or leprosy and refer those cases to the health system.

Additionally, we piloted and adapted, based on feedback from participating nurses in Vanuatu, an integrated skin diseases training for skin NTDs in 3 provinces. Unlike typical training, which is often didactic and based only on information delivery, this training takes a participatory, scenario-based, and peer-to-peer approach.

Results

In Sanma we reached 37,500 people and distributed 35,200 ivermectin, 31,100 albendazole, 4000 azithromycin and 3,400 permethrin cream. Our coverage for the MDA campaigns was 70-90% depending on the province.

In Sanma, a total of 127 people were referred to the primary health care system for follow up after a month of the MDA. Outcome of the follow up shows all suspected and confirmed yaws cases and scabies were healed.

Prevalence surveys found a prevalence of scabies of 14% in Tafea and 3% in Sanma. STH were common, with the following prevalences: *Ascaris lumbricoides* 48% in Tafea and 11% in Sanma; *Trichuris trichuria* 44% in Tafea, 6% in Sanma; hookworm 24% in Tafea and 10% in Sanma.

We improved the capacity of 97 nurses and healthcare workers to identify, diagnose, treat, and report cases of skin diseases across the country. The level of participants' knowledge of diagnosing, treating, and referring scabies, yaws, and leprosy (n=86 survey respondents) increased. There was a 30% increase in knowledge to diagnose, 32% to treat, and 37% to refer scabies. All participants have installed the SkinApp mobile application and are using it for their daily OPD diagnosis on any suspected NTDs and skin diseases. The monthly reporting established for the health workers to submit as a monitoring tools. Since the introduction to ISD training and creation of NTD ISD Messenger chat group there has been very active communication among health workers using this platform.

Free distribution of data for the health workers to be able to use for accessing SkinApp on their mobile, gather feedback through NTD messenger platforms and submitting their monthly NTD data, receiving NTD news and update through NTD Facebook page and

NTD webpage was created to ensure easy access for public on the NTD and MDA information.

A pediatrician based in the main referral hospital will be assisting the program to address the skin diseases clinical queries via the messenger platform.

Discussion

Overall the NTD program has successfully completed MDA campaigns on both provinces despite the global pandemic and confusions in general public. Lack of azithromycin precluded this medication being included in the MDA as originally planned, however we managed to conduct MDA in the communities where cases had been confirmed in Tafea. Our approach to integrated prevalence surveys also allowed to use the same visits to conduct scabies and STH baseline assessments against which we can measure impact of the MDA once the program is completed. Our model of participatory training was well received and effective.

Way forward

To improve the MDA coverage, we will do high level advocacy on the MDA campaign and strengthen risk communication strategy. There is the need to make sure that sufficient supplies of rapid test and drugs arrive timely in the country. We also need sufficient funding for implementation and advocacy of MDA, case investigation and response. Finally there is a need to strengthen the clinical diagnosis and health workers communications.

Conclusions

NTDs are often addressed in siloed programs parallel to the health system. Vanuatu challenged that by successfully integrating skin NTDs through strengthening services, community-based MDA, and outreach with an integrated high-impact campaign.

Link to all the platform mentions:

- Ministry of Health webpage: www.moh.gov.vu
- MOH- Health promotion Facebook page: https://www.facebook.com/HealthPromotions-Vanuatu-1674266679566197/
- NTD Facebook: https://www.facebook.com/groups/696941321398436/
- NTD messenger groups: SANMA MDA, TAFEA MDA, ISD training of trainers, NTD Sanma Survey for operation communication, reporting, feedback, supplies etc
- NTD webpage: http://igovdev/ntd/ or http://10.255.134.80/ntd/

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Integrated management and control of skin-related neglected tropical diseases in Ghana in 2022

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The skin-related neglected tropical diseases (skin-NTD) programmes carried out several case-searches and treatment activities for cases and their contacts in 2022.

Trained teams of healthcare workers (HW) and volunteers carried out active case searches in 450 hard-to-reach areas (HTRC) in 15 districts as follows: 10 HTRCs quarterly for 3 quarters in each district, aiming at >90% coverage. Approaches included house-to-house and school screening. Out of a total of 68,185 persons screened, a total of 4,802 individuals were suspected for a skin-NTD – 109 for Buruli ulcer; 79 for leprosy; and 4,505 for yaws. From these 4,802 suspected cases, 74 (67.9%) were tested for BU with PCR, whilst 18 (22.8%) and 169 (3.8%) were eventually confirmed as leprosy and yaws respectively for treatment.

Trained teams of HW and volunteers also visited homes of confirmed yaws cases from the 2018 and 2019 district-wide active case-searches and HTRCs, to screen contacts for skin-NTDs and treat contacts of confirmed yaws cases with Azithromycin. Contacts of the 384 confirmed cases in 2018/2019 and 169 confirmed cases in the HTRCs and additional contacts of 83 (1.7%) newly confirmed yaws cases during this Total Targeted Treatment (TTT) were screened, tested, and treated with Azithromycin. In all 5,027 contacts were reached for the 643 confirmed cases, giving a Case/Contacts ratio of 7.8:1.

Total Community Treatment (TCT) was subsequently undertaken in communities recording more than five confirmed yaws cases during prior activities. 61 communities in 9 districts benefited from mass administration of azithromycin (MAA). 31,009 of the 34,098 population were registered from 5,420 households for MAA, out of which 28,219 received treatment with azithromycin giving an overall coverage of 91.0%. Out of the 2,790 not given Azithromycin, there were 828 refusals and another 859 were excluded due to pregnancy, illness or being under-age. Regarding communities, ≥80% therapeutic coverage was achieved in 52 (nearly 70%), out of which 42 were above 90%, whilst the therapeutic coverage was below 80% in 9 communities.

In the two highest leprosy-endemic regions (Upper East and Upper West), contacts of historical detected cases from Jan 1, 2017, to Dec 1, 2021 were screened by trained teams of healthcare workers for leprosy and other skin-NTD, and single dose rifampicin administered as chemoprophylaxis to all consenting contacts. A total of 253 out of 359 (70.5%) historical index patients were geo-localized with 3,250 contacts initially listed. An additional 1,616 contacts were reached during the subsequent campaign phase. Out of the total contacts listed, 4,714 (96·9%) were examined. Of those examined, 4,544 (96.4%) met the inclusion criteria, and 3,822 (84.1%) were administered SDR during the campaign. There were 5 (0·11%) refusals, and no serious adverse events were reported.

Following reports of an unusual increase in the number of suspected yaws-like lesions in a previously non-endemic district for cutaneous leishmaniasis, teams of trained healthcare workers investigated this outbreak using the skin-camp approaches, during which persons presenting with ulcers were screened and samples taken for PCR confirmation in the last quarter of 2021. The results showed that most of the ulcers were likely due to cutaneous leishmaniasis with many cases of co-infection with *haemophilus ducreyi* and/or yaws. Based on these findings, the GHS in collaboration with scientists from the Noguchi Memorial Institute for Medical Research (NMIMR), and with support from the WHO in 2022 subsequently carried out a survey of selected communities in the Oti regions, which findings will be presented in a separate abstract.

Acknowledgments

Anesvad for Integrated Skin-NTD Project (HTRCs, TTT, TCT)
American Leprosy Missions (MUDPEP)
CL Survey (WHO)

Skin NTDs and/or integration – Keywords

Active case search, contact screening, total targeted treatment, total community treatment, chemoprophylaxis

Session 2 : Integration at country level – Posters

Managing skin NTDs and NCDs co-morbidity: Lessons and challenges

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Neglected tropical diseases (NTDs) are a diverse group of diseases and conditions which are prevalent in subtropical and tropical regions and thrive in resource-challenged contexts. Many NTDs have debilitating impact on affected persons, sometimes leading to death, impairments, or irreversible disability that result in psychological trauma and social stigmatization. Lymphoedema and hydrocoele are complications of lymphatic filariasis (LF) which could initiate co-morbidity with non-communicable diseases (NCDs) due to reduced mobility, stigma, feelings of shame, and depression.

The objectives of the study were to assess the experience and co-morbidity of NCDs among community members who benefited from hydrocoele surgeries in two districts in Abuja, Nigeria and to explore a functional pathway for managing NCDs referral within the health system.

A retrospective study was conducted using patients' (74 patients) fasting blood sugar (FBS-mmol/l) and blood pressure (B.P - mmHg) data collected prior to scheduled hydrocoele surgeries in two health facilities in FCT in 2021 (n=44) and 2022 (n = 30). In addition, in-depth interviews were conducted with randomly selected hydrocoele patients during programme monitoring.

From the health facility database twenty-six (35%) patients presented with blood pressure above 120/80 mmHg (Range- 130/100 -200/120 mmHg). Similarly, deranged blood glucose was found in 22% patients (ranging from 6.1 mmol/L to 8.8 mmol/L). The chance of developing these conditions was also associated with patients' age and duration of complications from LF with the average age and duration of living with LF morbidity being 47 years and 5 years respectively.

The patients identified with these conditions were referred within the health facility for further assessment and management before they were scheduled for the hydrocele surgery.

Responses from in-depth interviews revealed that persons affected by hydrocoele experienced shame, depression and social exclusion, thus requiring psychosocial support intervention.

LF morbidities and NCDs affect the same individuals in these areas. Developing integrated approaches and policies for the control and management of communicable and non- communicable diseases will facilitate efficient management of patients presenting with both conditions. This approach should also focus on building the capacity of health workers and ensure timely diagnosis and follow-up mechanism.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Lymphatic filariasis, Morbidity Management and Disability Prevention (MMDP), integration, comprehensive

Is scabies a problem among inmates in a Ghanaian prison?

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Introduction

Scabies is known to be common among the poor and vulnerable persons living in overcrowded conditions as exists in prisons. There has been no prior assessment of scabies situation among Ghanaian prisoners. We aimed to contribute to the data on scabies burden in Ghana and assess the scabies situation among prisoners who often have limited access to healthcare.

Methods

Written informed consent was obtained from all participants provided. Written permission was also obtained from the authorities of the Kumasi Central prisons and Ethics review committee (CHRPE/AP/671/19 and AP/829/22). The prison has a population of 1906 of which 20 are females. Prisoners were contacted within their cells and informed about the assessment and consent sought. Every third prisoner within a cell who provided informed consent was enrolled. Demographic and clinical details were recorded with the aid of a REDCap based questionnaire. A standardised skin examination of exposed regions of the body was performed on all participants. All examinations were performed within the infirmary of the prison. Scabies was diagnosed based on the criteria of the International Alliance for the Control of Scabies (IACS) and treated per national guidelines.

Results

Overall, 559 participants were randomly recruited and 66% were found to have clinical scabies as assessed by the IACS criteria. 209 participants had burrows and 98.9% of participants with clinical scabies had rash typical for scabies Only 96/559 had treatment for scabies in the preceding months and only 21% of these were disease free at the time of assessment. Scabies severity was mostly mild. Thirteen percent had impetigo (44.4% very mild; and 44.4% mild). Impetigo was found in 16.8% of participants with scabies and 5.2% of those without scabies [RR 6.7 (95% CI 3.2-13.9)].

Contact history was positive in 100% of participants with scabies.

The median number of people in a cell was 115. Almost all participants, both with and without scabies, had positive contact history.

Discussion/ conclusion

The prevalence of scabies was extremely high. The lack of a systematic approach to scabies treatment led to recurrence and ongoing spread in the prison. Alternative strategies such as Mass drug administration may be required to contain outbreaks early in such settings. The conditions in the prison may impact the test characteristics of clinical diagnosis of scabies using the IACS criteria.

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Skin NTDs and/or integration – Keywords

Skin NTDs, scabies

Use of telemedicine to connect researchers and research centers on leprosy in Brazil

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The goal set by the World Health Organization (WHO) of zero leprosy by the year 2030 requires integrated efforts and a holistic approach. Brazil is known to be one of the most endemic regions in the world for this disease and despite governmental and non-governmental efforts leprosy remains a sad reality. In leprosy, there are still major challenges and unmet needs in terms of diagnostic tests, late recognition by health workers of reactional states and the search for new treatments among others. An obstacle to achieving the goals by 2030 is the lack of communication between universities, medical residencies, research centers and researchers in Brazil and an integration at different levels has been pointed out as a solution. Creating an atmosphere that encourages communication between researchers and research centers from different regions of Brazil should also be part of the strategy.

During 2022, in a leprosy reference center in South Brazil - Hospital de Dermatologia Sanitária do Paraná HDSPR, a project has been developed that encourages an ecosystem of exchanges of ideas between geneticists, immunologists, leprosy specialists and the third sector to create an environment of innovation and stimulus to research. Due to the ease of interaction through monthly hybrid meetings with low-cost strategy such as Google Meets, researchers from both the basic and specialist's areas could interact, exchange experiences, explain what they were currently working on and learn together.

The results of this initiative could already be noticed after evaluation questionnaires were applied to the multidisciplinary team including resident physicians in dermatology training and non-researchers after every monthly meeting, which pointed a genuine increased interest and motivation of the audience to commit with the leprosy effort goals.

The target established by the WHO is challenging but necessary and in addition to the important national training programs for health professionals in the clinical recognition of leprosy and in self-care and rehabilitation guidelines, it is necessary to increase the interaction of different researchers in the most different regions of the country and turn these research projects into practical actions that can bring increasingly real benefits in terms of diagnosis, treatment and rehabilitation.

In conclusion, it is necessary to combine the most different efforts to reach the proposed goals for 2030 and connect all those involved through education and research. The presented initiative can be amplified and help to encourage new professionals to get involved with leprosy.

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Hospital de Dermatologia Sanitária do Paraná multidisciplinar team

Skin NTDs and/or integration – Keywords

Leprosy

Integrated control of skin-related neglected tropical diseases in the sub-prefecture of Chiépo, Côte d'Ivoire

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Introduction

Côte d'Ivoire in West Africa is endemic for 12 neglected tropical diseases (NTDs) including 6 skin NTDs.

The World Health Organization has recommended integration strategies for effective control of NTDs including integrated screening for skin diseases, water, sanitation and hygiene (WASH) strategies, and strengthening of the health system.

Chiépo, a sub-prefecture of 31 006 inhabitants located in the department of Divo in the south of Côte d'Ivoire is co-endemic for several NTDs. Under the aegis of the National Buruli Ulcer Control Programme and the National Leprosy Elimination Programme, we conducted action research incorporating the integrated screening of skin NTDs, WASH interventions and the strengthening of health infrastructures to prevent, curb or control skin NTDs by strengthening basic WASH services

Method

Three-stage action research:

- A baseline survey to identify priority problems.
- Interventions adapted to the context, including integrated screening campaigns, the construction/rehabilitation of WASH infrastructures and IEC for behaviour change.
- A final evaluation

Results

The baseline survey revealed co-endemicity with leprosy, Buruli ulcer (BU), and yaws; poor knowledge of NTDs specifically skin-related NTDs; and relatively low WASH indicators (health centre: no water or sanitation service; schools: no water, sanitation or hygiene service; households: 10% of households consumed water from an unimproved source). In addition, the prevalence of soil-transmitted helminthiasis was 2.97% among schoolchildren and the health infrastructure was in an advanced state of disrepair, reflecting the population's inadequate access to basic health services.

During the campaigns, 1 case of multibacillary leprosy, 11 cases of yaws positive on DPP, 30 cases of scabies and 964 cases of other dermatoses were detected.

The interventions also resulted in the installation of a drinking water supply system at the health centre, 14 latrines, and 17 hand-washing devices, the rehabilitation of 7 boreholes, and improved access to basic health services.

The final evaluation revealed an increase in the indicators, from 10% to 68.3% for the use of improved water sources for drinking water; from 4.0% to 21.2% for the proper transport of water between the catchment and the home; and from 74.0% to 87.9% for the possession of improved latrines at the household level. In short, the interventions enabled the population to adopt healthy-lifestyle attitudes and practices.

Conclusion

This action research has brought about a significant increase in WASH indicators thanks to IEC and the construction/rehabilitation of infrastructure. However, knowledge of NTDs still needs to be improved.

Acknowledgements

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Skin NTDs and/or integration – Keywords

WASH, Chiépo

Integrated screening for skin-related neglected tropical diseases in rural areas of Mono and Couffo departments in southern Benin, 2021-2022

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Introduction

Skin-related neglected tropical diseases (NTDs) can lead to functional and aesthetic sequelae if diagnosed and treated too late. Rural areas, although highly endemic for skin NTDs, often lack health workers qualified in dermatology. The aim of this study is to describe the epidemiological profile of skin NTDs and other dermatoses diagnosed during integrated screening in rural areas in the departments of Mono and Couffo in southern Benin.

Method

This was a descriptive cross-sectional study conducted between November 2021 and November 2022 in community settings in rural areas in the departments of Mono and Couffo in southern Benin. 189 villages were selected in different communes of these departments on the basis of their known endemicity from previous data from the National Leprosy and Buruli Ulcer Control Programme for the skin NTDs listed. The study population consisted of schoolchildren and adult volunteers who agreed to be screened. The selection of targets was effective thanks to two techniques: information disseminated by public criers and screening household-by-household with the support of health facility managers and local authorities. The subjects recruited were examined by a multidisciplinary team made up of a dermatologist, a general practitioner, nurses and nursing auxiliaries. Diagnosis of skin NTDs was clinical. The data collected was recorded on a pre-established collection sheet and then analyzed using Epi-info 7.2.5.0 software.

Results

A total of 3395 participants were examined. Dermatosis was diagnosed in 2808 participants (82.7%) of whom 820 (29.2%) had skin NTDs. The skin NTDs encountered were scabiosis with a prevalence of 29.13% (818/2808), leprosy with neurological sequelae 0.03% (1/2808) and onchocerciasis at the blindness stage 0.03% (1/ 2808). No cases of Buruli ulcer, yaws, mycetoma, or other deep fungal mycoses were detected. Schoolchildren were the most affected in the skin NTDs group (45.36%, 372/820). Among the other dermatoses, there were 1988 cases of fungal infections (i.e. 70.8%), including 43% of ringworm of the scalp (855/1988), 26.35% of pityriasis versicolor (524/1988), 22.08% ringworm of the hairless skin (439/1988), and 7.59% cutaneous candidiasis (151/1988). Patients with dermatoses were treated and followed up in routine consultations at a specialized facility. The other patients were referred to the nearest health facilities.

Discussion and conclusion

The study showed that scabiosis was the most common skin NTD in rural areas and that cases of Buruli ulcer and leprosy were decreasing in these departments, which were formerly highly endemic for these conditions. The remaining infectious dermatoses were fungal in nature. In general, infectious and contagious dermatoses predominated in our study. This shows the usefulness of integrated screening and a qualified team for the early diagnosis and effective management of dermatoses. The integrated screenings provided an opportunity to dispense advice on preventing skin NTDs and disseminate educational information, raise awareness and drive behaviour change.

Acknowledgements

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Skin NTDs and/or integration – Keywords

Neglected tropical disease, scabies, rural settings, Benin

Integrated screening for skin-related neglected tropical diseases in Ouémé and Plateau departments, Benin, 2018-2020

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Introduction

The World Health Organization has recommended integrated strategies for the control of skin-related neglected tropical diseases (NTDs). We report the results of the mobile consultations carried out in the departments of Ouémé and Plateau, Benin, between 2018 and 2020, in the context of implementing an integrated approach for early detection and treatment of skin NTDs.

Method

This was a descriptive cross-sectional study conducted in the departments of Ouémé and Plateau in Benin between 2018 and 2020. The sites that hosted the mobile consultations were selected by informed choice on the basis of epidemiological data available from the National Leprosy and Buruli Ulcer Control Programme (PNLLUB). All persons with a dermatological lesion who presented voluntarily on the day of the consultation were included and examined. The multidisciplinary team that carried out the study was made up of nursing auxiliaries, dermato-leprologist nurses, a biomedical engineer, a general practitioner, dermatologist, plastic surgeon and a public health specialist. . The data was processed and analyzed using Excel 2013 and Stata 11 software. For each confirmed skin NTD case, the geographical coordinates were noted. The maps were generated using ArcView GIS 3.2 software.

Results

5267 patients with various skin conditions attended. The median age was 14 years (Q1= 7 years; Q3= 34 years). In 57.17% (3011/5267) of cases, the patients with skin lesions were uneducated and 91.59% (n = 4824) had a low socio-economic standard of living. Dermatoses of infectious origin predominated, in 74.48% (3923/5267) of all the patients examined. 646 patients (12.27%) presented with skin NTDs.

The skin NTDs screened were dominated by scabiosis in 88.39% (571/646) followed by 37 cases of Buruli Ulcer (5.75%), 22 cases of leprosy (3.41%), 15 cases of lymphatic filariasis (2.32%) and one case of mycetoma (0.15%). No cases of yaws were identified. The other most common dermatological conditions were cases of ringworm (22.71%), dermatophyte infections (18.32%) and impetigo contagiosa (6.19%). All the detected cases of skin NTDs were treated and monitored free of charge either in the community or at the Pobè Leprosy and Buruli Ulcer Screening and Treatment Centre, according to WHO standards. Depending on the seriousness of the case and the availability of suitable technical equipment, the other dermatoses identified were also referred for immediate attention and/or outpatient medical treatment or referral to a specialized facility.

Conclusion

Mobile consultations are an effective solution for integrated screening of a large and varied number of skin NTDs. The epidemiological profile of skin NTDs in the departments of Ouémé and Plateau is dominated by scabiosis, which unfortunately is not yet the subject of a well-defined and coordinated control strategy. This should now be incorporated into the strategies pursued by the PNLLUB.

Acknowledgements

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Skin NTDs and/or integration – Keywords

Integrated screening, skin-related neglected tropical diseases, Benin

Mycetoma and other deep mycoses in Benin: 7 cases treated at CDTLUB between 2018 and 2023

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Introduction

Subcutaneous mycoses are chronic and localized infections of the skin and subcutaneous tissue. This study describes the different types of subcutaneous mycoses that have been treated in leprosy and Buruli Ulcer screening and treatment centers (CDTLUB) between 2018 and 2023 in Benin.

Method

This was a descriptive cross-sectional study that consisted in identifying all cases of subcutaneous mycosis encountered during mobile or routine consultations by the multidisciplinary teams of caregivers from CDTLUB in Benin between January 2018 and January 2023. Diagnosis was based on clinical presentation and also on culture and histopathological examination. The geographical coordinates of patients' places of residence were recorded and maps were generated using ArcView GIS 3.2 software.

Results

7 cases were identified. The median age of the patients was 34 years with extremes of 6 to 60 years. There was a predominance of males (6/7) and 3/7 paediatric cases. The patients were mostly farmers (4/7). Almost all of them consulted and received care from traditional healers prior to their first consultation. The median time before consultation was 36 months with extremes of 8 to 84 months. Most of the patients were from the departments of Plateau (3/7) and Ouémé (2/7). In 5 of the 7 cases, the patients presented disabling sequelae at screening. The extremities were the most common site of involvement. In 4 out of the 7 cases, the lesions were located in the pelvic limbs, followed by the thoracic limb (2/7) and the face (1/7). Histological investigation revealed 3 cases of entomophtoromycosis (basidiobolomycosis), 2 cases of nonmycotic mycetoma due to actinomycete-type filamentous bacteria, and 1 case of histoplasmosis and rhinoentomophthoromycosis, respectively. Specimen culture was not contributory to identifying the pathogens. The actinomycetoma cases were treated with cotrimoxazole, while the other cases of deep mycoses were treated with itraconazole. The medical team had some

problems sourcing itraconazole to manage these cases. Following treatment, the evolution was favorable.

Conclusion

Deep mycoses occur in Benin, albeit rarely. The delay in diagnosis, the lack of identification of the causal species and the difficulties in supplying inputs for the early treatment of cases constitute major challenges for all those involved with the National Leprosy and Buruli Ulcer Control Programme (PNLLUB) . It is essential to raise awareness in the community and train health workers to recognize the early signs and symptoms of this disease. Subcutaneous mycoses must also be taken into account in the policies and strategies of the PNLLUB.

Acknowledgements

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Skin NTDs and/or integration – Keywords

Subcutaneous mycoses, neglected tropical disease, Benin

Opportunities and barriers to healthcare seeking for skin NTDs in Atwima Mponua District in the Ashanti Region of Ghana

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Skin neglected tropical diseases are known to be a global health problem. This study explored the experiences associated with treatment-seeking trajectories of people living with leprosy, Buruli ulcer, and yaws in the area to help develop tailored interventions to improve treatment-seeking outcomes for patients. This study was conducted in Atwima Mponua District in the Ashanti Region of Ghana. Anecdotal evidence and case reports from facilities in neighboring districts suggest that the area is endemic for several skin NTDs, but it has not yet received any major interventions either through research or the health system. The study is part of formative research to inform the development and evaluation of integrated strategies to improve health and wellbeing in those affected by skin NTDs. This is a qualitative study that drew on purposive and snowball sampling techniques to recruit its participants. 33 interviews were conducted with healthcare workers, 7 with Buruli ulcer patients, 1 traditional healer, and 1 school teacher. Seven (7) focus group discussions were conducted with healthcare workers (n=2), adult community members (n=4), and patients (n=1). Ethnographic observations were conducted within places of social networks for patients including homes, therapeutic settings, and neighborhoods. A MAXQDA version 2020 was used to perform a thematic analysis on the data garnered to generate various themes.

We identified opportunities and barriers to care-seeking throughout the patient care pathway. The study demonstrated that the district lacks a dedicated facility to conduct diagnostic and confirmatory tests on skin NTDs. As a result, samples are taken and sent to adjourning districts or the regional capital. In addition, health workers lack adequate training or capacity to detect or diagnose skin diseases when they are presented with them. The district was found to have a cadre of dedicated community-based surveillance volunteers who support healthcare providers but these individuals are not well motivated, resulting in a low level of commitment. We identified that the district does not have any social support systems for people living with NTDs nor mechanisms to provide psychosocial support to patients. These gaps contribute toward patients losing trust in the formal healthcare system thereby increasing treatment-seeking from other care systems such as traditional healers, herbalists, and drugstore operators.

We recommend that strategies are adopted to improve intrinsic motivation of healthcare workers, in addition to ensuring adequate compensation as well as training them in skin NTDs detection and diagnosis to help improve healthcare-seeking outcomes for patients in the area and the country at large. In addition, strategies are required to provide psychosocial support to patients. Social support systems have to be instituted in the district to help take a burden off patients and potentially increase treatment compliance with a resultant effect of improved treatment outcomes.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Leprosy, Buruli ulcer, and yaws

Lessons learnt from history, a long way from a vertical to an integrated approach to skin NTDs: the case of yaws

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Colonial medical knowledge and health practices for the treatment of yaws have influenced the long-term approach to the disease. In regions under European domination, especially in Africa, the 1920s and 1930s mass campaigns against tropical diseases, mainly trypanosomiasis and yaws, were based on racist, brutal and vertical approaches. After the World War II, The WHO/UNICEF global treponematosis control programme (1952-1964) resulted in a significant decrease in cases. However, the implementation of treponematosis control campaigns in colonised territories was based on vertical practices. This may have been one of the factors in the failure to eradicate yaws at that time, as populations were fleeing colonial agents. Some vertical methods in treponematosis control persisted in the following decades. More recently, an integrated approach has been considered, as the social, cultural and historical dimensions are crucial today to reach a more global health.

Based on an interdisciplinary reflection, our work aims to provide insights into the influence of history on today's challenges around the control of yaws, as an example of skin NTDs, in its integrated approach. Combining historical data (archives, medical literature since 1900 and old movies) and medical expertise allows such aspects to be developed. The presentation will include the screening of a short extract from an old film in order to open the discussion on the challenges raised.

Our research describes the long path from vertical to integrated approaches based on the history of yaws in sub-Saharan Africa. We show that past medical knowledge on yaws, but also others tropical diseases, has influenced the social representation of skin NTDs until today. For instance, in the early 20th century an "exotic" form of syphilis was described, probably to minimise the health problem in colonies, stating that syphilis was a "benign skin disease" for African and Asiatic populations. The same discourse was held with regard to yaws. Low access to antibiotic treatment and the vulnerability of populations, especially young children living in rural areas, have maintained the neglect of the infection. Nowadays, yaws diagnosis procedure (clinical, biological) is not perfect, leading to over-diagnosis or under-diagnosis. Lack of funding and insufficient epidemiological data can be seen as a cause or a consequence of this situation.

Our work identifies factors that have negatively affected yaws control, allowing for a better understanding of both the minimisation of skin NTDs and their social dimensions. These historical insights highlight some crucial aspect of integrated approach of yaws today.

Acknowledgments

Swiss National Science Foundation – Sinergia project "Neverending infectious diseases"

Skin NTDs and/or integration – Keywords

Yaws, treponematosis, history, images of the diseases, social representations

Alleviating the burden from Skin diseases of affected People to improve Inclusion, Restoration and Empowerment: ASPIRE Project

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People living in Bihar State, India are exposed to heightened risk of many skin-NTDs. This includes mainly leprosy, lymphatic filariasis (LF), post-kala-azar dermal leishmaniasis (PKDL), cutaneous leishmaniasis (CL), scabies, and several fungal manifestations. Unreliable baselines, delayed diagnosis, stigma and discrimination associated to those chronic conditions, and poor socio-economic determinants are common problems associated with these diseases. Currently, only leprosy, LF and PKDL have formal protocols for disease control and management in India. However, these diseases are still far from being controlled and 2030 progress measurements are challenged by unreliable baselines and limited resources. For the most part, there are no quality routine surveillance systems in place and no disease management approaches for chronic manifestations, putting the burden on patients and their families.

The ASPIRE project is currently being implemented in the high skin-NTDs prevalence Jamui district of Bihar State, with over 2 million population. This is an innovative pilot project that tests an operational and scalable model, integrating the diagnosis and management of five skin-NTDs (leprosy, LF, PKDL, CL and scabies) and fungal diseases, for accelerating the achievement of WHO 2030 targets in the state of Bihar, India. Key project components include integrated active case detection (ACF) activities, progressive health system mainstreaming as well as coordination approaches, and a holistic community model, through community-based groups (CBGs), that aims to enable the empowerment of people affected, and to catalyze their physical health, mental health, and socio-economic outcomes. Impact will be measured at mid-term and end-line through a cohort study with nested cross-sectional studies.

Formative learnings revealed the importance of considering local contextual factors, sustainability and validated approaches when defining, ACF, primary healthcare (PHC) training, and community protocols. Initial learnings also suggest that impact of disease control and management efforts can be maximized by investing in supervision, monitoring and referral mechanisms at all levels. In addition, initial ACF activities and clinical diagnosis by trained PHC medical officers, indicated that the endemicity of some diseases, like leprosy, scabies, and LF, was far higher than what had been documented in recent reports. Finally, formative and baseline findings have also demonstrated the need to address the physical health, mental health, stigma and other socio-economic factors of people affected through holistic and coordinated models, bringing together both the community and the health system.

In conclusion, and although the ASPIRE project is still being implemented, initial findings are encouraging and we found great potential for a short-term scalability in neighboring districts by sustaining case detection activities in coordination with government officials, by strengthening health systems from the bottom up, starting at community level, by harmonizing essential care packages at different levels of care, and by providing ongoing technical support, as needed.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Leprosy, lymphatic filariasis, post-kala-azar dermal leishmaniasis, cutaneous leishmaniasis, scabies and fungal diseases

Scabies, as entry points to demonstrate the feasibility of community-based interventions for skin neglected tropical diseases

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Neglected tropical diseases (NTDs) are diseases that are endemic in most low and middle income countries where poverty is prevalent. Within the cluster of NTDs, skin NTDs relate to dermatological diseases, either as the primary presentation or as a related clinical feature. Skin NTDs often present with disfigurement, physical disability, stigmatization, discrimination, and psycho-social suffering. WHO promotes integrated and community-based approaches to control NTDs

The overall aim of this review is to generate critical evidence for community-based interventions of skin NTD. We use scabies as a model for diseases that are amenable for Preventive Chemotherapy.

In 2015 to address a large community-based outbreak in a country with critical shortage of mid and higher-level health professionals, we designed training to health extension workers (HEW) to control the scabies outbreak. HEWs screened the largest number of cases (1,125,770 people) in one month. We also documented the largest number of scabies cases (379,000), ever reported in the literature. A validation study to evaluate the effectiveness of the task shifting for the diagnosis of scabies concluded that the specificity of the diagnosis of scabies by the HEWs was 98.3%. Fifteen months after the scabies MDA campaign, we performed an impact assessment study which showed the efficacy (91.1%) and feasibility of MDA for scabies control in a large community.

In another follow up study, we documented a much wider experience of a coordinated response of the Ministry of Health of Ethiopia and the Amhara Regional Health Bureau to control the scabies outbreak. Using the routine monitoring data of the population-based scabies screening, campaign organization and MDA administration we described a) numbers screened and identified with scabies, b) treatment category and drug type and c) human resources used, duration, and cost of the campaign. The campaign was performed in 6 days, close to 15.000 HEWs and community volunteers were mobilized for the MDA implementation, costing about 1.29 USD per person screened. In total about 9 million people were screened, with 875,890 (9.7%) scabies cases and 995,471 (11.0%) contacts identified. Following this, 1,738,304 (93%) cases and contacts received scabies treatment.

The key recommendations from these studies were firstly that community-based data serve as reliable indicators for community-based burden assessment of the scabies outbreak. Secondly, this study also provided a good basis for advocating the use of community health workers for clinical diagnosis of scabies using an algorithm with a simple combination of signs and symptoms in resource- poor settings.

In conclusion, in the absence of trained physicians, transfer of clinical tasks to primary health care workers for the commonest skin conditions is essential.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Decentralization of skin NTD, operational research, population-based prevalence, community health workers, mass drug administration

Session 2 : Integration at country level – Other abstracts

Effect of a community-based integrated holistic care package on physical and psychosocial outcomes in people with lower limb disorder caused by lymphatic filariasis, podoconiosis and leprosy in Ethiopia

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Background

Lymphatic filariasis, podoconiosis and leprosy are highly stigmatised neglected tropical diseases. Morbidity management and disability prevention services have been shown to reduce their physical impacts, but little is known both about how to scale-up interventions or address the psychosocial-mental wellbeing needs of patients.

Methods

The EnDPoINT study is a three-phase implementation study that aims to address current knowledge gaps by assessing the impact of a holistic care package integrated into the Ethiopian health-care system on physical and psychosocial outcomes for people with lymphatic filariasis, podoconiosis and leprosy. In this paper, we present the quantitative results from Phase II of EnDPoINT where the effectiveness of the care package was assessed in a pilot district in the Amhara region of northern Ethiopian using a quasi-experimental pre-post design.

Results

Two-hundred and fifty-one participants were recruited. Improvement 12-months after initiation of the care package were seen in both physical and psychosocial outcomes. Significant improvements were notified in limb swelling (mean difference in lower limb circumference -2.0 cm; $p<0.001$), disability (mean WHODAS II-11.0; $p<0.001$), and signs of infection (aOR 0.08; $p<0.001$). Significant improvements were also observed in quality-of-life (mean difference in adjusted DLQI score -7.2; $p<0.001$), depression (mean PHQ-9 score -7.2; $p<0.001$), and stigma and discrimination (mean difference in DISC-12 score -3.2; $p<0.001$).

Conclusion

This study provides evidence that the EnDPoINT care package is effective in improving the physical and psychosocial health of people living with LF, podoconiosis, and leprosy in northern Ethiopia. We recommend scale up to other endemic districts in Ethiopia and other endemic countries.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Leprosy, podoconiosis, lymphatic filariasis, NTD, disability, quality of life, stigma, discrimination, and mental wellbeing

Mycetomas in Mauritania: An NTD apart

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Recognized by WHO as a neglected tropical disease (NTD), mycetoma is a chronic inflammatory tumour, of progressive evolution, producing grains whose colour is indicative both of the etiological diagnosis and the modalities of management. Mycetomas occupy a special place within the NTDs observed in Mauritania and many challenges concern this condition at the epidemiological, diagnostic, prognostic, preventive and therapeutic levels.

A retrospective study of this disease was carried out at three health facilities in the capital between January 2016 and January 2019: the National Hospital Centre (63 patients), the National Public Health Research Institute (17 patients) and Nouakchott military hospital (7 patients).

None of the 87 patients concerned had ever been referred by a health facility in the interior of the country. The average age of the patients was 41.8 years and their professional activity was related to traditional agricultural work. In more than half the cases the lesions occurred on the feet (78.16%) and, although painful, did not result in cessation of professional activity. The emission of grains was noted in 73.5% of cases with a predominance of black grains in 46.87% of cases.

The diagnosis of mycetoma was confirmed by histopathology in 95.7% of patients. Black grains were observed in 46.87% of cases and surgical treatment was usually initiated without prior medical treatment. 8 patients refused amputated of a lower limb and 29 others or 33.33% were lost to follow-up treatment.
This study confirmed the specificity of mycetoma within NTDs in Mauritania and identified several challenges.

Epidemiologically, the patients were all from the south of the country where there are no facilities with the capacity to carry out a mycological or histopathological diagnosis.

No patient was referred by a peripheral health facility, which highlights the lack of knowledge of this condition as well as the weakness of the referral system.

The refusal by 8 patients to have their lower limb amputated is explained by the chronicity of this condition and the patients' low socio-economic status which compels them to carry on their professional activity.

The high cost and the duration of the treatment are reasons why a large number of patients are lost to follow-up.

Treatment is limited to hospitalization and does not include the long-term or outpatient interventions which are often necessary in the event of mycetoma.

An epidemiological study would make it possible to assess the extent of the problem. This should be the prelude to a control programme combining prevention activities, the training of health workers and the establishment of mechanisms for diagnosis and management of these conditions, possibly with recourse to telemedicine.

An improvement in the referral system would allow for better follow-up of patients seen in Nouakchott and reduce the number of patients lost to treatment.

The greater frequency of black-grain mycetoma should stimulate therapeutic research at the national level and in collaboration with international stakeholders.

Skin NTDs – Keywords

Neglected tropical diseases, mycetoma, Mauritania

How can existing community based maternal and child health programs and structures be operationalized to enable community awareness, case detection and community-based rehabilitation for leprosy and lymphatic filariasis, in Nepal?

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Introduction

The NTD roadmap 2030 identifies two main cross-cutting approaches to tackling their burden, '*mainstreaming into Health Systems'* and '*coordination with relevant programs*'. One program that has made significant progress in recent years in Nepal, is maternal and child health (MCH). Three key activities that have driven progress in Nepal with MCH are strengthening of primary health care centers, establishment of community directed interventions and sustained knowledge diffusion through mothers' groups. There is growing evidence in how NTDs disproportionately affect women and children in Nepal. Not only during pregnancy due to anemia and iron deficiency but over the life-course for socio-cultural reasons and the stigma it causes. Therefore, identifying pathways through which MCH programs and engaging women can lead to effective interventions tackling NTDs, is critical.

Methods

Qualitative operations research to describe and identify an every-day phenomena within the existing FAIRMED program, was conducted, in Kapilvastu district, southern Nepal. This qualitative descriptive methodology in essence aimed to attain a "comprehensive summary of an event in the every-day terms of those events". Through focus group discussions and interviews, by asking, probing, discussing and continuous reflection, the study gathered information from key community actors and local health leadership. A total of 24 interviews and 4 FGDs were conducted.

Findings

Community Awareness: Trained community health volunteers (FCHV) disseminate NTD awareness messages through the mothers' groups meetings and their community visits. The mothers then become key channels through which awareness further spreads within the community.

Case detection: The FCHVs play a key role in various other health campaigns (immunization, Vitamin A, NCD camps) and are visiting door to door most of the community members within their catchment areas. Opportunistic screening and initial suspicion of leprosy or lymphatic filariasis is done through this. Another point of intersection is during the ANC visits from pregnant women to their local health post. This is when the NTD-trained nurse midwives, who conduct the ANC check-ups, also screen the women for NTDs endemic in that region. Another intersection happens when the NTD-trained auxiliary health worker (AHW), visits the community once a month, during outreach camps. During these outreach clinics the AHW screens for leprosy and lymphatic filariasis. Once suspected, they are referred to the health post for further confirmatory processes.

Community based rehabilitation: Those identified with disabilities or physical impacts from the NTDs, are provided with self-care training by the trained health workers and FCHVs. The affected persons are also provided with supportive supervision on self-care by trained health workers and social mobilizers in the community, often in their homes.

Challenges: Multiple challenges were identified: lack of training of all health workers, inadequate human resources, lack of community awareness, stigma and discrimination and difficulty with initiating, completing treatment and loss to follow-up.

Conclusion

The study results revealed that integration of NTD and MCH can been operationalized through clinical and community case detection and community awareness using existing MCH structures such as ANC clinic and FCHVs. Challenges do remain at each integration layer that needs to be systematically addressed.

Acknowledgments

People affected by leprosy and lymphatic filariasis
Epidemiology and Disease Control Division, EDCD, Government of Nepal
Ministry of Health, Lumbini Province and Province 1
All health workers
Various local Civil society Organizations
FAIRMED Nepal
FAIRMED Switzerland

Skin NTDs and/or integration – Keywords

Integration between leprosy and lymphatic filariasis, integration of leprosy and lymphatic filariasis with maternal and child health programs

An innovative integrated approach to screening for skin-related neglected tropical diseases in three provinces of the Democratic Republic of the Congo

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Introduction

Neglected tropical diseases (NTDs) are a set of preventable and curable diseases affecting the most vulnerable populations and 1.5 billion people worldwide, approximately 40% of whom live in Africa. These skin NTDs include leprosy, yaws and Buruli ulcer (BU).

Although DRC is situated in the belt of countries endemic for yaws and BU, national statistics show that these diseases are under-diagnosed and therefore treated. Indeed, only 17 cases of yaws and 99 cases of BU were detected and treated nationwide in 2018.

To improve the detection and management of these skin NTDs in DRC, our study proposed to test a strategy adapted to the context of DRC by using certain technological innovations.

Method

This was a multicentre randomized community trial that ran from 2020 to 2022 in 3 DRC provinces selected on the basis of historical co-endemicity for leprosy, yaws and BU. Two co-endemic health districts were selected in each province, including Pawa and Wamba for Haut-Uélé Province, Kimpese and Nsona-Mpangu for Central Kongo, and Kasongo and Lusangi for Maniema. Six co-endemic health areas were then identified per health district and randomized using the "random" function of the Excel software into "intervention health areas" and "control health areas". The intervention consisted in the use of skin-NTD integrated posters for awareness-raising, Skin App software for diagnostic assistance, and Kobocollect to collect and transmit data to the central offices of the health districts in the 18 intervention health areas. In the 18 control health areas, routine work continued without integrated NTD posters, Skin App or Kobocollect. All subjects presenting with suspected signs of neglected tropical diseases with targeted case management, and voluntarily agreeing to participate, were included in the study.

Results

The data showed that historical co-endemicity for the three targeted skin NTDs was reconfirmed in all three provinces. Except for leprosy which was less frequently detected in the intervention areas, BU and yaws accounted for the majority of the total number of cases detected compared with the control areas. Furthermore, comparison with the 2018 baseline data for the targeted health districts (intervention and control) in the 3 provinces studied showed a significant increase in yaws and BU cases.

Conclusion

The results of the first experience of integrated control of skin NTDs in DRC were encouraging. The co-endemicity of leprosy, yaws and Buruli ulcer was confirmed in the three provinces involved. The study highlighted the potential role of this innovative integrated approach in improving detection and management of skin NTDs in such a vast country as DRC.

Acknowledgements

We thank all those who participated in this study for their cooperation: the community health workers and health professionals in the intervention health areas in the provinces of Haut-Uélé, Kongo central and Maniema, and the administrative staff in the health districts and the leprosy and tuberculosis coordination bodies for their ongoing commitment and assistance. This study was supported by Action Damien, American Leprosy Missions and The Leprosy Missions.

Skin NTDs and/or integration – Keywords

Skin-related neglected tropical diseases, leprosy, yaws, Buruli ulcer, integrated screening, community trial, Kobocollect, Skin App, Haut-Uélé, Kongo central, Maniema, Democratic Republic of the Congo.

Epidemiology and clinical characteristics of chromoblastomycosis, Maranhão, Brazil, 1989-2021

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Chromoblastomycosis (CBM) is a one of the most prevalent implantation mycoses distributed in the tropical and subtropical regions of the world. Brazil has some endemic areas, especially in the Amazon area (including Maranhão, Amazonas, and Pará), central-west region and southern region. Although it is a disease with low mortality, its morbidity is high. CBM causes substantial stigma to affected patients, being as devastating as physical death itself.

In our study. we retrospectively reviewed the medical records of all patients with CBM diagnosed from 1989 to 2021 at the Department of Infectious Diseases of Federal University of Maranhão (UFMA). During the 33-year study period, 214 patients presenting with CBM were included, all being autochthonous to Maranhão (especially in the northern mesoregion of Maranhão [78.5%]). A total of 188 cases (88%) were male, with a male/female ratio of 8.3:1. The mean age was 56 years (range 15–91), including 82 patients (38.7%) over 60 years old. Patients were predominantly farmers (183, 85.8%), followed by carpenters, truckers, construction assistants, and gardeners. Most of them (202; 94.7%) came from rural areas. History of cutaneous trauma was reported by 200 (93.7%) patients, especially microtrauma with fragments of plants, wood, stumps, or work tools. Most patients were barefoot (179; 84%) at the time of inoculation. The most frequent location of skin lesions was lower limbs (173; 81.2%) followed by upper limbs (30; 14.2%). The most frequent clinical presentation was verrucous (117; 55%), followed by infiltrative plaque (103; 48.2%), nodular (50; 23.6%), cicatricial (21; 10%) and tumorous (5; 2.6%). Regarding grades of severity, moderate disease was the most common (103; 48.2%), followed by severe (86; 40.3%) and mild (24; 11.5%). Time to diagnosis of CBM varied from 3 months to 30 years. The onset to diagnosis delays were 4.8, 7.2 and 10.2 years in mild, moderate and severe forms, respectively.

The CBM Maranhão group intends to carry out training in the microregion of Baixada Maranhense, city of Pinheiro which has the highest prevalence of cases in the state. The purpose of this training is multidisciplinary with the participation of physicians, nurses, and community health agents. These professionals will be able to: (a) diagnose implantation mycoses, focusing on chromoblastomycosis, including the initial characteristics of the lesion and the five different dermatological types/forms; (b) characterize the severity and staging of the disease; (c) provide patient education with posters and folders for self-care and to improve the ability to suspect a subcutaneous infectious disease, leading to early diagnosis; (d) training of laboratory technicians in performing the characterization of fungal elements in direct examination, distinguishing chromoblastomycosis from other mycoses (phaeohyphomycosis, mycetoma, lacaziosis) and laboratory training for isolating fungal isolates and sending them to a state reference laboratory; and (e) training of doctors and laboratory technicians to collect samples for direct mycological examination and culture for fungi, in addition to initiating treatment after confirmation of diagnosis with antifungal drugs available from the Brazilian Ministry of Health. Finally, transportation of CBM team to remote provinces may be necessary.

Skin NTDs and/or integration – Keywords

Fungal diseases, chromoblastomycosis

Session 3 : Training tools – Presentations

Time	Subject	Presenters
Tuesday, 28 March 2023 **Chair: Esther Freeman**		
09:00 – 09:20	**Keynote presentation:** Capacity building and tools for district and community agents	Claire Fuller
09:20 – 09:40	Learning "on-the-job" for integrated skin NTD screening and care in Ethiopia: Optimizing resources by crossing boundaries of formal and informal education - pre-liminary results	Kitesa Debelo Bizuayehu Belete
09:40 – 10:00	Assessing the quality of the WHO SkinNTDs App as a training tool in Ghana and Kenya. Results from a cross-sectional study	Mireia Cano
10:00 – 10:20	Use of an mHealth App (eSkinHealth) for early detection and case management of skin diseases: a mixed methods pilot study in Côte d'Ivoire	Rie Yotsu
10:20 – 10:40	WHO skin NTDs tools for capacity building on case management and surveillance: online courses, mobile app and DHIS2	José Postigo
10:40 – 11:00	Training tools for integrated management of wounds and lymphoedema for skin NTDs	Michele Murdoch
11:00 – 11:20	A hybrid approach of machine learning and clinical decision support for improved diagnosis of neglected tropical diseases	Wendemagegn Yeshanh
11:20 – 11:40	InfoNTD.org: Capacity strengthening for researchers and other health professionals through an online portal	Roos Geutjes
11:40 – 12:00	Enhancing leprosy expertise: A new leprosy competencies framework	Bahadir Celiktemur
12:00 – 14:00	**Lunch**	

Key presentation – Capacity building and tools for district health workers and community agents

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To deliver the objectives of the 2030 WHO NTD road map requires, in addition to integration for great impact, innovative solutions. A review of approaches taken, thoughts about evaluation and concepts to hold in mind as we prepare to share examples and experiences on capacity building will be presented. Enhancing capability includes opportunities for teaching health care workers and community agents about common dermatological conditions as well as skin neglected tropical diseases. In addition diagnostic support and on the job supervision and feedback have potential to benefit using existing and convenient platforms as well as bespoke teledermatological solutions. We will reflect upon the breadth of available modalities from on line courses, in person training events to educational platforms providing real time resources to the front line healthcare worker in the field as well as review the experiences from experts in community dermatology and touch on opportunities for the future.

Learning “on-the-job” for integrated skin NTD screening and care in Ethiopia: Optimizing resources by crossing boundaries of formal and informal education - pre-liminary results

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Research on skin neglected tropical diseases (skin NTDs) has focused largely on documentation of prevalence, and detection and management strategies, including their opportunities and challenges. Most of the research on education in relation to skin NTDs has concerned assessments of the training efficacy of existing knowledge and particular tools. There is a pressing need also to advance knowledge of the processes by which learning occurs across health workers with formal and informal education, given the acute shortage of workforce in resource-poor environments. Such an ambition implies a “situated learning” approach, in which learning occurs in “real” contexts or “on-the-job”, for example, where knowledge is exchanged in the field. The aim of this study has been to understand how health workers at different levels exchanged knowledge in their efforts to optimize skin NTD care for under-served communities. The study was conducted in eastern Ethiopia, with data collected over three community skin camps. We interviewed 10 Health Workers at various levels (including a dermatologist, nurses and community health extension workers) who had been involved in screening and treatment at the skins camps. Interview data were analyzed thematically, meaning that data excerpts were allocated particular codes which, over a series of cycles, were rendered as patterns, and ultimately, higher-level themes. The results centred on the importance and dynamics of learning among individual health care providers. There was a strong difference between the type of learning that occurred for participants at different professional levels. The dermatologist was mostly engaged in training, coaching and mentoring nurses and health extension workers (HEWs) who work in the targeted communities. Nurses and HEWs said that they had little exposure to dermatological conditions prior to the skin camps. They reported to have learned a lot during training (organized in 2020-2021) and being taught by the dermatologist, but that they needed increased training (“refresher training session”) to be able to provide sustainable services, be independent, and optimize their desire to serve their communities. The dermatologist claimed to have learned from nurses and HEWs about the significant challenges of providing information and opportunities for screening and treatment with limited training, support and resources. A central sub-theme of the study was the importance of training for care coordination. It was perceived to be important that HEW training be feasible, and that they be trained not only in basic triage, but in communication, mobilization, and being able to facilitate links between patients/communities and health centres.

The results point to the contribution to the quality of integrated skin screening and care that comes from situated learning, the importance of fostering training in cross-positional learning, and investing in research in such learning. As such, the study shows the value of understanding *processes*, as well as *outcomes* of skin NTD screening and care, to contribute transferable skills and evaluation criteria which can be used to improve skin NTD screening and care for other under-served communities.

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Assessing the quality of the WHO *SkinNTDs* App as a training tool in Ghana and Kenya: Results from a cross-sectional study

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Background

Neglected tropical diseases (NTDs) affect over 1.5 billion people worldwide, the majority among impoverished populations in low- and middle-income countries (LMICs). Skin NTDs are a subgroup of NTDs that manifest primarily as skin lesions. The diagnosis and treatment of skin NTDs entail considerable resources, including trained personnel and financial backing. Many interventions are being launched and evaluated, particularly mobile health (mHealth) interventions, such as the *SkinNTDs* App, a training and decision support tool for Frontline Health Workers (FHWs) created by the World Health Organization (WHO). As most digital health guidelines prioritize the thorough evaluation of mHealth interventions it is essential to conduct a rigorous and validated assessment of *SkinNTDs* App.

Objective

We aimed to assess the quality of version 3 of *SkinNTDs* App, developed for WHO by Universal Doctor and Netherlands Leprosy Relief (NLR) as a training and decision support tool for FHWs.

Methods

A cross-sectional study was conducted in 2 LMICs: Ghana and Kenya. We used snowball sampling recruitment to select participants from the target population of all FHWs dealing with skin NTDs. The sample group of FHWs was asked to download and use *SkinNTDs* App for at least 5 days before answering an online survey containing demographic variables and the user Mobile App Rating Scale (uMARS) questionnaire. Then semi-structured interviews were organized with a smaller group. Quantitative and qualitative data was analyzed using SPSS, with statistical significance for all tests set at a confidence interval of 95% and $p \leq 0.05$ to consider significance difference. Answers from the semi-structured interviews were displayed in a table.

And few quotes were selected to highlight some key aspects that emerged during the interviews.

Results

44 participants participated in this study (20 from Kenya and 24 from Ghana).

SkinNTDs app scored highly on the uMARS questionnaire, with an App quality mean score of 4/5, a subjective quality score of 3.83/5 and a perceived impact of 4.5/5. There was no significant difference between the App quality mean score versus any of the categorical variables examined, according to the comparison of means analysis. Moreover, the logistic regression model revealed no association between the App quality mean score and any of the categorical variables examined. The answers obtained in the interviews (n=6) reaffirm most of the results obtained in the uMARS.

Conclusions

The findings of this study reveals a good quality of *SkinNTDs App* assessed by the uMARS questionnaire. Furthermore, the fact that the final result is independent of any variable is a very excellent sign for considering the App's to be used in any LMIC. These results can be employed to enhance upcoming releases of the *SkinNTDs* App by examination of FHWs' perspectives. Further research is needed regarding its clinical effectiveness and the strategy identification to accomplish worldwide dissemination.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Ghana, Kenya

Use of an mHealth App (eSkinHealth) for early detection and case management of skin diseases: A mixed methods pilot study in Côte d'Ivoire

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Background

The prevalence of skin diseases is extremely high in sub-Saharan Africa. Among these are skin neglected tropical diseases (skin NTDs) that could lead to lifelong disabilities and deformities if not diagnosed and treated early. To achieve early detection and early treatment of these skin diseases, we developed a mobile health (mHealth) app, eSkinHealth.

Objective

We evaluated the usability and effectiveness of our eSkinHealth app in the detection and effective management of skin diseases in rural Côte d'Ivoire.

Methods

The mixed methods pilot study was implemented as a 2-arm trial with local healthcare providers and patients with skin conditions over a 3-month follow-up period. The local healthcare providers were assigned to an intervention group receiving the eSkinHealth app to be used in their daily practices or a control group with usual care. A total of 4 nurses and 8 community healthcare workers (CHWs) were selected for each arm. Training was provided on the use and implementation of the app and the diagnostic pipeline to the intervention group only, while both groups received training on skin diseases. For usability study, we evaluated the eSkinHealth app with validated questionnaires and in-depth interviews. For effectiveness study, our primary outcome was to evaluate the early detection and effective management of our targeted five skin NTDs (Buruli ulcer, leprosy, lymphatic filariasis, scabies, and yaws) and other skin diseases using the eSkinHealth app by the number of cases reported and managed. Procedures of our methods were reviewed and approved by the IRB of the Ministry of Health, Côte d'Ivoire and by Tulane University.

Results

The mean age of our participants (providers) was 40.5 and 42.5 for intervention and control arms, respectively, and all were male (n=24). The System Usability Score (SUS) was applied to 12 users of the eSkinHealth app in the intervention arm. The average scores at baseline, the midpoint (6 weeks), and the end of the study (12 weeks) were 72.3 (SD 11.5), 72.3 (SD 12.4), and 86.3 (10.8), respectively.

All participants interviewed, including four dermatologists and program managers in addition to our participants, were satisfied with the app. Especially, CHWs felt empowered by equipped with the tool. Seventy-nine cases of skin NTDs were reported in the intervention arm as compared to 17 cases in the control arm (*p* value=0.0019). For the total 42 cases with skin conditions registered in the intervention arm which were diagnosed by dermatologists, the median number of days from entry to diagnosis by dermatologists was 21 (IQR25-75%, 16-63) and the average was 34.9 (SD ±25.5) days.

Conclusions

Our eSkinHealth is a field-adapted platform that could both provide direct diagnostic and management assistance to health workers in remote settings. The study provided evidence for the usability and the effectiveness of the eSkinHealth app to improve the early detection and case management of skin NTDs and other skin diseases in Côte d'Ivoire and, furthermore, are expected to contribute to knowledge on mobile health approaches in the control of skin NTDs.

Trial Registration: ClinicalTrials.gov NCT05300399; https://clinicaltrials.gov/ct2/show/NCT05300399.

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Skin NTDs and/or integration – Keywords

Buruli ulcer, cutaneous leishmaniasis, leprosy, lymphatic filariasis (lymphoedema and hydrocele), scabies, yaws, and fungal diseases, integration

WHO skin NTDs tools for capacity building on case management and surveillance: Online courses, mobile app and DHIS2

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World Health Organization

Capacity building is a core activity in WHO. WHO is currently carrying out training in relation to online courses, a mobile app and web-based surveillance using DHIS2 (District Health Information System).

In 2021, WHO cre

ated the Neglected Tropical Diseases channel for online courses at OpenWHO. OpenWHO has over 7.6 million learners enrolled, and 202 course topics offered in 65 languages. The NTDs channel has 20 courses, additional 21 translations into other languages and 85 000 learners enrolled. 11 out of the 20 courses are skin related with 30 000 learners enrolled as of mid-March. Online courses are available free of charge thanks to the volunteer contribution from over 100 disease experts and translators worldwide. 54% to 75% of the learners belong to the English version of the courses. Ten countries accounted for over 50% of the learners enrolled on skin related courses until October 2022, in descendant order: India, China, Nigeria, Pakistan, Azerbaijan, Ethiopia, Philippines, USA, Kenya and Mexico.

Post-course feed-back received from 3000 learners enrolled in six courses (Buruli ulcer, leprosy, onchocerciasis, podoconiosis, tropical dermatology and tungiasis) until October 2022, showed that 76% fully agreed and 15% somewhat agreed with the course having met their learning needs and the language used in the course being easy to understand.

In 2018, WHO published "Recognizing neglected tropical diseases through changes on the skin: a training guide for front-line health workers", available as hard copy and PDF in English, French, Portuguese and Spanish. Since 2020, the guide is available as the Skin NTDs app for Android and iOS with updated information and an algorithm that allows knowing which skin NTDs are endemic in the country where the patient comes from. The app is free of charge and works offline. Two beta versions of the app are available: one has information on 24 common skin diseases thanks to a collaboration signed with the NGO NLR (until No Leprosy Remains; formerly Netherlands Leprosy Relief). The other one has an augmented intelligence (AI) component developed by Universal Doctor able to identify Buruli ulcer, cutaneous leishmaniasis, leprosy, PKDL and yaws. In 2022, WHO launched a global network on AI for skin diseases to create a global photo library.

WHO and more than 75 countries are using DHIS2, a web-based free and open-source software platform for the collection, reporting, analysis and dissemination of aggregate and individual-level data. Some skin NTDs, such as Buruli ulcer, cutaneous leishmaniasis, leprosy PKDL and yaws are regularly reported to WHO using DHIS2. In countries where that software is used by ministries of health (e.g. East Africa, Côte d'Ivoire), WHO regularly conducts virtual and on-site trainings to build capacity on its use.

In conclusion, training tools developed by WHO are available through Internet and used in a wide range of countries. In depth analysis is needed to better understand why online courses in certain languages do not have the expected uptake. More photographs are needed to be able to include all skin NTDs in the AI algorithm of the mobile app.

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To all contributors. Sanofi and Canadian government.

Skin NTDs and/or integration – Keywords

Integration

Training tools for integrated management of wounds and lymphoedema for skin NTDs

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Skin wounds represent a widely neglected problem and the epidemiological burden of skin wounds in rural sub-Saharan Africa is unknown. Using combined active and passive case finding, Toppino *et al.* reported an overall wound prevalence of 13.0% in rural Côte d’Ivoire, with the most frequent aetiologies being mechanical trauma, furuncles, burns and Buruli ulcer (*PLOS Negl Trop Dis* 2022; 16(10): e0010608).

The recent World Health Organization’s document “Ending the neglect to attain the Sustainable Development Goals: a strategic framework for integrated control and management of skin-related neglected tropical diseases” emphasises the goal of integrating the management of skin NTDs within respective national health systems’ infra-structure. Many skin-NTDs either present with or can develop wounds (ulcers), including Buruli ulcer, cutaneous leishmaniasis, leprosy, tungiasis and yaws, whilst lymphatic filariasis, podoconiosis and leprosy reactions can all cause lymphoedema. Many common general skin conditions, such as diabetic foot and venous ulcers also require wound care, thus providing many opportunities for synergy of resources.

The newly established Wound Management Group, comprised of members from both the NNN Skin and DMDI Cross Cutting Groups, conducted an informal review of wound care training materials and found that several high quality training tools had already been published but were often quite lengthy, directed more towards resource-rich settings, and/or had limited online accessibility. We concluded it would be useful to synthesise and promote simplified, shorter training tools, suitable for use by front-line healthcare workers in resource limited settings where many of the skin NTDs are endemic.

Hand-in-hand with this approach is the need to promote the adoption and provision of ‘Essential Wound Kits’ for frontline health centres by national governments of NTD-endemic countries, together with the establishment of appropriate referral pathways if required.

Skin NTDs and/or integration – Keywords

Buruli ulcer, cutaneous leishmaniasis, leprosy, lymphatic filariasis (lymphoedema), podoconiosis, mycetoma, tungiasis, yaws.

Integration across multiple diseases and across multiple countries

A hybrid approach of machine learning and clinical decision support for improved diagnosis of neglected tropical diseases

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Background

Health-related decisions are often delivered around the world by providers who lack the resources and specialized knowledge required to optimally deliver quality outcomes, particularly with respect to Neglected Tropical Diseases (NTDs). Whether the first point of care for patients is in the community, the pharmacy, the clinic, or other facilities, there is a clear need for actionable decision support and education.

Given the rapid progress in AI and machine learning of images, skin related diagnosis has become a new area of focus for Artificial Intelligence (AI) research in medicine. Existing evidence showed that AI solutions have the ability to analyze skin conditions with the same degree of accuracy as primary care physicians (PCPs) referencing a visual aid. Studies have also showed clinical decision support tools such as VisualDx's DermExpert, designed for use on smart phones, can augment health workers decision-making and help to reduce medical errors and improve diagnostic accuracy for diverse skin tones.

The global health community continually seeks to improve primary health care delivery. To further this aim the WHO is leading initiatives to improve the recognition of skin NTDs and their management and recognizes the need to supply point of care information tools to healthcare workers at all expertise levels, including community health care workers. Key to this effort will be a problem-oriented approach to skin presenting diseases and to develop and deploy an app that covers all the diseases within the differential diagnosis for a given presentation. New software applications can address local needs and be customized to disease prevalence, local epidemiology, as well as the skill level of the users.

Methods

We propose to collect images of specific skin NTDs and related case data from our in-country partners in India and Nigeria, as well as from a global dermatology expert network. We will use this collected data to build upon an existing image database foundation of clinical care imagery and case history to support the development of AI/ML algorithms to build a phone based clinical decision support tool. To achieve our goals, we will prospectively and retrospectively collect imagery of skin disorders with our in-country partners. We intend to leverage the commercially successful VisualDx AI/ML algorithmic image analysis algorithms augmented by this expanded clinical data set to provide targeted differential creation and ultimately clinical education and health worker decision support for NTDs. Once fully developed, the smartphone application prototype will be iteratively field-tested, and refined.

Conclusion

This project aims to meet the goals of the WHO Skin NTD mobile app by supporting broad differential diagnosis for primary health workers. Ultimately, this clinical decision support tool will be designed to be extensible; fitting local disease epidemiology, supporting improved diagnosis in countries beyond Nigeria and India.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Skin NTDs, Decentralization, Integration, health workers capacity building

InfoNTD.org: Capacity strengthening for researchers and other health professionals through an online portal

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There will still be a shortage of 10 million health workers by 2033, particularly in WHO African and Eastern Mediterranean regions (1). This shortage needs to be overcome by using modernized methods for capacity strengthening, supporting health workers in providing an integrated, holistic approach. This is also promoted by the World Health Organization (WHO), in their strategic framework for integrated control and management of skin-related neglected tropical diseases (NTDs) (2). Within the NTDs sector this is especially relevant, since many of the NTDs have multiple cross-cutting issues. InfoNTD is an online platform that supports capacity building for NTD professionals by making cross-cutting NTD information easily accessible. It also includes a page on skin NTDs. The portal currently mainly focuses on sharing scientific papers. There is a growing need to access practical materials, e.g. training packages and operational guides, which are currently scattered throughout the internet, or not available online, and are therefore difficult to obtain. With limited resources available in the NTD sector, it is essential to learn from each other and, whenever relevant, to invest in the further development of available open-access resources.

To further improve and wide InfoNTD’s services and increase its reach, a survey was done to reflect on the continuous developments of InfoNTD by examining the current user experience and information and learning needs.

Survey participants were InfoNTD users and people from the NTD community, recruited through InfoNTD.org via a pop-up, the InfoNTD newsletter and email. They were asked to complete an online questionnaire on their user experience and practical information and learning needs. It was open from November 11, 2021, till January 11, 2022, and contained 18 questions, some were open and some were closed, sometimes multiple options were possible, and each question was optional to respond to.

In total, 73 people participated. Many of the respondents work for a non-governmental organization (38%) or academic institution (38%), some work for the government (8%) or independently (6%). The NTDs that 48 participants indicated to have experience with widely varied; but most frequently named are leprosy (44%), lymphatic filariasis (44%), Onchocerciasis (27%) and/or schistosomiasis (23%). Overall, respondents are interested in accessing different types of practical materials, especially how to/guidelines (62%), online courses (59%) and training materials (56%). The topics of interest for practical materials also widely varied. This question was answered by 61 respondents. The top three cross-cutting issues on which a need for practical materials was indicated were: health systems strengthening / public health (66%), stigma and mental wellbeing (58%), and skin-NTDs (51%). This question was answered by 59 respondents.

There is a need among NTD professionals to better access practical resources, especially learning materials such as online courses and other training materials, ‘how to'-guidelines. The InfoNTD portal will therefore set up a special ‘practical NTD tools’ section, which will be launched in March 2023.

Acknowledgments

We are grateful for the valuable responses that were given by the InfoNTD visitors.

Skin NTDs and/or integration – Keywords

NTDs, skin NTDs, capacity building, training tools

Buruli ulcer cutaneous leishmaniasis, post-kala azar dermal leishmaniasis, leprosy, lymphatic filariasis (lympoedema and hydrocele), podoconiosis, mycetoma, onchercerciasis, scabies, yaws.

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Enhancing leprosy expertise: Anew leprosy competencies framework

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Introduction

The 2020 ILEP Conference highlighted that limited or dwindling leprosy expertise at all levels is a challenge in almost every leprosy-endemic country and is a major obstacle to achieving zero leprosy. New innovative approaches are needed to enhance the knowledge and skills of existing health and development professionals, and to develop a new cadre of staff intent on defeating leprosy. However, there are a number of prerequisites before developing an innovative and effective approach to leprosy expertise development.

Description

This paper examines some of these prerequisites, and how the introduction of a newly developed Leprosy Competencies Framework can address these. Devised through a global consultation process, with input from experts across the field of leprosy, and piloted in Nepal and Nigeria, this framework looks at 10 competency areas which when implemented together, will achieve holistic care: diagnosis, transmission, leprosy control, nerve function impairment, reactions, wounds, eye complications, mental wellbeing, social aspects, laboratory skills.

For each competency, the Framework maps the leprosy knowledge and skills needed for health and development workers at basic, intermediate and advanced levels. It can be used as a tool to clarify the knowledge and skills needed for each role, and to assess the gaps to identify training and development needs. The list of skills can also be used to develop standard operating procedures to ensure quality standards in leprosy care, which will provide the basis for high-quality training and mentoring materials, thus ensuring consistent standards of care across countries and globally.

Conclusion

New standardised tools are needed to achieve the triple zeros that can be utilised across the health and development sectors. This Leprosy Competencies Framework provides the structure required by leprosy-endemic countries to develop the knowledge and skills essential to achieve the triple zeros.

Skin NTDs and/or integration – Keywords

Leprosy

Session 3 : Training tools – Posters

Assessment of knowledge regarding leprosy among health care professionals in Addis Ababa, Ethiopia

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Leprosy is a chronic infectious disease associated with disability and a significant social stigma related to socio-cultural beliefs that are associated with misconceptions. One of the reasons for this is the lack of adequate knowledge among the general public as well as health care workers. The lack of knowledge among healthcare workers leads to late diagnosis which in turn is related to disfigurement, disability, and poor quality of life among affected individuals. This study is aimed to assess the level of knowledge regarding leprosy and to determine factors associated with it among healthcare professionals in Addis Ababa, Ethiopia

A health facility based cross sectional study was conducted from 13/01/2022 and 28/02/2022 on a sample size of 291 healthcare professionals consisting of physicians, nurses and health officers working in selected health centers. The data was entered and cleaned using Epi info 7 while analysis was done using SPSS Version 25 software. Simple descriptive statistical measures, bivariate and multiple logistic regression were used for analysis.

A majority (55%) of the participants were found to have poor knowledge followed by 29.9% and 15.1% having moderate and good knowledge respectively. Being in the age group 35 to 44 years, having work experience of 10-14 years, and being a physician by profession were associated with better knowledge scores.

The study showed that the majority of the study's participants had poor knowledge in response to questions related to modes of transmission, clinical manifestation, diagnosis, and management of its complications. A greater emphasis should be given to leprosy and its training.

Acknowledgments

We acknowledge all health care professionals who gave their consent and participated in this study.

Skin NTDs and/or integration – Keywords

Leprosy, health care professionals, knowledge

Adding the five senses to create multisensory illustrations of Buruli ulcer for use by health care workers in Ghana

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Front-line health care workers (HCWs) need clear guidance to help them identify potential cases of Buruli ulcer (BU) that can then be referred to specialist clinics for diagnosis and treatment. Currently, this guidance is provided predominantly in the form of photographs, either in pictorial guides or in mobile-friendly apps. At the last WHO Skin NTDs meeting in 2019, we presented our progress towards the first clinically approved medical illustrations of BU that would enhance HCW appreciation of the clinical signs of the infection to enhance these photographic guides. Based on vital feedback from that meeting, and further rounds of improvement based on clinician input, these illustrations of BU and Yaws (for comparison) are now available to the community under an open access CC-BY license **https://openresearch.surrey.ac.uk/esploro/profile/joanna_julia_butler/output/all?institution=44SUR_INST**

Hence, there is an opportunity to approach visual health communications a different way in Africa, whilst also expanding upon what's already been achieved. For example, an illustration of a BU nodule 'feeling' like a pea under the skin was rated highly by WHO Skin NTD meeting participants. This sort of information cannot be conveyed by a photograph, and we wondered what other information of a similar nature we could illustrate to aid training of WCW.

We therefore undertook a multisensory analysis with six HCWs who are working with BU patients on a regular basis, and who are based in the treatment network associated with the KCCR in Kumasi, Ghana. The 'Think Aloud' method was used to gather their unprompted opinions whilst they talked freely about how their five senses guided their management of BU patients. The recorded audio transcripts were analysed using thematic analysis to determine the presence of relevant themes and concepts within the qualitative content.

The results identified three key themes: 'Detection,' 'Help Seeking,' and 'Adherence'. It was notable that the outcome of the study went far beyond the expected outcomes in the scope of what the HCW discussed in the recording. Illustrations of the appearance of non-pitting (vs. pitting) oedema (Detection; arising from thoughts around 'touch'), a positive image of patients receiving antibiotic treatment (Help Seeking; arising from thoughts around 'taste' and 'smell'), and the known harmless side effect of Rifampicin treatment on urine colour (Adherence; arising from thoughts around 'vision') have been produced based on these findings and will be presented, example in Figure 1.

The findings show how the senses can facilitate a compelling 5-dimensional narrative and a more inclusive view of BU. It illustrates that all senses, beyond just the visual, play an important role in the management BU. These illustrations should be useful for patient education and training of HCWs, and others undertaking outreach in BU endemic communities and represents a useful model to gather in-depth information and that can provide useful and supportive illustrative interventions for other skin NTDs in the future.

Acknowledgments

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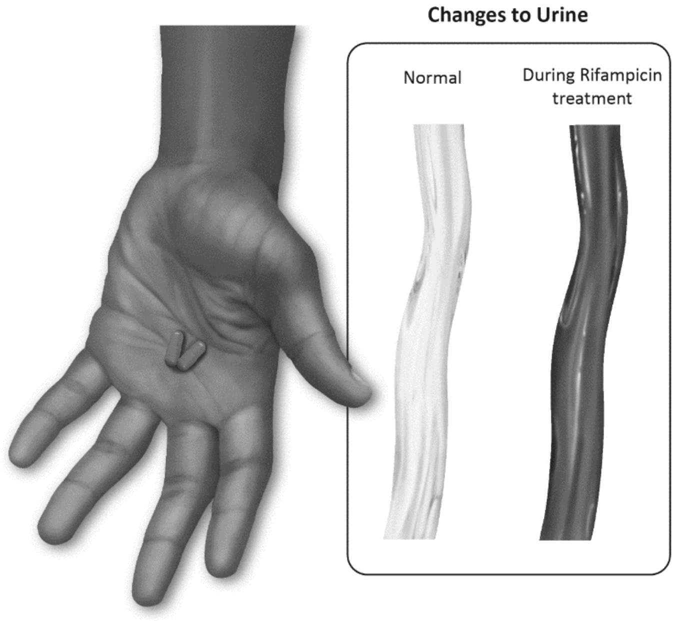
Skin NTDs and/or integration – Keywords

Buruli ulcer, yaws

Figure 1.



Technical Capacity Building in Action (TCBiA) to address dwindling (leprosy) technical expertise

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Many NTD-related organisations have difficulties in accessing adequate technical expertise, and to attract and retain sufficient technical staff who are fully equipped to perform their roles. *Learning* and *development* are essential to sustain efforts to eliminate infectious diseases [1,2,3].

An *effective collective response* requires strong, capable organisations and programmes to jointly meet the national and global targets. Strong organisations require competent staff with professional skills and expertise and preparedness to collaborate and coordinate.

The NLR Alliance aims to be a change-maker in the fight against leprosy, excelling in three strategies of change:

- Advising on and strengthening capacity in public health systems
- Conducting research and driving innovations
- Advocating and influencing policies and funding.

This is threatened by serious challenges to find and retain new highly-qualified people with adequate experience in the field of leprosy, while many available, experienced staff members reach the age of retirement[1].

In 2021 the NLR Alliance embarked on the TCBiA project, targeting all their technical staff. Kirkpatrick's 4-level model [4] was used to formulate a Learning and Development Strategy to form a *Learning Organisation* and formulate a *Learning and Development Strategy* with three components:

A. Learning needs in support of NLR's mission and vision;
B. Supply of expertise to respond to these needs;
C. Safeguarding good quality and effective capacity building.

At the start some quick-wins were included to address a commonly felt urgency, ensuring engagement of staff by offering attractive co-created technical capacity building activities.

Interventions focused on these three components. For *Human Resource Management* [comp. A] a self-assessment tool on essential competency-based knowledge and skills was designed and implemented among all technical staff, resulting in an overview of strengths and existing gaps. Subsequent *learning and development plans* were made to address these gaps.

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[1] For NLR Alliance, some 8-10 senior experts currently employed by NLR or providing expertise as external advisors may retire or otherwise become unavailable within the next few years.

To respond to the identified gaps *Learning and Development* interventions [comp. B and D] were organized, guided by the 70/20/10 principle[2] [5]: Four *Master classes*, two *Mentor training courses* and formation of a *Mentor taskforce*, and three *Communities of Practice* around specific themes were organized.

The project's governance and management structure engaged all Alliance members, stimulating co-creation and collaboration. Besides HRM and L&D, *creating a Learning Environment* (funding, time, support) is key to realize results.

An internal evaluation followed the inception phase, providing valuable lessons for further development and improvements.

Take away messages for successful TCB

- Ensure strong leadership support
- Engage and co-create TCB activities involving all technical staff,
- Capitalize on internal technical knowledge and skills
- Be guided by the 70/20/10 principle
- Work needs-based by integrating annual competency self-assessments, and performance interviews to develop individual/ organizational development plans
- Create awareness and a common communication platform for a lively learning environment
- Be realistic and focused, don't be too ambitious

Skin NTDs and/or integration – Keywords

Sustained Technical Capacity Building is critical for all (skin) NTDs. Lessons from this project can benefit other organizations. It clearly points at the need for collaboration, sharing resources, and creating a broader culture of learning using a blended learning approach.

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[2] most of what we learn (70%) we do through informal learning (on-the-job, exchange visits, discussion groups), 20% through peer-to-peer learning (mentoring, coaching), 10% by classic training (formal training, webinars).

Teledermatology training tools: Enhancing photography skills using cameras on phones in resource-limited settings

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Teledermatology aims to increase access to dermatologic care through either store-and-forward or live interactive technology. Store-and-forward teledermatology can help connect clinicians and remote dermatologists from anywhere in the world using images and clinical information. As the static images serve as the basis for interpretation, making diagnoses and ultimate therapeutic plans, the quality and type of photographs submitted are integral to the success of the program. Photography guides have been developed from the American Telemedicine Association for ideal clinical circumstances and obtaining professional level photographs. We have adapted this training by incorporating iPhone and Androids in the field for store-and-forward teledermatology in both Niamey, Niger and Bagamoyo, Tanzania. We present this educational material for incorporation into NTD programmes in all endemic countries.

Acknowledgments:

We also would like to acknowledge collaborators in Niamey, Niger at Clinique Olivia including Drs. Yacouba Kakale and Susan Beebout.

Skin NTDs and/or integration – Keywords

Integration across all NTDs and all locations

Tools for monitoring progress towards interruption of transmission and elimination of leprosy disease

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Leprosy is one of the Neglected Tropical Diseases (NTDs) included in the group of diseases targeted for interruption of transmission. In 2021, WHO constituted a Task Force on definitions, criteria and indicators for transmission and elimination of leprosy (TFCEL) to define concepts, definitions, epidemiological cut-offs, and identify programmatic criteria that need to be verified. Following a series of consultations, the TFCEL, outlined the leprosy elimination framework delineating the various phases a leprosy programme passes through.

Epidemiological cut-offs for each phase were examined on data sets from five countries before defining them as milestones. Zero autochthonous child cases for consecutive five years is recommended as an epidemiological cut-off for a sub-national area or a country to reach the phase of 'Interruption of transmission'. After this milestone is achieved, if no autochthonous cases (all ages) are reported for three consecutive years, the sub-national area or country is considered to have reached 'elimination of leprosy disease'. Owing to the long incubation period of leprosy, this phase is followed by a period of ten years of 'post-elimination' surveillance, wherein sporadic cases are likely to be detected. .

A leprosy elimination monitoring tool (LEMT) has been developed to monitor the various phases through traffic-light assessment. Efforts are underway to allow spatial analysis through mapping.

In order to verify the elimination of leprosy disease, programmatic criteria have been identified in addition to epidemiological indicators. The criteria include aspects related to political commitment, non-discriminatory policies and a robust surveillance system.

A Technical Guidance on these tools is in the final stages of consultation. The guidance will be useful for countries to monitor progress towards reaching the goal of interruption of transmission and further elimination of leprosy disease as laid down in the Global Leprosy Strategy 2021-2030.

Skin NTDs online training materials and diagnostic tools for front-line health care workers: a scoping review

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The integrated management of skin neglected tropical diseases (NTDs) requires effective training of front-line health care workers (HCWs). Identifying and assessing accessible training materials and diagnostic tools on skin NTDs would facilitate the development of a consolidated collection of training materials which could be used or adapted to meet the educational needs of front-line HCWs.

The main aim of this review was to identify and assess good quality training materials and diagnostic tools accessible online, related to the diagnosis and management of skin NTDs.

The review and analysis of training materials and diagnostic tools comprises three main stages:

- Identifying available material and tools through an online review, as well as personal approach to members of the skin NTD and dermatology community
- Analysis of training and diagnostic tools collected
- Assessment of the training material and diagnostic tools identified as relevant

The online search via Google (the most used search engine world-wide) and PubMed was first performed in September 2020 and repeated in January 2023. The search languages were English, French and Spanish.

A data extraction grid was used to summarize characteristics of the identified materials such as type of material, transfer for local storage (i.e. downloadable), target audience, subject matter, languages, cost, inclusion of skin NTDs and basic dermatology, variety of skin types included and a brief critique.

We found that the number of online training materials or clinical diagnostic tools designed specifically for skin NTDs was very low. The number increased to 17 when general dermatology training materials which included some skin NTDs were included. Of these, 16 were available free of charge. Ten of the tools identified in this review were available to download while 7 required an internet connection to use.

Six separate types of training materials on skin NDTs designed for front-line HCWs were identified: training guides (n=2), reference booklets and fact sheets (n=4), mobile applications (apps) (n=4), on-line journal accessed via an app (n=1), dermatological atlases (n=3) and online courses (n=3).

The main limitation of this scoping review is that the training and diagnostic tools were not assessed for accuracy of information. Evaluation of the diagnostic tools and training materials is not done or is yet to be made available.

The training materials and diagnostic tools identified may contribute to improvement in clinical practice of HCW dealing with skin NTDs and other dermatological conditions. We suggest future activities which will help to shape and improve training materials and diagnostic tools, such as evaluation, adaptability to geographical settings and improving accessibility.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Skin NTDs and integrated training materials

NLR-SkinApp validation, further improvements and integration into WHO skin NTD app

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In many countries endemic for skin neglected tropical diseases (NTDs) dermatological knowledge among frontline health workers (FHWs) is limited (1). To empower FHWs in diagnosing and managing skin diseases, including skin-NTDs, NLR developed the SkinApp (2). Initial studies showed that the SkinApp was an easy, user-friendly tool (3).

The diagnostic accuracy of the NLR-SkinApp, when used by FHWs, was assessed, followed by a study aiming to optimize the built-in decision tree.

The first study was a cross-sectional study in Ethiopia and Tanzania, 2018-2019. Patients with skin diseases were seen by two FHWs using the NLR-SkinApp and two dermatologists as reference standard. Diagnostic accuracy was measured as sensitivity, specificity and inter-rater reliability.

For the follow-up study a mixed-methods design was used; a Delphi panel filled in three rounds of questionnaires and in-depth interviews were conducted to determine the level of consensus among dermatological experts concerning frequency and relevance of signs and symptoms in skin diseases in skin-NTD endemic countries. Participants were medical professionals with at least five years' experience diagnosing skin diseases including skin-NTDs.

In the first study 443 patients were included. Five (categories of) skin diseases reached the sample size (>=27): eczema, tinea capitis/corporis, acne, HIV/AIDS-related skin diseases and skin-NTDs. Sensitivity ranged from 23% (CI:16.5-30.6%) for HIV/AIDS-related skin diseases to 76.9% (CI:70.6-82.4%) for eczema. Specificity ranged from 69.6% (CI:66.0-73.0%) for eczema to 99.3% (CI:98.4-99.7) for acne. The inter-rater reliability showed 58% agreement among the FHWs and 96% among the dermatologists.

This first study found that the SkinApp's functionality could be improved by adding four skin conditions (folliculitis, keloid, noma, urticaria) and by building in the relative importance of signs and symptoms in the SkinApp's decision tree.

The second study showed that of the 271 items presented in the Delphi questionnaires, concerning the frequency of signs and symptoms in skin diseases, consensus was reached on 85 items (31.4%) in round I (n=17) and on 111 items (41.0%) (n=9) and 133 items (48.9%) (n=10) in round II and III. The highest level agreement was reached on vitiligo (66.6%), blistering diseases (70.0%) and scabies (77.8%), the lowest level on folliculitis (16.7%), podoconiosis (22.2%) and psoriasis (27.3%).

There is scope to further improve the diagnostic support of the NLR-SkinApp by adding diseases and by incorporating frequency patterns into the built-in decision tree. However, there seems to be limited consensus among specialists on the relative importance of signs and symptoms when diagnosing skin diseases. Further studies will help to better understand and improve the added value of the application in support of the diagnosis and management of skin diseases.

Meanwhile the NLR-SkinApp has been integrated into the WHO SkinNTD app, which has led to an enriched application to elevate health workers' capacity to serve patients with skin diseases (4). The quality of the integrated WHO SkinNTD app was increased by adding advanced options such as: country specific settings and, artificial intelligence.

The NLR-SkinApp, now built-into the WHO SkinNTD app, is a simple, user-friendly tool that can continue to be developed with improved and additional functionalities.

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Skin NTDs and/or integration – Keywords

NTDs, mHealth, skin diseases, dermatology, mobile application, diagnosis

Buruli ulcer, cutaneous leishmaniasis, post-kala azar dermal leishmaniasis, leprosy, lymphatic filariasis, podoconiosis, mycetoma, onchocerciasis, scabies, yaws, and fungal diseases.

Integration across multiple diseases and multiple countries

Bringing adapted modern wound care to low-resource settings

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Challenges to providing wound care in low-resource settings include inadequate diagnosis, little knowledge of the wound healing process, long healing times, infection, healing with disability and resultant patient suffering with impaired quality of life and often stigma.

The presentation will include details of the World Alliance for Wound and Lymphedema Care (WAWLC) resources of ‘Teach the Teachers’ courses following six basic principles and a basic wound care kit list. Similar resources developed by Médecins Sans Frontières were deployed in Haiti in collaboration with a nurse wound care specialist over a three-month period. Analysis of patients’ files then showed an overall reduction in wound healing time from 35 days to 19 days.

The promotion of simple wound care education and adequate provision of wound care kits by national governments of NTD-endemic countries needs to be paramount in implementing the World Health Organization’s strategic framework for integrated control and management of skin-related neglected tropical diseases.

Skin NTDs and/or integration – Keywords

Buruli ulcer, cutaneous leishmaniasis, leprosy, lymphatic filariasis (lymphoedema), podoconiosis, mycetoma, tungiasis, yaws

Integration across multiple diseases or multiple countries

Integrated online training manual for health care workers on Skin NTDs: A cost-effective and an inclusive initiative

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Introduction

Skin NTDs are a group of tropical diseases with skin manifestation. There are 20 skin NTDs listed out by WHO. However, all of them are not prevalent in every country. So, a priority listed is to be created and diseases should be promoted accordingly for integrated control and management. Nepal is recently declared non-endemic with prevalence of less than 1 per 10,000 for leprosy, however prevalence on Scabies and other skin NTDs are lacking. The leprosy control section has been active in management of leprosy only. In recent years, it has integrated cutaneous leishmaniasis and post-kala azar dermal leishmaniasis to some extent in the training for dermatologist and medical officers. Training for medical officers are an integral part of leprosy control and management in Nepal. Training provided in leprosy by government and certain organizations covers only about 10% of registered doctors annually. This creates a dissociation of doctors from government. Another problem is even healthcare workers are also involved in making diagnosis and at time treating other NTDs including dermatophytes and scabies. A training on each of these diseases would not be cost-effective and more so non-inclusive. So we should plan on a better online platform for training and knowledge uplifting among the healthcare workers involved in skin NTDs?

Objective: To build an online all-inclusiveness and cost-effective method of training in skin NTDs in Nepal and globally.

Method

An approximate cost of trainings for healthcare workers in leprosy in the country in year 2019 was taken as a baseline. Similarly, cost involved in the publications of manuals would also be included. It was compared to a possible online platform development and its maintenance cost.

Results

More than 50,000 USD was spent in training for medical officers in leprosy in that year. This excluded training of health care workers which would be a similar figures. Similarly, expenditure for the training manual development and printing was almost 5,000 USD excluding the price of distribution to every health center and not to mention the delay in transportation. But, the yearly training were provided to medical officers less than 100 which accounted only 10% of doctors as per records of Nepal Medical Council (NMC) where approximately 1000 medical doctors get registered annually. This means that almost 900 (90%) of the medical officers are devoid of leprosy training among the recent graduates. This causes lack of uniformity in knowledge acquisition and creates more non-inclusiveness. More so, when multiple diseases are to be trained as in Skin-NTDs platform. So, a more inclusive, uniform and cost-effective integrated training online platform seems necessary. These courses can be developed as a part of mandatory training in close collaboration with NMC for doctors as part of continue medical education and part of professional development. This will help more doctors receive training without any extra expense. An one-time mobile application development cost would be around 15,000 USD and an annual maintenance cost would be of around 15000 USD which is extremely cost-effective comparing the number of medical officers it would provide training to in a small time-frame. It would be even more efficient if we can make a single platform for a global use with various language option integration within the mobile application.

Acknowledgments

Bitpoint Nepal for their technical support.

Skin NTDs and/or integration – Keywords

Cost-effectiveness, applications, inclusive, integration, online training, skin diseases

Integrated approach with skin camp, eSkinHealth app, and teledermatology in early detection and effective management of skin NTDs in Côte d’Ivoire

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Background

The prevalence of skin diseases is extremely high in sub-Saharan Africa, among which are skin neglected tropical diseases (skin NTDs) that could lead to life-long disabilities and deformities if not diagnosed and treated early. To achieve early detection and early treatment of these skin diseases, Hope commission International (HCI) with the support of Leprosy research Initiative (LRI), Nagazaki university and Tulane University implement 3 projects in Cote d‘Ivoire :

1. Integrated research to fight against Buruli ulcer and other skin NTDs in OUME health district
2. Combined approach with skin camp, eskin health app, and tele dermatology in early detection and effective management of skin NTDs in Zouan Hounien, Cote d’Ivoire,
3. **MIND-the-SKIN Project :** Multi-functional Innovative Digital Toolkit for Skin Diseases in health districts of Sinfra and Bouafle, Côte d’Ivoire & Beyond
4. The four districts of Oumé, Sinfra, Bouaflé and Zouan Hounien have high leprosy and Buruli Ulcer endemicity.

Objective

The objective of the projects is to develop an integrated approach for the early detection and effective management of skin NTDs (leprosy, Buruli ulcer, yaws, and FL) with skin campaigns coupled with awareness, mHealth tools and tele dermatology in Côte d'Ivoire.

Methods

The projects’ methodologies comprises 3 components:

- Household survey and health centers
- Observation of wound care in health centers and in the community with mhealth tool
- Organization of skin camps
- And disease surveillance with mhealth tools

The disease surveillance has two different components: 1) repeated cross-sectional surveys; 2) year-round active case detection and treatment activity by local healthcare workers, supported by mHealth tools and teledermatology. We use the mHealth tool called the‘eSkinHealthApp’, which was jointly developed with the Japanese IT company. Not only this app is used for tele dermatology, but the app allows to upload photos of the skin in individual patient files and therefore facilitates management and follow-up.

Key Results from 2020 to 2021

- ***A baseline survey on*** . 423 households from 67 villages and camps, 01 doctor, 15 nurses and 12 CHWs enabled us to understand ***factors*** that influence access to health care for Buruli ulcer (BU) and other NTDs affecting the skin in the health district of Oumé, Côte d'Ivoire
- Training of health care workers (Nurses): 50 health care workers trained in the 4 districts in skin disease diagnosis and treatment, and the use of E-skin health app.
- Training of 32 community health workers in 2 districts (Sinfra and Bouafle)
- Repeated SUS survey of E-skin trained PHC nurses
- Regular revision of the app with Tribolite
- Organization of 5 skin camps which enabled to diagnose around 3,500 diseases including 80% of skin diseases
- Patient follow-up:
- Weekly wound care data collection on patient with wounds in one Peripheral Health Clinic (PHC): 12 patients followed
- 1,199 other patients with all skin disease followed using e-skin health application: 131 in Oume; 353 in Zouan-Hounien;419 in Sinfra and 296 in Bouaflé.

Conclusions

The combine approach using, training of PHC nurses, organization of skin camps and the use of mobile health application provides significant improvement in early detection and case management of skin diseases in Côte d’Ivoire.

Acknowledgments

Leprosy research Initiative; Effect Hope Canada; National Institut for Health (USA); Tulane University. NO, USA; National Center for Global Health and Medicine, Tokyo, Japan.

Skin NTDs and/or integration – Keywords

Buruli ulcer, cutaneous leishmaniasis, leprosy, lymphatic filariasis (lymphoedema and hydrocele), scabies, tyaws, and fungal diseases

Session 3 : Training tools –Other abstract

An exploratory study on NTDs learning among junior faculties in medicine and allied departments of medical college in Uttarakhand India

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Introduction

There are many modes of learning on Tropical Diseases across the world such as Degree and Diplomas in Field of Internal Medicine, Community Medicine and Public health. But there is a lack of Special focus on Neglected tropical diseases in these courses. So there is an urgent need to Explore the Knowledge, Attitude & Practices of Junior Faculties in Medicine and Allied Departments

Methods

10 Junior Faculties(2 Profs, 1 Assoc,4 Asst Profs,3 SRs) of Medicine and Allied Departments of Medical College in Uttarakhand India were explored by Online Questionnaire on their Knowledge, Attitude & Practice on NTDs learning after their Degree or Diploma in Month of Jan 2023 for 15 days(1st -15th j

Results

Open WHO is Explored for Learning on NTDs by Profs(20%) and SRs (30%), Asst Profs have used **Coursera**(50%) and no body(100%) knew that NTDs learning courses from Leprosy Mission India. No body knew about Global NTDs Programme of CDC.

Discussion & Conclusion

Our Study reveals an urgent action required in the form of Special Training Programmes, Conferences, CMEs, and Certificate courses by Government of India & Uttarakhand for sensitizing Junior as well as Senior Faculties on NTDs Management.

Acknowledgments:

Authors are thankful to Chairman IEC Committee and Principal for allowing study.

Skin NTDs and/or integration – Keywords

NTDs, KAP, Uttarakhand, Open Learning

Session 4 : Integrated surveillance and mapping – Presentations

Tuesday, 28 March 2023 Chair: Ghislain Sopoh		
Time	**Subject**	**Presenter**
14:00 – 14:20	**Keynote presentation:** Importance of surveillance and mapping - current knowledge/experience and gaps	Michael Marks
14:20 – 14:40	A survey of yaws endemicity among the 47 countries in the WHO Africa Region in 2022 - Results	Yves Barogui
14:40 – 15:00	Prevalence of skin Neglected Tropical Diseases and superficial fungal infections in two peri-urban schools and one rural community setting in Togo	Michael Head
15:00 – 15:20	National prevalence and risk factors for tungiasis among school-going children in Kenya: results from a multi-county cross-sectional survey	Lynne Elson
15:20 – 15:40	Surveillance and treatment of tungiasis, podoconiosis and scabies in Northeast Uganda	Marlene Thielecke
15:40 – 16:00	Rapid assessment of yaws endemicity in 15 districts in Côte d'Ivoire	Aboa Paul Koffi
16:00 – 16:20	Integrated mapping methods for neglected skin diseases in Malawi	Cristina Galvan Casas
16:20 – 16:40	Mapping the burden of skin disease: scabies prevalence in a remote Aboriginal community in the Northern Territory in Australia conducted alongside a mass-drug administration treatment program	Victoria Cox
16:40 – 17:00	The development of an integrated community-based surveillance system for skin-NTDs in Cameroon	Earnest Tabah

A survey of yaws endemicity among the 47 countries in the WHO Africa Region in 2022: Results

Authors: Yves Thierry Barogui, Yetema Noemie Nikiema Nidjergou, Kingsley Bampoe Asiedu

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Background

The resolution of the World Health Assembly WHA66.12, the framework for the integrated control, elimination and eradication of tropical and vector-borne diseases in the African Region 2022–2030 as well as the Neglected Tropical Diseases (NTDs) Global Roadmap 2021-2030, have targeted yaws for eradication.

In the WHO African Region, yaws is poorly known and its current epidemiological situation is as follows:

- Nine (9) countries currently endemic,
- Twenty-six (26) countries were previously endemic but current status unknown
- Twelve (12) countries have no previous history of yaws.

This survey was conducted in 2022 to help African region to implement yaws eradication strategy to achieve 2030 targets.

Method

Between February 2022 and August 2022, we sent a standardized questionnaire to all 47 Member States to collect information on the epidemiological situation, surveillance, as well as country capacity to diagnose and manage yaws cases. Responses received were analyzed accordingly.

Results

In total, 74.5% (35 out 47) of countries responded to this survey as follow:

- 9 countries currently endemic,
- 19 countries were previously endemic but current status unknown
- 7 countries have no previous history of yaws.

The keys findings are as summarized:

- Five out seven countries with no history that participated in survey have reported any case since 1950.
- Yaws surveillance is integrated in only 12 out 35 countries (34%): all 9 confirmed endemic and 3 previously endemic countries
- Half of the countries (19 out 35) that participated in the survey have mentioned the lack of experts or institutions working on yaws.
- WHO guidelines are available, however, most of the countries (63%) don’t have a national technical guideline on yaws.
- Diagnostic tests are available in 7 out 9 endemic countries.

- At least one of the two medicines to treat yaws is included in the National Essential Medicines list in all countries.

Next steps

To accelerate efforts for yaws eradication:

- Endemic countries should strengthen surveillance by implementing Morges strategy.
- Previously endemic countries should provide comprehensive evidence to support interruption of transmission or plan an assessment.
- No history countries should prepare comprehensive dossier to certify of non-endemic yaws.

All countries are encouraged to strengthen yaws surveillance and integrate yaws into the NTD master plan. Countries should organize a yaws survey at national and sub-national levels to promote and conduct the bottom-up process for yaws eradication.

Acknowledgments

All partners supporting yaws eradications strategy and skin NTDs framework

Skin NTDs and/or integration – Keywords

Yaws, skin NTDs, survey, Eradication, integration, African Region,

Prevalence of skin neglected tropical diseases and superficial fungal infections in two peri-urban schools and one rural community setting in Togo

Authors: Bayaki Saka,Panawé Kassang, Piham Gnossike, Michael G. Head, Abla Séfako Akakpo, J ulienne Noude Teclessou, Yvette Moise Elegbede, Abas Mouhari-Toure,Garba Mahamadou, Kokoé Tevi, Kafouyema Katsou, Koussake Kombaté, Stephen L. Walker, Palokinam Pitché

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Introduction

Skin neglected tropical diseases (NTDs), are endemic and under-diagnosed in many lower-income communities. The objective of this study was to determine the prevalence of skin NTDs and fungal infections in two primary schools and a community setting in rural Togo.

Method

This was a cross-sectional study that took place between June-October 2021. The two primary schools are located on the outskirts of Lomé, the capital city. The community setting was Ndjéi, in north-east Togo. Study sites were purposively selected. Dermatologists examined the skin of study participants. Diagnosis of skin NTDs were made clinically.

Results

A total of 1401 individuals were examined, 954 (68.1%) from Ndjéi community, and 447 (31.9%) were children in the schools. Cutaneous skin infections were diagnosed in 438 (31.3%) participants, of whom 355 (81%) were in community settings. There were 105 observed skin NTDs (7.5%). Within the school setting, there were 20 individuals with NTDs (4.5% of 447 participants), and 85 NTDs (8.9%) from 954 community participants. Across all settings 68/1020 (6.7%) NTDs were in children, and 37/381 (9.7%) in adults. In addition, there were 333 observed mycoses (23.8% prevalence). The main cutaneous NTDs diagnosed were scabies (n = 86; 6.1%) and suspected yaws (n = 16, 1.1%). The prevalence of scabies in schools was 4.3%, and 7.0% in the rural community. One case of leprosy was diagnosed in each school and the rural community, and one suspected Buruli Ulcer case in the community. In the school setting, five (6%) children with a skin NTD reported being stigmatised, four of whom had refused to attend school because of their dermatosis. In Ndjéi, 44 (4.6%) individuals reported having experienced stigma and 41 (93.2%) of them missed at least one day of school or work.

Conclusion

This study shows that the burden of scabies and skin infections such as superficial mycoses is high in the school and rural community settings in Togo, with associated presence of stigma. Improved health promotion and education across institutional and community settings may reduce stigma and encourage early reporting of skin infection cases to a health facility.

Acknowledgments

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Paper - https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0010697

Skin NTDs and/or integration – Keywords

Togo, Africa, Skin NTDs, scabies, yaws, Buruli ulcer, leprosy, fungal, mycoses, tinea

National prevalence and risk factors for tungiasis among school-going children in Kenya: Results from a multi-county cross-sectional survey

Authors: Lynne Elson[1,2], Peter Macharia[3], Christopher Kamau[4], Sammy Koech[5], Christopher Muthama[6], Moses Obiero[7], Erastus Sinoti[8], Jacob Kapombe[9], Eliud Mburu[10], Miriam Wakio[11], Jimmy Lore[12], Marta Maia[1,2], Benedict Orindi[1], Phillip Bejon[1,2], Ulrike Fillinger[13]

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Tungiasis is a highly neglected tropical skin disease caused by the sand flea, *Tunga penetrans*, the female of which burrows into the skin, mostly of the feet. Although the disease is known to occur throughout the tropics of the Americas and Sub-Saharan Africa there are no data on national disease burden. This paper describes the first ever nationally representative survey for tungiasis and aimed to determine the national prevalence, distribution, and risk factors for tungiasis in Kenya.

Nine counties were selected to cover the major climate zones and cultures of Kenya. Stratified random sampling was conducted to select 22 primary schools from existing lists in each county and to select up to 114 pupils aged 8 to 14 years in each school. All pupils were examined for tungiasis and embedded fleas counted. Surveys were conducted between May 2021 and November 2022. A sub-sample of pupils were interviewed for risk factors using structured questionnaires. Generalized linear mixed models were used to assess associations between disease status and risk factor variables.

A total of 21,246 pupils were examined. The overall prevalence of tungiasis was 1.0% (95%CI varying between counties from 0.08 to 1.99%. Of the 194 schools surveyed, 34% had at least one infected pupil, school prevalence varying between 0% to 25%. Only 7.7% of schools had a prevalence over 5%, illustrating the high heterogeneity in distribution. Of the infected pupils, 27% had more than 10 fleas, a recommended classification for severe disease. Tungiasis infection was associated with male sex (AOR 2.33 95% CI 1.71-3.16), age (AOR 0.78 95% CI 0.72-0.85), public schools (AOR 7.22 95% CI 1.14-45.7) and having another skin disease (AOR 3.06 95%CI 1.95-4.82). Among the 605 pupils interviewed, tungiasis risk was negatively associated with socio-economic status (AOR 0.10 95%CI 0.04-0.28) and with never using soap to wash their feet (AOR 6.83 95% CI 1.35-34.6).

This study has shown tungiasis is widely distributed across Kenya and suggests interventions should focus on poverty alleviation and the daily use of soap for washing feet.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Tungiasis

Surveillance and treatment of tungiasis, podoconiosis and scabies in Northeast Uganda

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Napak district, Northeast Uganda, is characterized by very poor living conditions facilitating the spread of tungiasis and scabies and geochemical factors predisposing to podoconiosis. In this study we aimed to assess prevalence of skin diseases and to implement integrated control strategies in 17 villages in Napak distrikt.

Our intervention study consisted of population-based case detection of skin diseases, treatment and health promotion. All patients diagnosed to have tungiasis, scabies, podoconiosis or a combination of these diseases were followed up every 3 months, between February 2021 and December 2022. Tungiasis cases were treated with a topical application of a formula of dimeticone oils with a low viscosity (NYDA®). Scabies was treated twice with oral ivermectin or benzyl benzoate emulsion depending on weight. Treatment of podoconiosis included daily washing of feet with soap, bathing feet in salty water, and distribution of shoes made by an orthopedic shoe technician and adapted specifically to the feet of each patient. Health promotion focused on regular washing of feet, sweeping the house floors and smearing them with soil mixed with cow dung. Regular wearing of shoes were promoted. Communities were advised to wash all their clothes and beddings and put them under direct sunlight for at least six hours to kill mites.

At baseline, 4,035 individuals were examined for pathological skin conditions. Tungiasis was found in 62.8% (n=2,534) and scabies in 40.3% of the population (n=1,625). Forty-nine percent (n=1,239) of individuals had tungiasis and scabies simultaneously. In total, 69 cases of podoconiosis were identified, of whom 71% also had tungiasis. After 22 months of follow up, prevalence of tungiasis had dropped to 5.7% and no case of scabies was detected. In patients with podoconiosis, leg circumference and symptoms like burning sensations, itching, and pain had decreased significantly.

Tungiasis, scabies and podoconiosis were identified as major health hazards in Napak distrikt. They can be diagnosed clinically and treated with simple measures. Prevalence of tungiasis and scabies, and morbidity of podoconiosis significantly decreased along with treatment and hygiene measures. The high frequency of comorbidities can be explained by common risk factors, such as poverty and poor body hygiene.

Control strategies for skin NTDs in resource-poor settings should address all infectious and non-infectious skin diseases to increase cost-efficacy.

Acknowledgments

We thank the communities of the 17 study villages who participated in the study and Innovations for Tropical Diseases Elimination (IFOTRODE) that coordinated the project activities in Uganda. The study was funded by Else Kröner Fresenius Stiftung (EFKS) and German Doctors.

Skin NTDs and/or integration – Keywords

Tungiasis, scabies, podoconiosis

A rapid assessment of yaws in 15 districts in Côte d’Ivoire

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Introduction

Yaws is a neglected tropical disease with cutaneous manifestation. Children under the age of fifteen are the most affected with a predominance between 6 and 10 years. Yaws is known to be endemic in several countries including Côte d'Ivoire where the health system reports suspected cases. According to the WHO NTD Roadmap 2021-2030, yaws is targeted for eradication. Côte d'Ivoire has therefore undertaken a rapid epidemiological assessment of the disease. The objective of this assessment was to measure the true extent of yaws endemicity in the country.

Methods

We actively searched cases using the integrated approach in three phases, lasting 45 days each. Health personnel and community relays were trained in the 15 purposely selected health districts. The research took place in primary schools as well as households. All localities were visited centripetally. Cities and large villages were not targeted. Children aged 2 to 15 in and out of school were the main target. All skin lesion carriers were registered and tested according to WHO protocol; first with SD syphilis 3.0 (multi) manufactured by Standard Diagnostic in Germany. SD positives were tested at DPP Syphilis Screen and Confirm Assay by Chemio Diagnostic System USA. All DPP-positive cases were treated with a single dose of azithromycin. Other skin lesions were reported, and patients were treated. Data were collected on WHO standardized data sheets, entered, and analyzed in DHIS2.

Results

A total of 3870 localities were visited in 345 health areas and 498,350 children were registered, of whom 62,822 (12.6%) with skin lesions were screened; Of these, 0.83% (n=525) children were positive for SD. 41% (n=215) of these cases were confirmed with DPP. Compared to all skin lesions, 0.3% of children (male=58.87%, female=41.13%) with an age ranging from 7 to 12 years were confirmed yaws.

In addition to yaws, 5 cases of Buruli ulcer, 4 cases of leprosy and 468 cases of scabies were detected and treated. Eleven thousand ninety-seven (11,097) children with other skin lesions were treated. Based on these results, it was confirmed that all 15 districts were endemic to yaws with a prevalence of 0.3%. Most of the endemic areas were in forested areas. Geographical coverage was 98%.

Conclusion

This rapid assessment confirmed the endemicity of yaws in Côte d'Ivoire but with a low prevalence. The approach used resulted in the reporting of some other NTDs as well as numerous dermatological lesions in the same communities. The results obtained could open up prospects for the implementation of interventions that would contribute to the eradication of yaws; This may include active and passive epidemiological surveillance or the implementation of targeted mass treatment.

Acknowledgments

Fondation Anesvad, WHO

Skin NTDs and/or integration – Keywords

Yaws, skin NTDs, endemicity, Côte d'Ivoire

Integrated mapping methods for neglected skin diseases on in Malawi

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Introduction

Skin diseases world's burden is high, coexist in the same population groups, may be avoided or their sequelae lessened through prevention or early diagnosis, and many require the same treatment.

Skin exam offers an opportunity to identify multiple conditions in a single visit.

Community activities for active case detection and treatment is a very hard and resource-consuming task.

Integrated approach for training, mapping, evaluation, prevention, combating stigma, treatment, and surveillance, is therefore necessary.

The DerMalawi project is driven by an integrational approach.

Methods

Based on the Dermatology Clinics and Teledermatology activities we identified needs that suggest an integrated control strategy.

Requested by, and in close collaboration with local health authorities, mass screening and drug administration (MSDA) for scabies was organized.

Other detected needs, leprosy, skin ulcers and malignant tumors in albino population were also addressed during the MSDA.

An area of 30,000 inhabitants was chosen. All 14 schools in the area were visited and, subsequently, all the 94 villages related to each school.

- Scabies cases and contacts were registered and treated with standard of care.
- Samples for 16S molecular analysis of the ulcers swabs was obtained.
- Every suspected leprosy case, was recorded and referred to the Clinics
- Albino and Xeroderma Pigmentoso malignant and premalignant tumors were referred to the clinics.

Results

Scabies prevalence dropped from 17.2% to 2.4%. Coverage was 50%.

59 Ulcers swab results joined an ongoing study on the etiologic agent of skin ulcers in Africa.

9 new leprosy cases were diagnosed, contact tracing was started, and awareness were generated that drives patients to come to the clinics.

31 albino malignat tumors were treated

Discussion

Official prevalence figures are very different from the real ones, and the measures to be taken depend on these figures.

MSDA consists in screening the entire population of a geographic area, regardless of symptomatology. Standard of care treatment is offered to all cases an available contacts. Its objectives are:

- to know the real prevalence
- to reach the cases and contacts who do not consult and
- to reduce the parasite reservoir in the population, limiting its transmission.

The main difficulties were:

- Coverage. Population has little home life, and there is significant school absenteeism. It is difficult for cases to come for the second dose, or to agree to be examined in subsequent rounds, once they are feeling better.
- The feeling of violation of privacy makes it difficult the complete dermatological exam and to supervise the application of the cream.
- Screening and field treatment requires a lot of effort in terms of time, human resources, fatigue and difficult working conditions.

Conclusions

1. Scabies prevalence is a major public problem in the area
2. Population-based activities are necessary to bring diagnosis closer to under-diagnosed leprosy and albino malignant tumors cases
3. More studies are needed to analyse the causative agents of tropical ulcers in Africa.
4. Teams need to be composed of male and female clinicians
5. Stakeholders must encourage the access to diagnosis and treatment of NSTD
6. We must take advantage of the skin exam to address prevalent pathologies in the same act, and promote training resources

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Skin NTDs and/or integration – Keywords

Scabies, leprosy, ulcers, Albino malignant tumors

Mapping the burden of skin disease: scabies prevalence in a remote Aboriginal community in the Northern Territory conducted alongside a mass-drug administration treatment program

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Background

Scabies is estimated to affect 455 million people worldwide and is one of twenty Neglected Tropical Diseases recognised by the World Health Organisation. The parasitic mite infestation is hyperendemic in low-resource regions and the disease burden in northern Australia is believed to be among the highest in the world. However, few recent prevalence assessments have been conducted in northern Australia and it is not known whether historical assessments are still representative of the disease burden. Furthermore, it is difficult to advocate for the allocation of government funding and resources without accurate information on the burden of disease.

Methods

An observational cross-sectional study design involved undertaking a simplified skin examination of all consenting community residents in a remote Aboriginal community in northern Australia, to determine the prevalence of scabies and common skin conditions. The targeted assessment focused on identifying skin lesions on exposed areas of the head, neck, arms and legs (and trunk in young children). Three or more typical skin lesions in a typical body distribution indicated a positive diagnosis of scabies. The point prevalence with binomial 95% confidence intervals was calculated for scabies, impetigo, tinea/fungal disease, pityriasis versicolor, boils, cellulitis, and crusted scabies. A logistic regression was used to calculate an adjusted Odds Ratio to determine whether the presence of skin disease was associated with sociodemographic factors.

Results

1306 simplified skin examinations were conducted in a remote Aboriginal community during Healthy Skin Week from 14 – 18 November 2022. The point prevalence for scabies was 25.25% with 330

individuals affected and the prevalence of impetigo was 7.1% with 93 cases. No cases of crusted scabies were identified during the study period.

Conclusion

Scabies is endemic in Indigenous communities in northern Australia. This was the first prevalence assessment that has been conducted in the Northern Territory in more than a decade and the first mass-drug administration treatment program conducted as a local health intervention by an Aboriginal Medical Service and not as a clinical trial. This is an important step towards considering effective rapid mapping strategies to estimate the burden of scabies and common skin conditions, which is essential to tailor a public health response to address the high burden of scabies in northern Australia.

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Skin NTDs and/or integration – Keywords

Scabies, impetigo, neglected tropical diseases, northern Australia, prevalence, mass drug administration, ivermectin.

The development of an integrated community-based surveillance system for skin NTDs in Cameroon

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Cameroon is endemic for at least 15 of the 20 NTDs, including 9 skin NTDs. Although a national skin-NTDs control programme has existed since 2009, no functional integrated surveillance system for skin NTDs was in place. Through the funding opportunity provided by the OCEAC-KFW NTDs Project for the CEMAC sub-region, an integrated community-based surveillance system for skin-NTDs was implemented in 21 health districts (HD) of Cameroon, from 2020-2022.

Integrated recording and reporting tools, IEC material as well as training modules for skin-NTDs were developed. The Cameroon national DHIS2 platform was configured to provide notification of skin-NTDs. Training of trainers followed by cascaded training of primary health care personnel as well as community volunteers (CV) was conducted in the 21 HD. Implementation of integrated surveillance of skin-NTDs started immediately after the training. This included: suspicion of cases in communities and referral to the Primary Health Care Centers (PHCC) by the CV; clinical examination of the referred cases by trained health personnel at the PHCC; samples collection from cases requiring laboratory confirmation and transmission to the Centre Pasteur du Cameroun Reference laboratory through the National Programme Office. Confirmed cases of skin-NTDs were properly documented at the PHCC and treated according to the national guidelines. The documented cases were notified through the DHIS2 platform. The surveillance activities were monitored and supervised by a team of national and regional level M&E workers. The routine surveillance was reinforced by integrated active case search once in each of the 21 HD.

Regarding the outcome: an integrated poster, a pocket guide for recognition of skin NTDs, a community register and a notification/referral form were developed for the CV. An integrated skin-NTDs register, clinical forms for skin-NTDs, and an integrated skin-NTDs image box were developed for the PHCC level. The integrated register was configured on the DHIS2 for the purpose of notification. 358 PHC personnel and 1740 CV were trained. Case notification of skin-NTDs via the DHIS2 rose from 209 in 2020 to 2279 in 2022. Over 850000 people were sensitized on skin-NTDs. Active case search led to the examination of 40790 persons of whom 4504 (11%) had skin-NTDs and 6653(16%) had non-NTDs skin lesions. Of the 21 HD, 9(42.9%) were newly confirmed for yaws and 2(9.5%) Buruli ulcer. Scabies accounted for 44.5% of skin-NTDs and superficial cutaneous mycoses for 62.3% of non-skin-NTDs detected.

The successful development and implementation of an integrated community-based surveillance of skin-NTDs in 21 HDs has strengthened the health system in the domain of NTDs. It has revealed the actual burden of not only skin-NTDs but also other skin conditions plaguing remote health districts. This experience requires scaling-up to other HD in the country. The confirmation of yaws in 9 HD paves the way for the implementation of the Morges strategy in these new districts, as a pathway to achieving the yaws eradication target in Cameroon.

We conclude that an integrated control of skin-NTDs, as recommended by the WHO, is very feasible and should be embraced by all endemic countries.

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Skin NTDs and/or integration – Keywords

Surveillance, Cameroon

Session 4 : Integrated surveillance and mapping – Posters

Integrated case finding for skin diseases detects polymicrobial ulcers classified as cutaneous leishmaniasis, yaws, and *Haemophilus ducreyi*, in Ghana

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Introduction: Cutaneous leishmaniasis (CL), Buruli ulcer, *Haemophilus ducreyi*, and yaws are skin ulcer diseases caused by *Leishmania spp.*, *Mycobacterium ulcerans*. *H. ducreyi*, and *Treponema pallidum* sub. Sp. *pertenue* respectively **Methods:** A community based cross-sectional study was conducted in December 2021 in the Oti region of Ghana to investigate causes of undetermined skin ulcers. **Results:** A total of 101 skin ulcer samples were obtained from 101 persons in 5 communities of the region. All participants were screened in the field as potential yaws cases using the Syphilis 3.0 and Dual path platform (DPP) rapid diagnostic tests (RDT). The samples from each participant were systematically tested for *Leishmania spp.*, *Mycobacterium ulcerans*, *Haemophilus ducreyi*, and *Treponema pallidum* sub species *pertenue*, using polymerase chain reaction (PCR) molecular methods. Two persons (2%) were suspected to have yaws via the RDT screening in the field. Of the 101 samples tested, 83(82.2%), 68 (67.3%), and 74(73.3%) were positive for *Leishmania spp.*, *Treponema pallidum* sub. Sp. *pertenue*, and *H. ducreyi* respectively. None of the samples was positive for *Mycobacterium ulcerans*. *Leishmania spp.*, *Treponema pallidum* sub. sp. *pertenue*, and *H. ducreyi* were simultaneously detected in 43 (42.6%) of the ulcers. **Discussion/Conclusions:** Detection of single and mixed occurrence of the causative organisms for CL, yaws, and *H. ducreyi* has implications for skin ulcer nomenclature and calls for the development of a comprehensive guideline for diagnosing and treating tropical ulcers in the study area. We propose a syndromic treatment algorithm for validation in the study areas.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis, yaws, *Haemophilus ducreyi*, Buruli ulcer, Oti Region, Ghana

Status of onchocerciasis elimination in Gabon: A fresh look at the distribution of this neglected disease

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Onchocerciasis is a parasitic disease caused by the nematode Onchocerca volvulus, transmitted to humans through repeated contact with an infected simulium. This cutaneous filariasis not only manifests itself by severe itching, but also by visual impairment and can even lead to blindness, hence the name "river blindness". At present, an estimated 18 million people are infected with the disease, 14.6 million of whom suffer from dermal damage. However, according to the World Health Organization, 99% of people affected by this parasite live in inter-tropical Africa, where the disease remains a real public health problem.

To counter the impact of this disease on African populations, a number of control and treatment programs have been set up, resulting in major advances. However, some countries have so far failed to set up genuine onchocerciasis control programs. This is particularly the case in countries where the disease coexists with Loa loa filariasis. This lack of a control strategy based on WHO recommendations for the treatment of onchocerciasis with ivermectin in certain hypoendemic zones coexisting with Loase in Central Africa could constitute an obstacle to the global elimination of onchocerciasis: the case of Gabon. In fact, MDA is difficult to implement in Gabon due to the lack of information on the actual distribution of the disease in the country.

Studies have shown disparate levels of transmission in some of the country's villages. However, these studies have only focused on the same region. This makes it very difficult to implement a MDA in the country, as long as actual data are not available. It is therefore becoming urgent and crucial to collect data on the distribution and level of infection of onchocerciasis in Gabon, in order to establish a true mapping in a country highly endemic to Loa loa. Our aim in this work was therefore to carry out a systematic review of available data on onchocerciasis, in order to gain a fresh perspective on the current situation regarding its incidence. Our results show that the distribution of the disease is heterogeneous across the country, with prevalences ranging from 0% to over 20%.

They also reveal that certain villages with infection levels of between 10% and 60% could be considered onchocerciasis foci. In conclusion, we believe that Gabon's participation in various onchocerciasis eradication programs depends on a better understanding of the disease's bioecology, so that Gabon does not constitute a reservoir of onchocerciasis for neighboring countries which are making efforts to combat this parasitosis. Thus, this work contributes to the effort to identify risk areas in view of providing useful information for the implementation of a mass control and treatment strategy aimed at eliminating onchocerciasis as a public health problem in Gabon.

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Skin NTDs and/or integration – Keywords

Onchocercaiasis, mapping, prevalence, surveillance, Gabon

Piloting integration of mycetoma surveillance and control within Ethiopia’s NTD Program through sentinel surveillance and knowledge transfer

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In May 2016, the World Health Organization added mycetoma to the Neglected Tropical Diseases (NTD) list. Mycetoma is a chronic, granulomatous, inflammatory, infectious disease caused by true fungi (“eumycetoma”) or filamentous bacteria (“actinomycetoma”). The most common pathogen entry point is trauma through the foot, although other body parts can be infected. Mycetoma affects subcutaneous tissue, forming tumour-like swellings filled with tiny granules containing aggregations of the pathogen. In later stages, pathogens can invade bone tissue, forming lesions and necessitating amputation. Mycetoma has a high morbidity rate, adverse socioeconomic consequences, and mental stigma for affected populations, largely manual labourers, farmers, and shepherds.

There is substantial evidence to indicate the existence of mycetoma-causing organisms in Ethiopia. Yet, the actual burden is unknown due to the lack of reporting mechanisms and laboratory diagnostic capacity. Additionally, structured mycetoma control and surveillance programs are absent. The project aims to pilot concise training for healthcare workers to recognize and report mycetoma, nested within Ethiopia’s existing community health priorities.

Southern Nations, Nationalities, and People’s Region (SNNPR) is Ethiopia’s pilot region for mycetoma identification training. Partners from the Federal Ministry of Health and Arba Minch University Collaborative Research and Training Center for NTDs (CRTC-NTDs) designated primary care clinics and hospitals as sentinel surveillance sites. In addition, they surveyed existing health management information systems (HMIS) in use for reportable skin NTDs, including scabies and lymphatic filariasis, at the community and national levels. Finally, they assessed existing skin NTD case detection and community sensitization efforts to determine the feasibility of integrating mycetoma interventions.

Targeted case definitions and training toolkits for clinicians and Healthcare Extension Workers (HEWs) were developed for the selected facilities. HEWs’ toolkits emphasized collecting patient history and clinical manifestations, whereas clinicians’ toolkits focused on diagnostic differences among skin NTDs in the local context. Toolkits will be integrated into existing initiatives until funding is procured.

As a pilot integration programme, data collection is essential to building evidence-based recommendations that can be integrated into the current skin NTD intervention programs to ensure buy-in and scalability. The training toolkits for both clinicians and HEWs will be evaluated from two perspectives: participant learning and participant learning transfer. Participant learning will be evaluated through basic pre-tests and post-tests administered directly before and immediately after trainings to measure existing participant knowledge and knowledge gained through training. Participant learning transfer will be assessed in the six months following the training, after which analysts will compare the aggregated number of mycetoma referrals to the number of cases diagnosed from these referrals to determine the positive predictive value of toolkit diagnostic criteria as applied in the field. Based on these results, the toolkits will be adapted to better suit the needs of clinicians and HEWs, and results for each successive training group will inform subsequent trainings in an iterative fashion. Ultimately, these toolkits will be used in a training-of-the-trainers model, in which individual clinicians and HEWs are training colleagues to apply diagnostic criteria, improving surveillance, early identification, and referral of mycetoma patients.

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Skin NTDs and/or integration – Keywords

Mycetoma, Eumycetoma (Fungus), Actinomyetoma (Bacterial)

Ethiopia, SNNPR, NTD Skin Intervention Program, scabies, lymphatic filariasis

A retrospective clinico-epidemiological study of leprosy in Kolkata district of last 6 months: Can we dream of the eradication of leprosy?

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M Leprosy elimination was declared in 2002 in India and officially we are in the eradication stage.

In the 8 months of this study from April to November 2022 in the district of Kolkata, total 429 new cases were diagnosed, while among them were children. The data shows that while we have come a long way, the data shows we need to do a lot better in coming years to reach our goal of eradication. A retrospective data was collected by us in Calcutta national medical college in collaboration with LEPROSY CELL, Government of WEST BENGAL (WB).

We had a total of 429 newly diagnosed leprosy Cases in last 8 months), among which total MB cases were 414, and total new PB cases were 15.

Among all new cases voluntarily reported cases were 420, among which 15 were PB cases and 405 were MB cases. Among all new cases total number of males were 314, among which there were only 8 PB cases and total of 306 MB cases were noted, total number of females among newly diagnosed cases were 109, among which majority were MB cases of total 103 cases and 6 PB cases were there.

Total number of childhood cases were 6, among which 3 were boys and 3 girls. While all girl children were diagnosed as MB cases, 1 boy child was classified to be PB & 2 boys were diagnosed as MB cases.

Among the newly reported cases, there were 11 patients who were the residents of states other than WB, and all of them were diagnosed to be MB cases.

Total 171 patients presented with Lepra reactions in these 8 Months, among which 157 were cases of Type 1 Lepra reaction, and 14 were cases of Type 2 Lepra reaction. Among 157 T1R cases, 154 cases developed in patients who were having ongoing MDT, and 3 cases developed in patients released from treatment, all these cases being among MB patients.

Among the total 14 Type 2 Lepra reaction cases, 13 cases were among patients already under MDT, and only 1 patient who was released from treatment developed Type 2 Lepra reaction, all being MB cases.

Total number of patients undergoing MDT as of November 2022 were 524 in number, consisting a total of 400 males (8 PB & 392 MB cases), 115 females (5 PB & 110 MB cases) and 9 children (2 PB & 7 MB cases).

No relapse cases were reported from any PHC/ District Hospital.

New cases diagnosed with leprosy related deformities were a total of 49 cases, among which 45 were grade I deformity cases and 4 were the cases of grade II deformities. Among grade I deformities, 32 were males and 13 were females, which in cases of grade II deformities 3 were males and 1 was a female. No children were newly diagnosed with deformities.

Conclusions

Most new cases are MB cases and will require longer surveillance and treatment.

Childhood leprosy is quite significant.

Authors opine –leprosy elimination by 2030 may be a pipedream if more concerted efforts were not taken up.

Acknowledgments

Data collected from govt of west Bengal leprosy cell

Skin NTDs and/or integration – Keywords

Leprosy, elimination by 2030

Buruli ulcer in Japan: An update

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Japan is one of the few non-tropical countries where patients with Buruli ulcers (BU) are seen. Since the previous report we made during the WHO BU and Skin NTD Meeting in 2019, an additional 10 new cases have been reported – totaling to 83 BU cases since the first report in 1982, The cases are sporadic and have been reported from various parts of Japan, with confirmed cases from 23 out of the 47 prefectures (49%). PCR analyses were performed in all the cases. Among these patients, 53 cases (64%) were confirmed to have been caused by *Mycobacterium* (*M.) ulcerans* subsp. *shinshuense,* a subspecies of *M. ulcerans* exclusively isolated in Japan.

Our newest 10 cases were reported from 8 different prefectures, with 3 male and 7 female patients. The age range was between 6-89 years old. 9 of the ulcers were category 1, and 1 ulcer was category 2. The majority of cases affected the extremities, with 3 cases developing ulcers in the head and neck region. Pain was present in only 3 of the cases. 5 cases had completely resolved following treatment, and 5 cases are still undergoing treatment.

Most BU cases in Japan have been successfully treated with combination of oral rifampicin (RFP), clarithromycin (CAM) and levofloxacin (LVFX) (replaced by tosufloxacin (TFLX) for children). There are no specific treatment recommendations based on the sizes of BU lesions, but treatments besides antibiotics may be needed in severe cases, including radical debridement, skin grafting, as well as new wound care methods such as negative pressure wound therapy. Ulcer relapse after surgery frequently occurs due to residual bacteria.

Recently, we are facing challenges in obtaining reports for all cases that occur in Japan. The Leprosy Research Center (LRC) at the National Institute of Infectious Diseases used to be the only institution in Japan where BU could be diagnosed, and this facilitated epidemiological data collection and analysis. However, the diagnostic abilities at general hospitals have greatly advanced, and it has become possible to diagnose BU more readily, and even to confirm the subspecies of *M. ulcerans* subsp. *shinshuense* in the past few years. Some of these cases are not reported to the LRC, leading to under-reporting. Therefore, we speculate that 10 cases over the three-year period are not representing the true case number.

During the meeting, we will present an update of the epidemiological status of BU in Japan, with in-depth clinical explanations of the recently reported cases.

Skin NTDs and/or integration – Keywords

Buruli ulcer, Japan, epidemiology, *Mycobacterium ulcerans*, *shinshuense*

The Global Healthcare Study on Psoriasis (GHSP): Epidemiology and barriers to care in low- and middle-income countries

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Introduction

Psoriasis is a common chronic inflammatory skin disease with a negative impact on physical, psychological, and social functioning. Associated comorbidities, including psoriatic arthritis, cardiovascular disease, and psychiatric illness further worsens disease burden and impairs function of day-to-day life. It is crucial for patients to receive timely diagnoses and have access to appropriate treatment.

Unfortunately, many patients with psoriasis do not receive prompt, optimal care, even in high-income countries. This gap in provision of healthcare may be even more profound in low- and middle-income settings with additional barriers to availability and access to treatment. Patients may also face added challenges of delayed or misdiagnoses (eczema, tinea, syphilis, onychomycosis). Psoriasis alone accounts for 0.19% of the individual skin disease burden in the Global Burden of Disease Study 2013, surpassing scabies (0.07%), viral (0.16%) and fungal (0.15%) skin infections. Magnitude of the burden from psoriasis increases with age.

Since 2019, the Global Healthcare Study on Psoriasis (GHSP) identifies the standards of and access to psoriasis care, charts the socioeconomic, physical, and psychological impact of psoriasis at the patient-, institution-, and country-level, and explores the availability of and access to treatment options as well as current barriers to care.

Methods

The GHSP is an investigator-driven, multi-country and multi-center cross-sectional study. Participating dermatologists complete questionnaires on access to general healthcare and insurance, prevalence of psoriasis and other major skin diseases, and availability of different treatment options. Psoriasis patients' demographics, socioeconomics, disease characteristics, treatment history, and severity are collected. Data analysis allows for inter-country comparison on the prevalence and severity of psoriasis (PASI, BSA), and DLQI for health-related quality of life (QoL) measures. Associated comorbidities, including psoriatic arthritis, cardiovascular, depression, and anxiety, are recorded and delayed, missed and (mis-) diagnosis as well as barriers to treatment documented.

Results

As of January 15th, 2023, 60 investigators from 58 study centers across 11 countries have collated 2,501 patient surveys, with further onboarding of investigators in progress. Interim analysis shows differences in access to treatment within Latin America, no difference in disease severity between privately and publicly insured patients in Chile, highest prevalence of anxiety in the USA [(10.3% out of 2,179 patients globally or 13.79 times more likely), followed by Switzerland (2.5%), Singapore (1.6%)], most depression in Brazil [15.7% of patients, followed by Chile (14.2%), USA (14.0%)] and no self-reported cases of mental health diseases in China. An increase in PASI impacts QoL most severely for patients in Europe (correlation coefficient ρ=0.47, p<0.001 for Europe).

Discussion

Robust data is required to track trends in incidence and prevalence of psoriasis globally, especially in low- and middle-income countries. The GHSP provides high-quality data to map psoriasis globally and to address geographic gaps in knowledge, diagnosis and treatment with the aim to support the development of strategies to improve the lives of people living with psoriasis.

Conclusions

In the upcoming expansion of the GHSP, neglected skin diseases will be included and integrated strategies will be implemented to improve timely diagnoses, increase access to care, and influence health economics decisions.

Acknowledgments

We thank the dermatologists and patients who participated in the Global Healthcare Study on Psoriasis (GHSP). Furthermore, we thank the University of Zurich and the University Hospital of Zurich for the support.

Skin NTDs and/or integration – Keywords

Psoriasis, mapping, global healthcare study on psoriasis (GHSP), differential diagnosis, skin NTDs and integration

Cutaneous leishmaniasis: An emerging problem in Nepal

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Introduction

Cutaneous leishmaniasis is a vector borne disease transmitted by sandfly and caused by *Leishmania* protozoa. According to weekly epidemiological report of WHO, in 2021 out of 200 countries 99 were considered as endemic for leishmaniasis among them 89 were endemic for cutaneous leishmaniasis, 80 were endemic for visceral leishmaniasis and 71 for both. Nepal is considered endemic only for visceral leishmaniasis as no data is available for cutaneous leishmaniasis. Recently the cases of autochthonous cutaneous leishmaniasis have been increasing in Nepal. We report the cases of cutaneous leishmaniasis that has been diagnosed at our center.

Methods

Retrospective review of the patients' record presented to Anandaban hospital, a referral center for leprosy management, from Jan 2014 to December 2022 A.D. We reviewed their clinical demographics, history, clinical photographs, investigation and treatment.

Results

In total of 16 cases (10 male and 6 female), average age 35.56 years (range 1 -77 years) were reviewed. Eight out of 16 patients had single lesion and 8 patients had more than 1 lesion. Among them 9 patients had lesion only on face, 4 had lesions on face and arm, 3 patients had only extra facial lesion; nose being the commonest site. Six cases were misdiagnosed initially by other centers, 5 as cutaneous tuberculosis and 1 as leprosy and treated accordingly. All the patients were negative for slit skin smear for acid fast bacilli. Only three patients had history of travel to endemic area outside Nepal but 13 patients never travelled outside Nepal. All the patients were histologically confirmed as cutaneous leishmaniasis. K-39 was positive in 7 cases, 14 patients had successfully completed the treatment, 7 with miltefosine, 4 with liposomal amphotericin B, 1 with sodium stibogluconate and cryotherapy, and 1 with sodium stibogluconate and amphotericin B, 1 with oral Fluconazole. Two patients were unable to come to our center as they were living in remote area.

Discussion and Conclusion

The cases of cutaneous leishmaniasis are increasing in Nepal but the proper reporting is not being done which should be taken care of. We should also advocate the presence of cutaneous leishmaniasis to the clinicians and pathologist of Nepal since it can be easily misdiagnosed as cutaneous tuberculosis and leprosy both clinically and histologically. Since most of the cases involves the face, delay in diagnosis can lead stigmatization and sometimes to facial disfigurement. There is also need of typing the strain of leishmania that is causing cutaneous leishmaniasis in Nepal as we are known to endemic for only *Leishmania donovani* strain. Leprosy is the major skin NTD in Nepal and has many programs ongoing to fight against leprosy so it will be very effective if other skin NTDs like cutaneous leishmaniasis are also get incorporated along leprosy programs as these programs have trained human resources and well-equipped hospitals and laboratories.

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Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis

Assessment of cutaneous leishmaniasis coverage and cases before and after integration into Afghanistan health service packages

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Cutaneous leishmaniasis (CL) is a widespread tropical infection caused by different species of Leishmania protozoa that are transmitted by sandflies. Secondary, uncommon transmission routes are also reported. Its clinical presentations are diverse and dependent on a variety of parasite and host factors that are poorly understood. Based on the WHO report, Afghanistan is an endemic country for CL and VL.

Case management of (CL) was fully integrated into the Basic Package of Health Services (BPHS) and Essential Package of Hospital Services (EPHS) of the country in 2017. Before integration, diagnosis and treatment of CL were only provided by the Provincial Malaria and other Vector Borne Diseases Program (PMVDP) through 24 functional sentinel sites in 21 provinces of Afghanistan using paper-based surveillance system, and the anti-leishmaniasis medicine was provided by WHO.

After integration, all related health providers at diagnostic health facilities and hospitals were trained on case management of Leishmaniasis including the new surveillance system. The BPHS and EHPHS implementing NGOs took the responsibility of anti-leishmaniasis provision as well.

This study aims to illustrate the effectiveness of the CL integration into BPHS and EPHS in term of services coverage and the number of CL cases in Afghanistan.

However, It is a descriptive study using surveillance data of the MVDP. The CL pre-integration data was extracted from the vertical system and the CL post-integration data was collected from malaria and leishmaniasis Health System (MLIS) and District Health Information System (DHIS2).

The information regarding service delivery and availability of anti-leishmaniasis medicine was extracted from MVDP M&E digitalization system. The data from 5 years before and 5 years after CL integration into Health services were compared based on coverage of the CL services and the number of cases. Excel and Epi Info V7.2.1 were used for data analysis.

Totally 140,112 CL cases were reported from 24 sentinel sites from 2012-2016,(4 central and 20 provincial) the annual average of the cases were 28,022. The remaining provinces were not providing anti leishmaniasis services due to lack of skilled staff and sentinel sites. Before integration, for all the CL centers, the anti-leishmaniasis medicine was provided by the WHO. The coverage of CL sentinel site based on provinces were 62% (21/34) and all the services at the provincial level were provided by the PMVDP staff.

After integration of CL services into BPHS and EPHS, CL cases have been reported from all 34 province of the country. During 2018-2022, totally 225,999 cases were reported and the annual average of the cases is 45,199. Around 90% (539/594) of all diagnostic centers at country level are providing diagnostic and treatment services. The availability of anti-leishmaniasis medicine at the health facility level is 70 % in 2022.

Data indicates 38% increase of CL cases and 28.7% increase in the coverage of CL diagnosis and treatment services after the integration.

Integration of Leishmaniasis in the health system of Afghanistan has increased the coverage of Leishmaniasis diagnosis and treatment services and has expanded the people's access. At the same time, the integration program has led to the supply of anti-leishmaniasis by the implementing NGOs. There is need to intensify the monitoring programs to ensure the implementation of leishmaniasis services is properly in place and the relevant implementing NGOs are regularly supply the optimum amount of anti-leishmaniasis medicine at the level of health centers.

Acknowledgments

As mentioned, cutaneous leishmaniasis is a serious problem in Afghanistan which is getting worse day by day but all the praise for WHO that keeps supporting by providing medicines and hosting workshops for capacity building.

Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis, integration, accessibility, coverage, Afghanistan

Epidemiology and clinical characteristics of implantation mycoses in a commercially insured population, United States

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Implantation mycoses, such as eumycetoma, chromoblastomycosis (including phaeohyphomycotic abscesses), and other deep mycoses (i.e., sporotrichosis, mucormycosis, talaromycosis, rhinosporidiosis, and lobomycosis), are a diverse group of fungal neglected tropical diseases that usually develop after traumatic skin inoculation. These infections primarily occur in resource-limited countries located in tropical or subtropical regions, may require prolonged antifungal therapy and surgery if not diagnosed early, and cause substantial stigma and morbidity. For most implantation mycoses, WHO treatment guidelines do not exist and U.S. data about these diseases are scarce. Understanding the U.S. epidemiology of these diseases might help inform prevention measures, increase early recognition, and stimulate research to improve diagnostic, surveillance, and treatment strategies. Therefore, we estimated prevalence and described the features of U.S. patients diagnosed with implantation mycoses during January 1, 2017–December 31, 2021.

We analyzed the Merative® MarketScan® Commercial and Medicare Supplemental databases, using ICD-10 codes to identify implantation mycosis patients and underlying conditions. We estimated the 5-year prevalence of each mycosis and described demographics and clinical characteristics.

During 2017–2021, among ~45,000,000 unique patients, prevalence per 1,000,000 was highest for chromoblastomycosis (14.7), followed by sporotrichosis (12.4), mucormycosis (10.4), and eumycetoma (5.2); prevalence was <2.0 for rhinosporidiosis, talaromycosis, and lobomycosis. Across mycoses, prevalence generally increased with increasing age and was highest among patients aged ≥65 years. Prevalence was higher among females compared with males for sporotrichosis (13.1 vs 11.6) and eumycetoma (6.4 vs 4.0). Prevalence varied by U.S. census region, with the highest chromoblastomycosis (16.4) and sporotrichosis (14.7) prevalence in the South, highest mucormycosis prevalence in the West (11.9), and highest eumycetoma prevalence in the Midwest (5.8). Prevalence was generally higher in rural vs nonrural areas, except for eumycetoma (2.9 vs 5.5). A higher percentage of patients with mucormycosis (43.6%) had an immunocompromising condition compared with eumycetoma (23.3%), sporotrichosis (16.7%), and chromoblastomycosis (15.1%). Mucormycosis patients were more often initially diagnosed in inpatient settings (35.4%) compared with the other mycoses (<10%, each).

Our analysis provides preliminary insight into implantation mycoses in the United States, each of which affected <15 commercially-insured patients per 1,000,000 during a 5-year period. Chromoblastomycosis was more prevalent than mucormycosis and sporotrichosis, two conditions that are more widely recognized and studied in the United States. This finding potentially reflects the comparatively indolent course of chromoblastomycosis, but also highlights the need for increased attention to this disease. That sporotrichosis prevalence was highest in the U.S. South and mucormycosis in the West is consistent with previously published studies. The female predominance for eumycetoma among U.S. cases contrasts with data from other countries and might reflect differences in care-seeking behaviors or other factors that this analysis could not assess.

Our analysis is limited by the lack of information on race/ethnicity, laboratory testing results (and thus, reliance on ICD-10 codes), exposure characteristics (e.g., travel history), and patients without or with other types of insurance. Nonetheless, our findings underscore the need for clinical awareness, treatment guidelines, surveillance, and improved diagnostic tools for implantation mycoses, despite their rarity, given the potential for debilitating disease if untreated.

Skin NTDs and/or integration – Keywords

Fungal diseases, chromoblastomycosis, eumycetoma, mucormycosis, sporotrichosis, rhinosporidiosis, talaromycosis, and lobomycosis

LeishMan, the European network for management of leishmaniasis, teams up with WHO to monitor imported and autochthonous cases in Europe

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[11]Clinical Microbiology, Infection Prevention and Control, Region Skåne, Sweden; and Department of infection medicine, Lund University, Sweden
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Case numbers on imported and autochthonous cutaneous (CL) and mucosal (ML) leishmaniasis in the European territory are poorly documented. Since 2010, over 50 infectious disease and diagnostic specialists from over 30 European institutes in 12 countries have teamed up in the informal network called "LeishMan". Initiated to harmonize diagnosis and treatment of the leishmaniases, LeishMan members report cases in a common database.

LeishMan has been collecting CL and ML case data since 2012. In 2020, the network joined forces with WHO in setting up a new database platform linked to the generic cutaneous leishmaniasis reporting tool of WHO (implemented in DHIS2). We gather data on epidemiology, clinical presentation, diagnostic tests, parasite species, and treatment.

Several papers have been published based on data collected by LeishMan, dealing with surveillance, diagnostics, species typing, and species-stratified clinical presentation and treatment. We will present a brief overview of these reports.

Implementation of the new data collection system is ongoing, with IT support from WHO, but in order to take full advantage LeishMan seeks additional partners to populate the database. This will further improve near real-time monitoring of the situation in Europe. As currently primarily institutes from West and North Europe are part of LeishMan, we especially invite members of eastern Europe and the Balkan to join our network.

Acknowledgments

The LeishMan network receives no specific funding. WHO is supporting the IT component in DHIS2.

Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis

Surveillance of tegumentary leishmaniasis in northeastern Italy

Authors: Stefania Varani[1,2] Tommaso Gritti[1], Valeria Gaspari[3], Annalisa Santi[4], Giorgio Galletti[4], Arianna Rossi[4], Gianluca Rugna[4], Elena Carra[4], Andrea Mattivi[5], Giulio Matteo[5], Giovanna Mattei[5], Gian L. Belloli[5], Margherita Ortalli[1], Gert Van der Auwera[6] and the Skin_Leish_RER network

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Tegumentary leishmaniasis (TL) includes cutaneous (CL) and mucosal (ML) leishmaniasis; despite being endemic in southern Europe, it is often underdiagnosed and underreported. This study aimed to retrospectively examine data from patients with TL in the Emilia-Romagna region (RER), northeastern Italy; molecular typing on selected samples was also carried out.

To perform this study, a network of 10 diagnostic units within the surveillance area (Skin_Leish_RER_network) was established, including specialists in Parasitology, Dermatology, Infectious Diseases and Pathology. All confirmed cases of TL that were diagnosed in RER between 2017 and 2020 were collected. Furthermore, molecular typing was performed on biopsies of selected TL cases. Two DNA targets were amplified by PCR and sequenced: the ribosomal internal transcribed spacer-1 (ITS1) and the heat-shock protein 70 gene (*hsp70*).

Between 2017 and 2020, a total of 135 TL cases were collected, with an average annual incidence rate of 0.76 cases per 100,000 inhabitants. The establishment of the Skin_Leish_RER network contributed to recover of 22 (16%) cases that were not reported to the public health authorities. Eighty-four percent of the TL cases were considered as autochthonous and exhibited a defined spatial distribution in the foothill area of the region. Among the clinical forms of TL, the most represented was CL (92%), while ML was found in 11 cases (8%). Analysis of ITS1 showed that 92% of tested samples (68/74) were consistent with *Leishmania infantum.* We also detected 4 cases of *L.major* and 2 cases of *L.tropica*; all 6 cases reported travelling in endemic countries for these *Leishmania* species. Further, *hsp70* typing of autochthonous cases showed the presence of sequence variants of *L.infantum* circulating in the selected region.

This study confirmed that TL is an underreported disease in northeastern Italy. We provide evidence of distinct geographic distribution of TL cases in the examined area as well as a high proportion of autochthonous ML cases; all autochthonous cases were typed as *L.infantum*.

Our observations suggest the need to raise the awareness about TL among clinicians and pathologists, promote the molecular confirmation of cases by reference laboratories and encourage the establishment of surveillance networks for this neglected disease.

Acknowledgments

This study was funded by Regione Emilia-Romagna (fondi LabP3), Ministero della Salute (Ricerca Corrente 2019, PRC2019016), University of Bologna (RFO funds).

Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis

Session 4 : Integrated surveillance and mapping – Other abstracts

Angola's experience and challenges in integrated management of skin NTDs

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Ministry of health, World Health Organization

Introduction

Skin-related neglected tropical diseases are characterized by skin lesions and are associated with long-term disfigurement and disability. They include leprosy, Buruli ulcer, leishmaniasis, mycetoma, yaws, onchocerciasis, lymphedema and hydrocele resulting from lymphatic filariasis and podoconiosis.

Integrated active case-finding to screen for neglected tropical diseases and manage skin-related cases was carried out between 26 April and 13 May. The diseases targeted by this initiative, the first of its kind in Angola, were leprosy, Buruli ulcer, yaws, human African trypanosomiasis and dracunculiasis. The case-finding was organized by the National Leprosy Control Programme with technical support from WHO/AFRO. The exercise revealed a real lack of knowledge about the epidemiological situation of tropical dermatoses in Angola, while identifying hundreds of people with specific skin lesions characteristic of a wide variety of dermatological pathologies involving an immediate need for approach and case management. It also gave impetus to the planning of national monitoring, elimination and eradication strategies.

Method

Treatment-based observational, descriptive cross-sectional research with an analytical component carried out by a multidisciplinary technical team of health professionals, composed of Angolan and foreign specialists in NTDs, in the period 26 April-13 May 2021.

The data was collected using forms and daily consultation meetings.

The research was preceded by working meetings (online and face-to-face) of the various participating delegations from DRC, Angola and WHO/AFRO, to share information on the organization of Angola/DRC cross-border surveillance, integrated case management of NTDs with skin manifestations, harmonization of the schedule and confirmation of villages to be visited, as well as logistical aspects.

Resuts and discussion

The research was conducted in 10 villages in the provinces of Zaire and Uíge, both bordering the Central Congo region of the Democratic Republic of Congo, with a sample frame of 630 individuals, 297 women and 333 men.

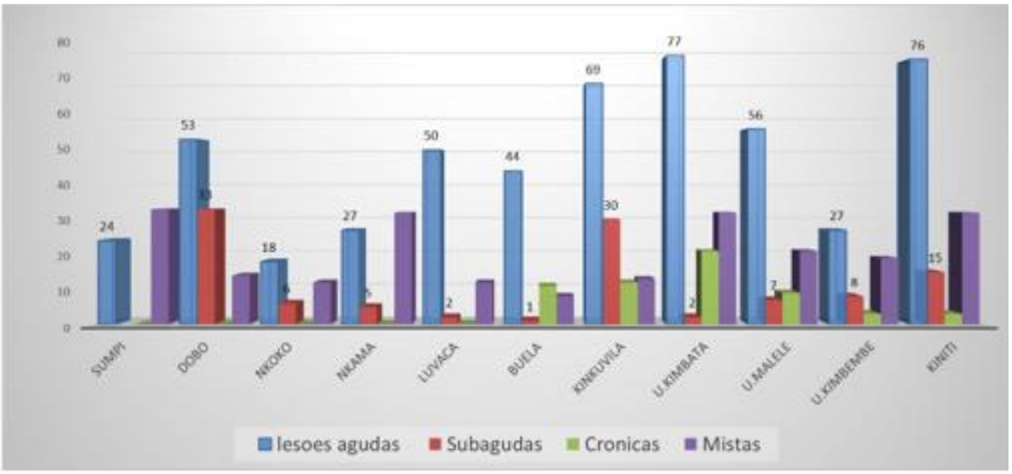

Figure 3. **Distribution by skin condition of cases observed during active case-finding in rural areas of tropical regions of Angola**

Legend: acute lesions; sub-acute; chronic; mixed

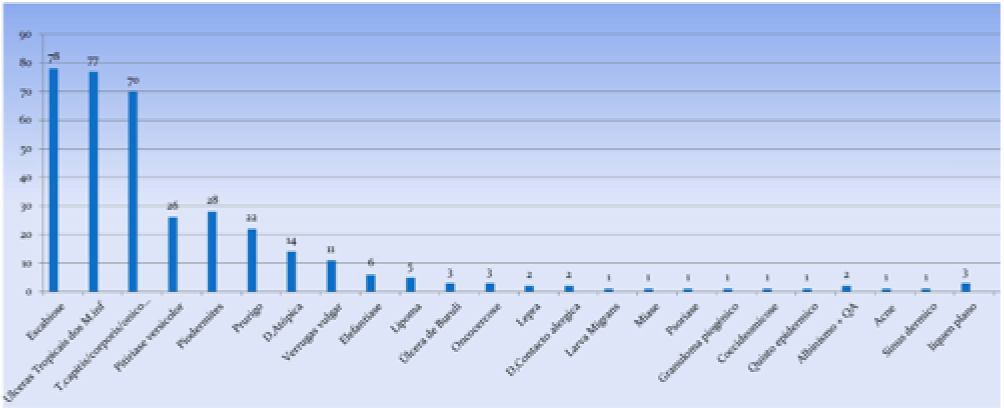

Figure 4. **Distribution of dermatoses observed in active case-finding in rural areas of tropical regions of Angola**

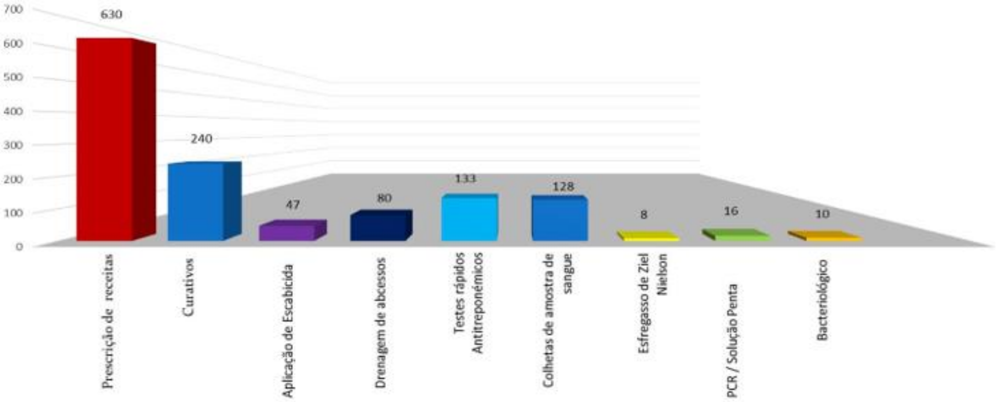

Figure 5. Distribution of procedures and examinations carried out during the active search for dermatoses in rural areas of tropical Angola

Conclusion

Based on the skin lesions observed in the 10 villages visited, the need to set up integrated case detection with a focus on skin diseases was perceived. This exercise helped to build the capacity of health professionals in the integrated screening of skin NTDs, and for the first time confirmed cases of indigenous Buruli ulcer, and identified the Mbanza Congo/Angola region as endemic for Buruli ulcer and other tropical ulcers.

Acknowledgments

First of all, we thank God, who has allowed implementation to become a reality and an achievement in our countries and in our lives, for fulfilling this wish of WHO/AFRO, in the person of Dr. Alexandre Tiendrebéogo. We would like to thank the WHO/AFRO and DRC technical team, who shared their knowledge of the integrated management of NTDs for the intensive management of cases with skin manifestations, with the team of professionals in Angola. We are grateful to the Sasakawa Health Foundation for funding the integrated management of leprosy, Buruli ulcer and yaws project. We would like to thank all those who participated in any way in this work.

Skin NTDs and/or integration – Key words

Skin NTDs, cross-border surveillance

Assessing the prevalence of tungiasis during soil-transmitted helminths and lymphatic filariasis surveillance in the coastal region of Kenya

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The World Health Organization (WHO) encourages neglected tropical diseases (NTDs) programs to employ an integrated approach for disease survey implementation through collection of data for NTDs with similar epidemiology and geographical distribution to avoid duplication of efforts, enhance efficiency and reduce implementation costs. There are currently no data on the prevalence of tungiasis at national or regional levels due to lack of resources and yet it is known to occur widely and to be having a considerable impact on school-aged children. The current study used an integrated approach to assess the prevalence of tungiasis along with soil-transmitted helminths (STH), and lymphatic filariasis (LF) during the LF Transmission Assessment Survey 1 (TAS 1) in two coastal counties of Kilifi and Kwale.

A cross-sectional integrated study was conducted in 330 randomly selected schools, 30 in each of 11 sub-counties in Kilifi and Kwale as recommended by WHO in areas where school enrolment is >75%. The study population for TAS1 included 17,602 children aged 6-7 years who were not severely ill. The presence of the circulating filarial antigen (CFA) among the consenting children was tested using the rapid filariasis test strip (FTS) and, if positive for filarial antigens, was subsequently tested using microscopy for microfilariae (MF). For STH and tungiasis, 60 children per school of ages 10-14 years were randomly selected,12 children from each of grades 4 to 8. All sampled children were asked to provide stool samples for STH testing, and each child had their feet washed, dried and carefully examined for the presence of *Tunga penetrans* fleas.

LF results

Positive results for LF antigenemia were only reported in Kilifi County in two sub-counties- Rabai 2/1,655; 0.12% (95%CI: 0.03-0.47) and Magarini 1/1,624; 0.06% (95%CI: 0.01-0.46). Night blood sample results subsequently taken for the three positive cases were all negative.

STH results

Overall, there was a moderately low school prevalence of STH in the two counties at 6.3% (95% CI5.1-7.9) in Kwale County and 4.0% (95%CI 3.3-4.7) in Kilifi County. The highest prevalence was in Msambweni sub-county (15.1%, 95%CI: 12.2-18.6). The prevalence of moderate to heavy intensity of STH infections was only 0.2% (95%CI 0.1-0.2).

Tungiasis results

The highest median school prevalence was recorded in Msambweni Sub-County (6.8%, 95%CI: 5.2-8.9), followed by Matuga (5.7%, 95%CI: 3.7-8.7), Kilifi South (5.6%,95%CI: 2.5-12.5), and was lowest in Kilifi North (0.3%,95%CI: 0.1-0.7). The highest intensity of infection was recorded in Kinango Sub-County with a median of 8.0 (IQR 2.8-8.0) embedded fleas, followed by Rabai with 4.0 (IQR 3.0-17.5). Schools with the highest prevalence were in the same wards as schools with a high prevalence of STH.

Integration of tungiasis into surveys for other NTDs was feasible and enabled the evaluation of tungiasis prevalence which had never been conducted before due to the lack of resources.

Acknowledgments

We would like to appreciate the World Health Organization and the END Fund for the financial support through the Interconnected Health Solutions and Amref Kenya

Skin NTDs and/or integration – Key words

Tungiasis integrated with soil-transmitted helminths and lymphatic filariasis

Interest of polymerase chain reaction (PCR) in the early diagnosis of leprosy in Antananarivo, Madagascar

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Introduction

Leprosy is a chronic bacterial infection where delay in diagnosis and treatment can lead to severe deformities. Leprosy is not still eradicated in Madagascar with a 1206 new cases per year. The standard diagnosis of leprosy is based on bascilloscopy of skin smears. Polymerase chain reaction (PCR) is not an usual diagnostic tool used for diagnosis in Madagascar; however, this technique would be better in the detection of early forms of leprosy. The aim of this study is to evaluate the value of PCR in the diagnosis of leprosy

Methods

This is a retrospective cross-sectional evaluative study from August 2012 to August 2021. All clinical forms of leprosy were included, referred to Charles Mérieux Infectious Diseases Center, which is the only Molecular Biology Center for leprosy in Madagascar. All the patients were from three departments of dermatology of the University Hospital Center of Antananarivo.

Results

The study included 113 new leprosy cases with a mean age of 34 years and a sex ratio of 2.42. For multibacillary forms, proportion of 72,57% (N=82) of the patients were positive for PCR, compared to 10.62% (N=12) for bascilloscopy. For paucibacillary form, PCR positivity was 54.55% (N=6) and bascilloscopy was all negative.

Conclusion

PCR is more sensitive than bascilloscopy, especially in the diagnosis of early leprosy. PCR has become a technique of first necessity in the early diagnosis of leprosy, throughout Madagascar

Skin NTDs and/or integration – Key words

Bascilloscopy, diagnosis, Leprosy, Madagascar, PCR

Session 5 : Disability, rehabilitation, stigma, mental health, and inclusion – Presentations

Wednesday, 29 March 2023 Chair: Christian Johnson		
Time	**Subject**	**Presenters**
09:00 – 09:20	**Keynote presentation:** The psychosocial and economic impact of skin NTD-related disability and stigma – how can rehabilitation help	Wim van Brakel
09:20 – 09:40	Patient organizations as partners in optimal health care	Jennifer Austin
09:40 – 10:00	Depression and quality of life amongst persons affected by filarial lymphoedema: determining socio-demographic and clinical risk factors, and the impact of an enhanced self-care treatment	Carrie Barrett
10:00 – 10:20	Informal health provider roles in addressing stigma and mental health needs among people affected by skin NTDs in Liberia	Hannah Berrian
10:20 – 10:40	Impact of a social intervention on podoconiosis-related stigma in Northwestern Ethiopia	Kibur Engdawork
10:40 – 11:00	Impact of tungiasis on neurocognitive development, school attendance and achievement	Berrick Otieno
11:00 – 11:20	Stigma experience, mental wellbeing, depression and social participation among persons with disability due to leprosy and lymphatic filariasis in North India	Wim van Brakel
11:20 – 11:40	The role of a community conversation intervention in reducing stigma related to lower limb lymphoedema in Northern Ethiopia	Maya Semrau Abebayehu Tora
11:40 – 12:00	Mycetoma disabilities and stigma: innovative thinking out of the box solutions	Ahmed Fahal
12:00 – 14:00	**Lunch**	

Patient organizations as partners in optimal health care

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Patient Centricity is a well-understood and accepted principle of designing a service or solution around the patient. It therefore stands to reason that organizations that support people living with dermatological diseases offer broad patient perspectives that can meaningfully inform and optimize national health policy, programs and interventions. In fact, the NTD Roadmap states: "…involvement of patient groups and people living with NTDs in designing NTD programmes can empower them and ensure that interventions adequately cater to patient needs."

GlobalSkin is a not-for-profit network of 209 patient organizations representing 67 countries and 57 disease areas in dermatology. GlobalSkin exists to: (1) Elevate the voice of the global dermatology patient community; (2) Champion the common interests of people affected by dermatological conditions globally; and (3) Unite global dermatology stakeholders to bring about transformative change for patients. By working with its extensive network, GlobalSkin has studied and documented lessons learned and best practices in how patient organizations can work with key stakeholders, including regional and national governments, in optimizing health services.

Close collaboration and co-creation with patient organizations generate program benefits at the country level by:

- Identifying verifiable patient and community needs
- Leveraging organizations' energy and patient networks
- Saving time, money and human resources
- Increasing the likelihood of patients opting-in.

Key outcomes from this type of patient organization involvement include:

- Increasing trust with patients
- Meaningfully meeting patient needs (the right program for the right people at the right time)
- Improving health outcomes and patient satisfaction within national health systems.

Best practices for successfully implementing this approach include:

- Developing frameworks for meaningful dialogue and engagement
- Supporting involvement of patient organizations as equal partners
- Promoting global exchange of best practices (GlobalSkin can be a repository for lessons and case studies and shared around the globe).

Types of collaborations with patient organizations that can be most impactful include:

- Identifying and addressing education and support gaps
- Supporting health promotion activities, including capacity and awareness building
- Helping to create patient education materials/program/events from a lay-person perspective.

The challenges of supporting people living with NTDs cannot fall solely to governments. Patient organizations must be engaged and empowered as key partners in building insights, connectedness and channels to patients. This is essential in meeting all three of the NTD Roadmap pillars.

Acknowledgments

GlobalSkin and its network of patient organizations

Skin NTDs and/or integration – Keywords

Integration across all diseases and all countries. Also supports NTD Roadmap in these areas: (1) Accelerate programmatic actions, (2) Health care infrastructure and workforce, (3) Capacity and awareness building, (4) Mainstream delivery platforms within national health systems. Also relevant to Universal Health Coverage.

Depression and quality of life amongst persons affected by filarial lymphoedema: Determining socio-demographic and clinical risk factors, and the impact of an enhanced self-care treatment

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Lymphatic filariasis (LF) can develop into lymphoedema, a progressive, disabling physical impairment. Despite a wealth of evidence on the physical morbidity associated with LF, less is known about the psychological impacts. This study aimed to determine; (1) prevalence of depression and low quality of life (QOL), (2) associated socio-demographic and clinical risk factors, and (3) the impact of an enhanced self-care treatment intervention for lymphoedema management. A prospective cohort study of adults with filarial lymphoedema from two regions of Malawi was conducted over six months. Patients were surveyed at baseline then trained in home-based enhanced self-care treatment. Follow-up surveys at 3- and 6-months were conducted. Depression and QOL were assessed using a self-reported patient health questionnaire (PHQ-9) and LF specific QOL questionnaire (LFSQQ), respectively.

Univariable beta regression was applied to identify significant socio-demographic and clinical risk factors, as well as any seasonal trend. Out of 311 patients surveyed 23% (95%CI, 18%-29%) reported mild/moderate depression (PHQ-9 score > 5) and 31% (95%CI, 26%-37%) reported moderate/severe lowered QOL (LFSQQ score > 30). A higher number of acute filarial attacks in the last month was significantly associated with higher depression and lower QOL scores ($p<0.001$). A significant reduction in depression and QOL scores was observed in the initial 3 months following the enhanced self-care treatment (OR = 0.93, 0.98, $p<0.001$). This impact was not significantly sustained after the 3 month follow-up. In conclusion, we provide evidence that implementing an enhanced self-care protocol can improve mental health in people affected by filarial lymphoedema, but suggested continuation of disease management, disability and inclusion activities that include psychological support is needed to sustain positive impact. To address these issues, further work has been conducted through a series of in-depth interviews with a subset of participants affected by lymphoedema. Analysis is ongoing and preliminary findings will be presented.

Acknowledgments

We thank the participants and acknowledge the support of the national team who undertook this field study. This research was approved by the Liverpool School of Tropical Medicine Ethics Committee and the National Health Sciences Research Committee, Malawi and supported by grants to the Centre of Neglected Tropical Disease in the Liverpool School of Tropical Medicine.

Skin NTDs and/or integration – Keywords

Lymphatic filariasis, neglected tropical diseases, mental health, depression, quality of life, self-care

Informal health provider roles in addressing stigma and mental health needs among people affected by skin NTDs in Liberia

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People affected by skin Neglected Tropical Diseases (NTDs) often experience co-morbid mental health conditions and social stigma related to beliefs surrounding the cause of their illness. These beliefs often have a supernatural and/ or spiritual element, which often leads people affected to seek care from informal providers (e.g. traditional or faith healers), or from both the informal and formal health providers to manage different parts of their illnesses. This may lead to delayed biomedical treatment, potentially resulting in permanent physical disability. Traditional and faith healers working in the community use their existing role to provide support for affected people. However, there is limited evidence for identifying suitable structures and opportunities for collaboration between formal and informal providers in the management of NTDs. As part of the REDRESS implementation research study, we sought to: investigate the role of informal providers in the management of NTDs in Liberia; their experiences and perceptions of caring for people affected by skin NTDs; and to co-design an intervention to improve their engagement through the use of participatory approaches.

Our findings reveal that health beliefs shape health-seeking in Liberia. Faith healers described feelings of empathy toward people affected by skin conditions as well as those experiencing mental distress. They reported stigma as a reason for people affected to conceal conditions. Both traditional and faith healers described needing multi-pronged approaches to addressing stigma at the individual and community levels. There was an emphasis on trying to dispel myths that underly stigma related to specific health conditions at the community level. Both faith and traditional healers described talk therapy and counselling as part of their role, as a form of giving hope to people that seem to be hopeless or rejected. They also expressed a desire to collaborate more with the formal health system in supporting people affected by skin NTDs.

In partnership with traditional and faith healers, we developed a one-day sensitization for informal providers which included an emphasis on recognition of people affected by skin NTDs, dispelling myths around the cause of these conditions, referral linkages, providing basic psychosocial support, and understanding stigma. To date, 588 informal providers across three counties in Liberia (Lofa, Grand Gedeh, and Margibi) have received this sensitization. After the sensitization, participants expressed appreciation for their new knowledge of the cause of skin NTDs, commitment to share awareness within their community, intention to refer people thought to have skin NTDs at an earlier stage to the health facility and to work in collaboration with health workers.

Our findings identified willingness of informal providers to collaborate with formal health providers to support care for people affected by NTDs, including the delivery of stigma reduction strategies and mental health support. Traditional and faith healers play a key role in providing support and addressing stigma. Sensitization sessions for informal providers can address myths and misunderstandings, with the potential to reduce stigma and inform referral. *Combatting NTDs requires multi-sectional collaboration between formal and informal health systems.*

Acknowledgments

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Skin NTDs and/or integration – Keywords

Key informal provider; faith healer; traditional healer; integrated case management; mental health, stigma, health-seeking; health beliefs words

Impact of a social intervention on podoconiosis-related stigma in Northwestern Ethiopia

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Podoconiosis is a neglected tropical disease that causes debilitating swelling of the lower legs among people who walk barefoot and have a genetic susceptibility. People affected by podoconiosis face stigma that intersects with other axes of disempowerment and marginalization. Although several interventions have been implemented to mitigate stigma, there is little information on the effectiveness of these interventions.

The targets of the intervention are characterized by low socio-economic status. We found gender to be an important influencer of health as husbands mostly make treatment-seeking decisions, resulting in higher participation of male patients in the intervention ($\chi 2$ (1) = 3.87, p =0.04). Stigmatising attitudes were common among community participants: 62% of unaffected respondents were not willing to help patients treat their feet and the vast majority (86.5%) were not willing to marry affected individuals. These attitudes led to stigmatising actions: 85.7% of patients reported that they had been insulted due to their condition while over a quarter (28.6%) reported that their possessions had been taken. Consequently, levels of felt stigma were high among patients. About 70% of affected individuals reported that their life was not satisfying while nearly two in three stated that they felt inferior to others. Misplaced beliefs were rife and included that podoconiosis was infectious or hereditary; both these beliefs significantly correlated with stigmatizing attitudes ($r= -0.21$, $p<0.01$ and $r = -0.16$, $p<0.01$, respectively). Although the associations are of borderline statistical significance, people involved in the intervention held fewer non-scientific beliefs about podoconiosis (p=0.06), were more knowledgeable about preventive actions (p=0.08) and were less likely to hold stigmatizing attitudes (p=0.06). However, there was no significant difference between felt stigma among affected individuals who were involved in the intervention and those who were not. Qualitative findings suggested that patients suffer from internalized stigma, and that while stigma towards affected individuals exists, the community did not consider it as important as the stigma related to evil eye, fistula, or tuberculosis. Patients with greater economic power or spiritual status were less stigmatized irrespective of their disease status.

Although the NGO intervention reached rural residents who never had access to health services before, and had the tendency to increase knowledge about podoconiosis and decrease stigmatizing attitudes in the community, it did not appear to reduce felt stigma among patients. A stronger focus on gender-transformative psychosocial support and economic empowerment programs might increase the impact of the program on stigma.

Acknowledgments

We would like to acknowledge the study participants, local officials and the intervention implementors (IOCC and NaPAN). This research was funded by the NIHR (NIHR 200140) using UK aid from the UK Government to support global health research.

Skin NTDs and/or integration – Keywords

Podoconiosis, stigma, intervention, health education, prevention, Ethiopia

Impact of tungiasis on neurocognitive development, school attendance and achievement

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Tungiasis is a highly neglected tropical skin disease caused by the sand flea, *Tunga penetrans*. The female flea burrows into the skin, mostly of the feet, where it grows 2000-fold inflicting immense pain and itching. Anecdotal reports suggest the pain and itching in turn causes difficulty walking, school absenteeism, reduced concentration in class, disrupts sleep and lowers school exam results. The objectives were to determine the impact tungiasis has on neurocognitive development and school achievement.

Neurocognitive development was assessed in a study of one sub-county in western Kenya and two sub-counties in south coastal Kenya, in which 454 pupils age 8 to 14 years were stratified random selected from 48 primary schools. Pupils were subjected to cognitive tests assessing language, literacy, numeracy, motor skills, working memory, cognitive flexibility, non-verbal intelligence, visual attention and response inhibition. Multilevel mixed effects generalized linear mixed models were used to assess associations between disease status and impact variables. School achievement and absenteeism were assessed from a nine-county survey in which stratified random sampling was conducted to select 95 primary schools from existing lists to include all sub-counties in each county across Kenya and to select pupils aged 8 to 14 years in each school. Surveys were conducted between October 2021 and November 2022. School attendance and exam scores were collected from school records for the previous term for 73 infected pupils and 539 uninfected pupils.

Tungiasis was associated with significantly lower scores in language (β=$^{-}$0.08, 95% CI $^{-}$0.13- $^{-}$ 0.02), cognitive flexibility (β=$^{-}$6.09, 95% CI $^{-}$10.91 - $^{-}$ 1.27), literacy (β=$^{-}$10.77, 95% CI $^{-}$19.29- $^{-}$ 2.26), fine motor control (β=$^{-}$0.75, 95% CI $^{-}$1.14-$^{-}$0.36), and response inhibition (β=$^{-}$0.05, 95% CI $^{-}$0.09- $^{-}$0.01). Pupils with tungiasis currently attending school had missed more days of school in the previous term than uninfected pupils (AOR 1.47, 95%CI 1.0-2.16) when adjusted for county, socio-economic status and age. They also had lower scores in school maths exams than uninfected pupils even when adjusted for age, sex, disability, socio-economic status, and absenteeism (AOR 0.24 95% CI 0.11-0.51).

These studies have demonstrated for the first time that children with tungiasis had poorer performance in multiple cognitive domains and poorer school achievement which may well affect their future academic and economic opportunities.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Tungiasis

Stigma experience, mental wellbeing, depression and social participation among persons with disability due to leprosy and lymphatic filariasis in North India

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A study was undertaken in Jaunpur District, Uttar Pradesh, and Bokaro District, Jharkhand, India, to establish the prevalence and geographic distribution of persons with disability due to leprosy and lymphatic filariasis (LF). The severity of impairments was also established. Over 11,000 persons were enumerated and mapped between September and December 2021.

The study investigated the extent to which women and men with leprosy- or LF-related disability perceive and experience stigma and the extent to which their mental wellbeing and social participation are affected.

A random sample of over 400 persons was interviewed regarding stigma perception and experience (SARI Stigma Scale), mental wellbeing (WEMWBS), signs of depression (PHQ-9) and social participation (Participation Scale Short Simplified). A community reference sample was also included to calculate locally-relevant reference values for the instruments used (n=98).

Two-hundred and one persons with leprosy-related and 240 with LF-related disability were interviewed, of whom 51% were women. The level of stigma experience was high; the mean SARI score was 16.4 (95% CI 14.2-18.7) among leprosy-affected and 10.2 (8.7-11.7) among LF-affected respondents. Forty-five percent and 50% had low mental wellbeing, respectively. Signs of moderate to severe depression were reported by 39% and 38%, respectively, while 41% in both NTD groups reported moderate or severe participation restrictions. In the community group, only 14% had low mental wellbeing, 14% moderate depression (no one moderately severe or severe) and 6% moderate or severe participation restriction.

The study enumerated over 11,000 persons with leprosy- or LF-related disability in the two study districts. In a representative sample, stigma experience was high, up to 50% had low mental wellbeing, over one third had signs of moderate to severe depression and 40% moderate to severe problems with social and work participation in both NTD groups. Integrated assessment using the same tools worked very well.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Leprosy, lymphatic filariasis; integrated assessment of disability, stigma and mental wellbeing

The role of a community conversation intervention in reducing stigma related to lower limb lymphoedema in Northern Ethiopia

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Community conversation (CC) is a community engagement strategy applied in low-literacy and resource-constrained settings to address health-related stigma. Enhancing disease-related health literacy at the community level, CC is believed to break the vicious cycle of psychosocial burdens induced by stigma related to skin-NTDs and improve access to morbidity management and disability prevention (MMDP) services. As part of the IMPRESS project, a quasi-experimental study was conducted in three purposively selected districts of Northern Ethiopia: one district acting as CC intervention site, while the CC intervention was delayed in the other two districts until after completion of six months' follow up. Comprehensive MMDP and mental health services including capacity-building training for health care organization staff, case detection and treatment for patients at health facility level, integrated mental health care, and community awareness campaigns were provided in both the CC intervention and control districts over a six-month period as part of the EnDPoINT project within which this study was embedded. The primary outcomes of the IMPRESS study reported here were experienced and internalized stigma in lymphoedema patients, community knowledge of the causes of lymphoedema, stigmatizing attitudes towards lymphoedema patients, social exclusion (social distance), and perceived social support. The CC intervention was implemented over a period of six months, with outcomes being assessed at baseline and at six-month follow-up. In intervention and control sites, a total of 254 lymphoedema patients and 759 community members without lymphoedema, who were present both at baseline and follow-up, were included in the analysis. At baseline, stigmatizing attitudes, social distance and levels of experienced stigma and internalized stigma were higher in the intervention district than the control districts, and social support for patients was lower. Over the course of the intervention, in all sites, knowledge increased, and social distance and stigmatizing attitudes decreased in the community, whilst experienced and internalized stigma decreased among patients. However, the changes in all these outcomes were greater in the sites in which the holistic care package was implemented without CC. This may be attributable to poor quality of CC implementation and requires further investigation. This study provides evidence that the CC intervention provides no additional stigma reduction when used alongside a holistic physical and mental health care package. An economic evaluation, which will be reported separately, will also be important in influencing policy. Provision of comprehensive and holistic MMDP services may be adequate and appropriate to tackle stigma related to lower limb lymphoedema in a resource-constrained setting like Ethiopia.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Lymphoedema, community conversation, experienced stigma, internalized stigma

Mycetoma disabilities and stigma: Innovative thinking out of the box solutions

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Mycetoma enjoys all the other skin NTDs characteristics. It garnered diminutive attention, despite its ability to inflict significant suffering and disabilities with numerous socioeconomic impacts on patients, families, and communities in endemic areas. It is stigmatising and leads to the marginalisation of afflicted individuals, trapping them in a vicious cycle of scarcity, poverty and disease progression. It usually affects the poorest of the poor in poor, remote communities. The disease is considered a social stigma in, particularly among females and children thus, they tend to hide it for prolonged, and when they are compelled to seek medical care, the condition is then at a late stage.

A review of the management of 10,000 patients with mycetoma seen at the Mycetoma Research Center, WHO Collaborating Center on Mycetoma revealed a poor treatment outcome with only a 27% cure rate, high recurrence (34%) and follow-up dropout (55%) rates. The amputation rate was 14%, and the disabilities and deformities rate was 34%.

To overcome these problems and difficulties affecting patients and their families, the MRC has invented several innovative solutions to support them. One of them is the establishment of the Mycetoma Vocational and entrepreneurship Training Center (SAAÍD). It is a hub for vocational training, business development, and entertainment located at the MRC. It aims to create an enabling environment for mycetoma amputees, disabled persons and their families to learn and develop income-generating skills, perform and upgrade their talents, and be prepared to lead a new life of being productive, self-reliant and confident. Reducing poverty, illiteracy and stigma of the affected patients and community are important SAAI'D objectives. SAA'ID has various vocational training programmes such as Sudanese handcraft and leather industry, artisan work, painting, graphics, woodwork, bakery, etc. Furthermore, it qualifies trainees on business development skills to become professional entrepreneurs and ready to establish small developing enterprises. SAAI'D had trained and rehabilitated a good number of patients and family members in various vocational activities. It also organised many advocacy and awareness campaigns and bazaars to sell the trainees' products.

The MRC had organised a prosthesis campaign at one mycetoma endemic village where a mobile workshop was mobilised to the village. More than 160 prostheses were made locally and given free of charge to needy people.

We believe these unique experiences can be replicated in many other low resources.

Skin NTDs and/or integration – Keywords

Disability, rehabilitation, stigma, inclusion, mycetoma

Session 5 : Disability, rehabilitation, stigma, mental health, and inclusion – Posters

Integration of skin NTDs in Nigeria through combined self-care groups: Lessons learned from the Ready4PEP

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Introduction

Although some Self-Care Groups (SCGs) existed in Nigeria in the past, many have disappeared, and the few remaining ones are barely or not functioning in many LGAs. SCGs are social associations involving persons affected by leprosy who meet regularly to support each other in preventing disabilities. They aim to promote the participants' disease knowledge, improve mental well-being, disability prevention, manage complications, empower persons affected to reduce internalised stigma, and, more importantly, facilitate friendships by exchanging experiences. Therefore, SCGs can be a way towards zero discrimination and zero disabilities caused by NTDs. In the past the groups are mainly for persons affected by leprosy. However, considering the need for SCGs to support not only persons affected the Ready4PEP project Nigeria introduced Combined Self-Care Groups (CSCGs) for persons affected by disabilities due skin-NTDs.

Methods

In 2021 and 2022, LTR Nigeria set up 17 CSCGs in 10 project LGAs across six implementation States. Persons affected by leprosy, lymphatic filariasis, other Skin-NTDs and non-communicable diseases, with or without disabilities and living in the same village, were invited for the group. A practical guide for health workers was developed that includes lessons learnt on setting up and guiding these groups. Health workers were trained in facilitator skills, disability prevention and empowering persons affected. A baseline on disability level and quality of life (using the WHODAS and the WHOQOL) was conducted and will be repeated at the end of the project (2023) to monitor possible changes at individual group member's level.

Results

The seventeen newly set up CSCGs consist of, on average 15 members, of which 35% is female. Among them, 86% are affected by leprosy, while 14% by Lymphatic Filariasis, Onchocerciasis, Mycetoma, Buruli Ulcer(BU), Diabetes Sickle Cell Disease and other diseases). More detailed results including WHODAS/WHOQOL results to be provided.

Discussion

During the work with CSCGs, it became evident that a linkage between the group and health worker at the primary health centre is essential for quality support. Although some changes in stigma and discrimination towards persons affected were verified, more attention needs to be paid to this, especially when expanding to new LGAs. Moreover, the 17 CSCGs appear to have too many members. Some of the members live too far from where activities occur. Therefore, splitting the existing groups into smaller, more locally functioning groups is recommended. Also, some groups have commenced self-help activities by contributing funds; therefore, start-up-support will be an enabler for economic empowerment. Nevertheless, a great milestone already achieved is that the National Tuberculosis and Leprosy Control Program has decided to include combined self-care group as part of the new national guideline for TB, leprosy and BU.

Conclusions

CSCG are a good strategy to support people affected by disabling NTDs and to promote self-care. They bring friendship, reduce stigma/discrimination, and contribute to finding new cases of NTDs in Nigeria. It can also serve as an entry point for economic empowerment and mental health. However, as the initiative is in its earlier stage, rigorous technical support and advocacy will ensure sustainability.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Leprosy, lymphatic filariasis, disability, community-based approach, integrated self-care groups

List of acronyms

WHOQOL - WHO Quality Of Life
WHODAS - WHO Disability Assessment Schedule
BU - Buruli Ulcer

Integrated management of skin NTDs in Jigawa State, Nigeria

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Neglected tropical diseases (NTDs) are a group of infectious diseases that thrive in resource-challenged settings in tropical and subtropical regions. Some NTDs have debilitating effects on humans leading to morbidity and irreversible disability. Provision of morbidity management and disability prevention (MMDP) services as part of the Lymphatic filariasis (LF) elimination programme is one criterion required by the WHO for validation of a country's elimination of LF as a public health problem. The WHO NTD roadmap also recommends a paradigm shift towards a holistic, cross-cutting, integrated and intersectoral approach for programmes. This paper presents the learning, challenges, and recommendations from piloting a comprehensive NTD project with the goal of integrating NTD related morbidity case finding with house-to house MDA and ensuring that comprehensive MMDP services are provided in Jigawa State, Nigeria.

The project was implemented across a population of about 500 thousand people in Birnin Kudu local government area of Jigawa State. An intersectoral stakeholders' planning and implementation approach was applied and community sensitization activities targeted demystify myths and misconceptions around the causes of LF and other NTD associated morbidities. Integrated pre- onchocerciasis and LF MDA training of health workers and community drug distributors (CDDs) had components of identifying and referring NTD morbidity during MDA. Psychiatric nurses and front-line health workers were also trained on the Mental Health Gap Action Programme (mhGAP). LF and NTDs related morbidities were referred to the nearest health facility during house-to-house MDA. At the health facility, the socio-demographic information and the features of the presented cases were used to verify the cases and the appropriate services were provided while some cases were referred to a secondary facility for further investigation and support. A participatory evaluation and a review meeting were conducted at the end of the project.

This comprehensive NTD pilot project demonstrated that an intersectoral approach enabled access to key services required by people affected by NTDs morbidity. Out of over 206 persons referred for hydrocele, 67 (33%) were confirmed and received hydrocele surgery. Forty-one lymphedema cases were identified, and the patients and their care givers were trained on home-based limb care and management. Majority of the other skin conditions referred were eczema and fungal infections. The trained mental health personnel assessed LF morbidity patients out of which twenty-seven patients presented symptoms of anxiety and depression due to social isolation and stigma associated with cultural beliefs about LF morbidity cases. These patients received psychosocial intervention and counselling. In some cases, antidepressants was provided while severe cases were referred to a specialist at a secondary. The integrated approach of identifying NTDs associated morbidity leveraging the MDA structure allows optimal use of resources. By training community health workers in comprehensive skin NTD services, the community can have access to trained personnel available to provide immediate solutions. To create a sustainable change in perception of NTD morbidity, it is crucial to continue advocacy, communication, and social mobilization with a focus on addressing myths associated with NTD related morbidity and demystifying mental health.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Skin NTDs, lymphatic filariasis; Morbidity Management and Disability Prevention (MMDP), integration, comprehensive

Buruli ulcer disease is associated with significant mental health distress and reduced quality of life in affected patients in Ghana

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Introduction

Although there is increasing evidence suggesting a strong association between neglected tropical diseases (NTDs) and mental illness, there is a relative lack of information on the mental health impact and quality of life (QoL) burden of Buruli ulcer disease (BUD) in affected individuals in Ghana. This study is to assess the impact of BUD on mental health and quality of life of patients with active and past BUD infection, and their caregivers.

Methods

We conducted a case control study in 3 BUD endemic districts in Ghana. Face-to-face structured questionnaire-based interviews were conducted on BUD patients with active and past infection, as well as caregivers of BUD patients using WHO Quality of Life scale, WHO Disability Assessment Schedule, Self-Reporting Questionnaire, Buruli Ulcer Functional Limitation Score and Hospital Anxiety and Depression Scale data tools. Descriptive statistics were used to summarize the characteristics of the study participants. Participant groups were compared using student t test and chi-square ($\chi 2$) or Fisher's exact tests. Mean quality of life scores are reported with their respective 95% confidence intervals. Data was analysed using STATA statistical software.

Results

The results show that mental distress and mental health sequelae was more prevalent in all BUD patients (active and past infection) and their caregivers, compared to controls. Depression (p=0.003) was more common in participants with active (27%) and past BU infection (17%), compared to controls (0%). Anxiety was found in 42% (11/26) and 20% (6/29) of participants with active and past BUD infection compared to 14% (5/36) of controls. Quality of life was also significantly diminished in active BUD infection, compared to controls. In the physical health domain, mean QoL scores were 54 ± 11.1 and 56 ± 11.0 (95% CI: 49.5–58.5 and 52.2–59.7) respectively for participants with active infection and controls. Similarly in the psychological domain, scores were lower for active infection than controls [57.1 ± 15.2 (95% CI: 50.9–63.2) vs 64.7 ± 11.6 (95% CI: 60.8–68.6)].

Participants with past infection had high QoL scores in both physical [61.3 ± 13.5 (95% CI: 56.1–66.5)] and psychological health domains [68.4 ± 14.6 (95% CI: 62.7–74.0)]. Significant levels of functional limitations in the lower limbs were observed in patients with active BU infection compared to patients with past BU infection.

Discussion

This study holistically assessed the impact of BUD on patients (active infection as well as past infection) and their caregivers. With these findings, we show BUD imparts substantial burden on the mental health of affected patients (active and past infection) and their caregivers when compared to controls. A range of functional limitations were associated with mental distress among BUD patients (active and past infection). Factors associated with functional limitations in BUD included the presence of pain, ulcers and dry scars.

Conclusion

BUD is associated with significant mental health distress and reduced quality of life in affected persons and their caregivers in Ghana. There is a need for integration of psychosocial interventions in the management of the disease.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Buruli ulcer, mental health

Patient-Reported Impact of Dermatological Diseases (PRIDD): Measuring impact of skin NTDs from the patient perspective

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When GlobalSkin formed in 2015, founding patient organizations from around the world identified significant gaps in their ability to advocate for their patients due to a lack of verifiable patient-evidence data. This is largely because existing patient-reported outcome measures (PROMs) are not theory-informed and do not comprehensively capture the full impact of dermatological diseases on patients' lives - including stigma, mental health and barriers to inclusion - and therefore underestimate patient burden.

The Global Research on the Impact of Dermatological Diseases (GRIDD) project was therefore initiated in 2017 to develop PRIDD (Patient-Reported Impact of Dermatological Diseases), a new measure of the impact of dermatological conditions on patients' lives. The novel methodology is based on gathering patients' views on the impacts of their diseases and is the first global research project from the patient perspective encompassing all dermatological conditions, including skin NTDs.

GRIDD is a mixed-methods study consisting of five phases, all of which were completed as of January 2023: 1) A COSMIN systematic review. 2) A qualitative interview study to develop the conceptual framework of impact and generate items. 3) A Delphi study to elicit consensus from patients on which impact items to prioritize for inclusion in PRIDD. 4) A cognitive interview study to evaluate PRIDD's content validity, acceptability, and feasibility. 5) Psychometric testing.

1) None of the 36 PROMs evaluated in the systematic review were recommended for use as the 'gold standard' primarily due to insufficient patient input during development. 2) The conceptual framework depicted impact as a multifaceted construct involving physical, psychological, social and life-responsibilities impacts. 3) The Delphi study reduced the item pool of 263 to a 27-item draft PRIDD. 4) Cognitive interviews produced a 26-item version of PRIDD with evidence of content validity, feasibility, and acceptability from patients. 5) A

confirmatory factor analysis refined the conceptual framework. PRIDD fit the Rasch model and met COSMIN for structural validity, internal consistency, construct validity, and test-retest reliability. The final 16-item PRIDD completed the psychometric phase and is ready for use. It will now be translated from its original English into 16 languages.

PRIDD was developed in partnership with 2,490 patients representing 90 conditions from 61 countries to meet COSMIN. PRIDD will address the shortcomings of existing measures and greatly enhance patient perspectives by providing quantifiable patient-impact data for better health care decision-making at the individual, national and global levels, and higher prioritization of dermatological conditions, including skin NTDs.

GlobalSkin will launch its global GRIDD Study in Q2 2023, including the new PRIDD measure, WHO-5, ED-5D, PHQ-9, GAD-7, DLQI and demographics. A sample size of 10,000+ people living with dermatological diseases worldwide, including skin NTDs, will be recruited. This validated data will fully describe the challenges patients face living with dermatological conditions and will contribute to cross-validation of the new PRIDD measure. Data and insights will be packaged by disease and country so that patients and organizations that support them can pursue evidence-based advocacy calling for improved access to the care and treatment they need.

Acknowledgments

Project of the International Alliance of Dermatology Patient Organizations (GlobalSkin), Ottawa, Canada in collaboration with Institute for Health Services Research in Dermatology and Nursing, University Medical Center Hamburg-Eppendorf, Hamburg, Germany and School of Healthcare Sciences, Cardiff University, Cardiff, United Kingdom. Funded by GlobalSkin via sponsorships listed here: https://globalskin.org/research.

Skin NTDs and/or integration – Keywords

Integration across all skin NTDs in all countries. Also supports NTD Roadmap in these areas: (1) Accelerate programmatic actions, (2) Health care infrastructure and workforce, (3) Capacity and awareness building, (4) Mainstream delivery platforms within national health systems. Also relevant to Universal Health Coverage.

Socio-economic cost and psychosocial effects of chronic wounds including ulcerative skin NTDs in the health district of Tiassalé, Côte d'Ivoire

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In Côte d'Ivoire access to wound care is constrained by socio-cultural and economic factors leading to late recourse to care and chronic development of wounds. This study aimed to assess the socio-economic costs for and psychosocial effects on patients and households in a subpopulation of Taabo HDSS.

A cross-sectional mixed qualitative and quantitative survey was conducted from August 2019 to May 2020 among 34 wound patients treated at the wound management unit (WMU) as part of the ongoing prospective community-based wound management study at three levels (community, health center, district hospital where the WMU is located). Data were collected using an interview guide and a questionnaire. Quantitative data were analysed using SPHINX software while thematic content analysis was conducted for qualitative data. The parameters analysed were direct and indirect costs and the psychological, emotional, and social impact on patients.

Self-isolation and social exclusion distress patients with chronic wounds. This continues to a certain extent under the long-lasting treatment of chronic and complicated wounds. The duration of care leads to family instability and loss of social status of adult patients, especially women, in the community. School dropout and failure were a common phenomenon among school-age children. The average total cost of complete wound management was around 48,000 CFA. Indirect non-medical expenses (family support, transport, food, production loss) represent 47% of the Ivorian monthly wage and 59% of the total cost of wound care.

Late identification and treatment of wounds, including skin NTDs, represents a big financial and psychosocial burden for patients and households. The ongoing study on the community-based wound management model explores the strategy “Identify and treat wounds early” to target the problem upstream, at the household level, to reduce suffering, cost and to cope downstream with access to care at health centers and district hospitals.

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Skin NTDs and/or integration – Keywords

Chronic wound, social, economic, psychosocial burden, wound management, skin NTDs, Buruli ulcer, yaws, lymphatic filariasis, common skin conditions.

Disability profile of people affected by leprosy in Janjgir-Champa district of Chhattisgarh, India

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Introduction

Leprosy can result in visible and functional impairments and disabilities if not treated early. Even after release from treatment, persons affected by leprosy can continue to develop new disabilities. Despite the disease being around for centuries, there is still a lack of credible data on the prevalence of disabilities related to leprosy-specific impairments. This factor is one of the main barriers to designing effective interventions. Considering the above, this study was conducted to obtain baseline data to effectively plan, develop and evaluate a follow-on study of an intervention to reduce the prevalence of disabilities among people affected by Leprosy through enhanced self-care. This study was a part of NIHR funded 5-year research project under the Research and Innovation in Global health transformation program NIHR200132.

Methods

A community based cross-sectional descriptive study was conducted from October 2021 to April 2022 in 3 blocks of Janjgir-Champa district. Data from the government healthcare registers was used to identify and trace persons affected by leprosy registered in the past 5 years. Those with neuropathy and impairments were included in the study. After obtaining consent, socio-demographic and clinical data (ulcers and eye, hand and foot disabilities) were collected using semi-structured questionnaire on electronic tablets.

Results

1695 patients were listed in the government registers. After tracing, 718 were excluded for various reasons and 977 were included for screening. 779 were excluded with no impairment, leaving 198 with impairment. 55 others with impairment, who were not on the registers, were identified and included in the study, bringing it to a total of 253 with leprosy-related impairments.

54.9% of the subjects were male, 45% were uneducated and 43.9% were farmers. 222 (87.7%) had Grade 2 disability. Mean EHF score was 4 ±2.27 SD.

129 (50.2%) had hand impairments, 209 (82.6%) had foot impairment. Prevalence of ulcers among those with sensory impairment was 31.58 (25.34-38.35 CI) and among those with history of ulcer was 66.99 (60.16-73.32).Mean surface area of the foot ulcers was 2.39 cm^2 ± 4.81 SD. On accounting for other variables, foot drop (OR 3.52, 95% CI 1.36-9.11), foot shortening (OR 2.88, 95% CI 1.24-6.69), foot callus (OR 2.76, 95% CI 1.16-6.57) and self-care soaking (OR 2.87, 95% CI 1.4-5.86) were found to be significant.

Discussion

27-30% persons affected by leprosy can develop disability during and after completion of treatment. Prevalence of disability is reported only at the time of registration. True prevalence is thus much more than known. This subset of patients do not feature in any surveillance system and thus unable to access disability care.

Community-based self-care interventions are essential in the prevention, early identification and management of the disability burden. Empowering patients to perform self-care early in the disease can help change the current disability scenario in leprosy.

Conclusions

There is a need to create and strengthen initiatives related to disability prevention and management. Reporting needs to be strengthened and surveillance systems need to be place. Community based initiatives will improve accessibility to services that will go a long way to improve disability care among persons affected by leprosy.

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Skin NTDs and/or integration – Keywords

Leprosy

Assessing the impact of tungiasis on quality of life in Kenya

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Tungiasis is a neglected tropical skin disease caused by the sand flea, *Tunga penetrans*. The female flea penetrates the skin, mostly of the feet, where it grows 2000-fold inducing inflammation, considerable pain, and itching. One previous study with a small group of patients found tungiasis impacted children's quality of life. In this study we aimed to assess that impact in a larger number of children in two distinct areas and cultures of Kenya using two different instruments.

From February 2020 to April 2021, 176 pupils age 8-14 years with tungiasis were quasi-randomly selected from 44 public primary schools in one sub-county in western Kenya and two sub-counties in south coastal Kenya. Each was interviewed using the dermatological quality of life index (mDQLI) tool modified for use in tungiasis. The caregivers of each infected pupil and 197 uninfected pupils were interviewed for their own health status using the Patient Health Questionnaire (PHQ-9), and for them to assess their child's health-related quality of life (HR-QoL) using the proxy KIDscreen52® instrument. The caregivers were also interviewed for household risk factors. The KIDScreen52® data was processed according to standard procedures. Multilevel mixed effects generalized linear or panel ordered models were used to assess associations between disease status and impact variables.

Of the infected children interviewed using the mDQLI tool, 30.3% reported tungiasis had a moderate to very high (mDQLI 13-27) impact on their quality of life. The areas of their life impacted the most were feelings of sadness and shame, ability to sleep and to concentrate in school. There was no association with disease severity, mild disease having <11 fleas, severe having >10 fleas (adjusted incidence rate ratio (AIRR) 1.06, 95%CI 0.85-1.32), but there was with caregiver depression (AIRR1.38, 95%CI 1.1-1.72), if a caregiver reported they hugged the child (AIRR 0.66, 95%CI 0.5-0.86) and if the child reported talking to nobody when unwell (AIRR 1.61, 95%CI 1.25-2.09). In bivariable analysis, there was a positive association of mDQLI with levels of pain (IRR 1.43, 95%CI 1.31-1.57) and itching (IRR 1.42, 95%CI 1.29-1.57). Pupils' HR-QoL as reported by their caregiver was negatively associated with severe disease (β coefficient-23.36, 95%CI $^{-}$42.71- $^{-}$4.01). However, this was confounded by the caregiver depression (β $^{-}$40.65, 95%CI $^{-}$57.61- $^{-}$23.69), the time the caregiver reported spending with the child (β 24.0, 95%CI 6.85-41.16) and their region of residence (β 29.72, 95%CI 13.53-45.9). The HR-QoL domains associated with severe tungiasis were negative emotions (β $^{-}$4.39, 95%CI $^{-}$7.24- $^{-}$1.55), self-perception (β $^{-}$4.41, 95%CI $^{-}$7.03- $^{-}$1.78) and bullying (β $^{-}$6.06, 95%CI $^{-}$9.57- $^{-}$2.55). There was no association of this caregiver assessed HR-QoL with levels of pain and itching reported by the child. Responses to the two instruments were significantly, negatively correlated to each other (β $^{-}$4.22, 95% CI $^{-}$6.0- $^{-}$2.63, p<0.001).

The two instruments both indicate the quality of life of these children are impacted by tungiasis but there is interference from the many other challenges in the children's lives and possibly a culture of not expressing negative emotions which influence their responses.

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Skin NTDs and/or integration – Keywords

Tungiasis

Addressing social stigma through community awareness campaigns in Tigray, Northern Ethiopia

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Cutaneous leishmaniasis is endemic to the rural areas of northern Ethiopia and continues to be a major public health concern today. This research focuses on how people with cutaneous leishmaniasis coexist and interact with the people within their society and when living in other areas. The study was undertaken throughout much of 2022 in two districts of Tigray region, Ethiopia, namely, Degua-tembein and Subuha-saesie. Ethnographic fieldwork was employed to understand people's perception knowledge and awareness about the disease and community attitudes towards CL patients.

The findings reveal that Cutaneous leishmaniasis had a huge impact on the livelihood of the people with cutaneous leishmaniasis. They faced several challenges at work, school and social gatherings like markets, and churches, and while performing collective endeavors. The level of work impairment and stigma depends on the size and location of the lesion as well as popular beliefs on mode of transmission. If the lesion appears on the hands, legs and face, CL patients fail to carry out their daily routines including agricultural activities because they get hurt, it bleeds and hence they experience pain. People with CL alienate themselves from taking part in religious feasts, and social events such as weeding, christening and cultural celebrations because of social stigma or the fear of it. Children dropped out from school because they were mistreated by their fellow compatriots and did not have the confidence to play with their friends. People with active lesion never dared to socialize because they believed people would feel shocked which made them feel embarrassed. Women with Ccutaneous leishmaniasis also felt less of themselves because they were not preferred for marriage due to the lesion and were exposed to social stigma. The conclusions of the study point towards the need to have interventions aimed at promoting early treatment, community awareness and reducing stigma thereby ultimately empowering CL patients. Target groups should include, health extension workers, community elders, religious leaders, women and the youth.

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Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis, stigma, livelihood, school, lesion, embarrassment

Albinism in tropical areas: a skin condition with a complex physical, mental, and social burden addressed by a network of complementary stakeholders

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Global Albinism Alliance

Albinism is a rare, genetic, congenital condition characterized by decreased or absent pigmentation in the skin, hair and/or eyes. Albinism occurs worldwide regardless of ethnicity or gender. Prevalence data is still scarce and approximate. In Western societies, albinism has been documented to range from 1:14,000 to 1:17,000. In African countries, it is said to lie between 1:1,500 and 1:15,000.

The lack of melanin pigment in persons with albinism (PWAs) increases their vulnerability to the sun. Their skin is more exposed to the chronic effects of UV-radiation, and they are at higher risk of developing non-melanoma skin cancer.

Although skin cancer in PWAs is preventable and curable, in tropical countries, where UV-radiation is high and the socio-economic status of the populations rather low, many PWAs develop skin cancers before 30 y/o, which significantly impacts their life-expectancy.

In addition to physical health concerns, in tropical and subtropical countries, where the population has generally a rather dark pigmentation, PWAs are hyper-visible, which contributes to significant social and psychological challenges. Their very distinctive appearance is the source of recurrent stigmatization, discrimination, and marginalization. Most social discrimination appears to stem from a lack of education on albinism among communities. There is limited awareness of its genetic inheritance, giving rise to numerous deep-rooted myths and superstitions. In those same countries, PWAs are also often reported to be victims of harmful practices related to witchcraft and ritual attacks.

To address these multiple challenges, numerous local and national associations of PWAs have been founded over the past forty years, starting with the Tanzania Albinism Society, created in 1978.

In the late 2000s, greater media coverage led several international NGOs to launch albinism programs in several sub-Saharan countries. Some of them have focused on access to education and advocacy. Others have chosen to work on access to health, developing skin cancer screening and treatment programs, as well as setting up local sunscreen production units.

In addition, efficient advocacy efforts at the global level have led to the adoption of several UN resolutions, including the 2015 creation of a mandate at the OHCHR with the nomination of an Independent Expert to address the rights of persons with albinism.

Recently, active governmental involvement has been reported in several tropical countries. Two examples are Panamá and Guinea, where advocacy efforts made by national albinism associations led to the adoption of laws addressing the special needs of PWAs, including in the field of skin health.

Finally, in 2020, an international alliance of albinism organizations was created to advocate at the global level, improve knowledge about albinism and help and support member organizations.

Today, these organizations, together with healthcare providers and other human rights and disability CSOs, form a very rich ecosystem where everyone has a role to play and where better progress is made when all stakeholders work together. Interestingly, regardless of the country, the starting point of any successful set of initiatives often appears to be the existence of a strong national association representing and gathering the albinism community.

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Skin NTDs and/or integration

Skin cancer in Albinism

Social participation of persons living with disabilities associated with neglected tropical diseases in Benin in 2022

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Introduction

The issue of disability raises a set of multi-sectoral issues which, if not resolved, generate obstacles to the integration of people with disabilities. People with neglected tropical diseases detected at a late stage have disabling sequelae that affect their social and economic life owing to stigma. Our objective is to identify the factors associated with the social participation of people with disabilities resulting from neglected tropical diseases in the communes of Ouidah, Lalo, Pobè and Allada in Benin in 2022.

Method

This was a cross-sectional, analytical study conducted in 2021-2022. The study population consisted of people with disabilities resulting from neglected tropical diseases in the aforementioned municipalities and surrounding area. A systematic random sampling method was used. The dependent variable was social participation assessed according to the P-scale, categorized into five degrees of restriction defined in accordance with WHO criteria, which were then made binary (no restriction/with restriction). The independent variables were socio-demographic and socio-economic, linked to diagnosis and evolution, support, perception and psychology.

Results

418 people living with a disability were surveyed, experiencing 72.2% restriction of social participation. Disability-related types of neglected tropical diseases with skin manifestations included Buruli ulcer, leprosy and lymphatic filariasis. The study population was predominantly male with a sex ratio of 1.4; the mean age was 36 ± 20 years (min: 1.5 years; max: 90 years); 70.1% were Christians; 95.7% had low income. They were 43.5% single and 53.6% uneducated. The types of disability encountered were motor (62.7%), sensory (22.7%) or cerebral palsy-type (8.6%). The cause of the disability (ORa: 1.22 [1.05-1.42]; p = 0.011); personal care (ORa: 0.38 [0.19-0.71]; p = 0.003) and acceptance of the disability by the family (ORa: 0.36 [0.15-0.85]; p = 0.025) were factors associated with social participation.

Conclusion

The majority of people with disabilities experienced a restriction in social participation. Family acceptance protected against restriction, while the cause of the disability increased the risk, thus testifying to the fact that the restriction is essentially the result of stigma in the community. Awareness-raising interventions for people with disabilities and for the community will reduce this stigma.

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Skin NTDs and/or integration – Keywords

Social participation, people with disabilities, neglected tropical diseases, Benin

Health-related quality of life of adults with cutaneous leishmaniasis at ALERT Hospital, Addis Ababa, Ethiopia

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Cutaneous leishmaniasis (CL) is the most common form of leishmaniasis. There is a large burden of CL in Ethiopia. The effects of CL on the health-related quality of life (HRQoL) of affected individuals has not been formally assessed in Ethiopia.

The objective of this study was to assess HRQoL in adults with active CL at ALERT Hospital, Addis Ababa, Ethiopia using the Amharic version of the Dermatology Life Quality Index (DLQI).

A cross-sectional study of eligible adults with CL was conducted in which trained health staff administered the DLQI.

302 patients with active CL participated. The median DLQI score was 10 (IQR 8). There was no significant difference in DLQI scores between male and female participants or rural and urban dwellers. DLQI scores were higher in patients diagnosed with DCL (median 18) compared to patients with LCL and MCL. The DLQI domain of 'work and school' was the most affected, scoring 71% of total possible scores, followed by that of 'symptom and feeling' (at 54.5%), whereas the 'personal relationships' domain showed the lowest score (22.2%). Men were significantly more affected than women in the domains of 'leisure' and 'personal relationships'.

Conclusion: In our study, all of the participants reported that CL had an impact on their HRQoL, the effect of which ranged from small to extremely large. The most common affected subdomain of the DLQI was 'work and school'. Physicians need to consider the high prevalence of impaired HRQoL in people affected by CL and should consider this as part of good care. Counseling should be provided on the nature of the disease, therapeutic options as well as clinical outcomes and complications. Further study is needed to assess the association of different clinical parameters and the effect of treatment on HRQoL, possibly with more disease specific tools.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis, HRQoL, DLQI, Ethiopia

Ethnographic observations of wound management at a traditional therapeutic setting in the Atwima Mponua District of the Ashanti Region of Ghana

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Skin NTDs such as leprosy and Buruli ulcer are perceived as diseases of the poor. Studies have highlighted that in many endemic areas, treatment seeking at the traditional therapeutic settings most often precedes the health facility. This may be due to financial difficulties faced by the patients, lack of access to health facilities, or poor attitudes of healthcare personnel if such facilities exist among others. However, there is dearth of information on the care received by affected people from such settings. The study's objectives were to understand how Buruli ulcer wounds are managed at the traditional therapeutic setting and to characterize the interactions between the care provider and patients and among patients.

We did a one-year ethnographic study that involved direct observations and informal conversations at the traditional healer’s setting to better understand the interactions between the traditional healer and patients during wound management in this setting. Ten (10) Buruli ulcer patients were purposively sampled for the study with aid of the traditional healer. Prior to the data collection, consent was sought from the traditional healer and the patients.

Generally, we observed that wounds were managed by the traditional healer in similar ways including dressing using unsterilized dressing materials (gauze, cotton, and bandages), wound cleaning with hydrogen peroxide, and treatment with local herbal preparations. By observing the wound dressing processes, we noted some infection control concerns, including the traditional healer using unsterilized scissors, and most of the time, the same pair of gloves was used on all the patients. However, we saw no evidence of prejudice or stigmatizing behavior, and on several occasions noted healers sympathizing and empathizing with patients during treatment.

Informal conversations with patients revealed unconditional trust in the effectiveness of traditional wound care, local beliefs associated with illness causation, testimonials/success stories, low treatment cost, compassionate and respectful care, and flexibility of payment as some of the factors promoting the patronization of traditional wound management over the formal healthcare. Interactions with the traditional healer suggest his readiness and willingness to collaborate with the formal care system to meet the health needs of skin NTD patients.

The findings of this study are congruent with other research results that treatment costs, local aetiologies, the lay referral system, attitudes, and behaviors of healthcare providers among others make patients choose care from traditional healers over the formal care system. Findings from this study suggest that traditional healers play a meaningful role in the support of people with skin conditions in the community providing both wound management and informal psychosocial support. However, we noted that inadequate infection control measures could promote the transmission of other infections from patient to patient. Therefore, we recommend that the district health directorate and other relevant stakeholders explore measures like establishing a network of traditional healers in the district and introduce them to proper wound management practices and appropriate onward referral where necessary to improve treatment-seeking outcomes for patients with skin NTDs.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Buruli ulcer, stigma

Empowering people with cutaneous leishmaniasis in Brazil, Ethiopia and Sri Lanka: A decolonial approach to global health research (ECLIPSE)

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Cutaneous leishmaniasis (CL) is a stigmatising neglected tropical disease which affects highly marginalized and underserved communities across the globe. Disease control strategies are often medical-centric, ignoring the heavy psychosocial burden of the condition. We present here findings from the five-year interdisciplinary ECLIPSE programme which aims to improve the CL patient journey and reduce stigma in the most underserved communities in Brazil, Ethiopia and Sri Lanka. ECLIPSE brings together an international, cross-cultural, multidisciplinary team of over 60 researchers, including anthropologists, parasitologists, clinicians, psychologists, leishmaniasis specialists and public health researchers to work directly with community members of the three countries in developing culturally appropriate interventions.

The ECLIPSE team are working towards a patient journey that is holistic, patient-centred and mapped on a biopsychosocial model of CL. Two types of interventions are being co-developed, implemented and evaluated in each ECLIPSE country, aimed at promoting early diagnosis and treatment seeking behaviour, decreasing social isolation and stigma, empowering CL-endemic communities and improving treatment pathways. The ECLIPSE team have used a range of qualitative and quantitative methods and anthropological theories to gain in-depth understanding of people, communities and healthcare professionals experiences and views on the effects of CL on the daily lives of those affected, the barriers to seeking healthcare, obtaining accurate, early diagnosis and receiving effective treatment. The insights gained are now informing the development of new interventions: health promotion campaigns to increase disease awareness and reduce CL-associated stigma in affected communities to facilitate health seeking behaviours, and training packages for healthcare and education professionals.

The ECLIPSE team is strongly committed to involving community members in all the ECLIPSE activities in partner countries. Each stage of our applied health programme is conducted with community members, in line with our ethos: '*no research about us, without us*'. We recognise, value and amplify the community knowledge and understandings of health and illness, and the facilitators and challenges to seeking treatment for CL. This recognition places community engagement and involvement at the heart of ECLIPSE. The communities' experiential knowledge, combined with other knowledge (such as biomedical and anthropological insights) is resulting in the co-creation of new knowledge which underpins the ECLIPSE interventions.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis, stigma, social sciences, anthropology, patient journey, interventions

Quality of life in patients with scabies: A cross-sectional study using Dermatology Life Quality Index (DLQI) questionnaire

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Scabies has a high prevalence and is a major public health concern in many parts of the world.

In certain areas, scabies represents the fifth most common skin disease with a large

number of cases noted during summer. The prevalence of the scabies worldwide is around 300 million cases with a high number of cases in South-East Asia. In Nepal, the prevalence of scabies is 5.5%. Scabies predominates in people of lower socioeconomic strata.

We conducted a prospective observational study among the patients who visited our government hospital with clinical features of scabies from April 2021 to April 2022. After an informed written consent, Quality of Life (QoL) assessment was performed using self-administered Nepali translated version of the DLQI questionnaire.

The final analysis included 119 patients. Of these, 76.5% were males, 61.3% were living single and 57.1% were students. The mean age of the study population was 24.69 ± 8.74 years. Almost half of the people (42.8%) had had scabies for more than 1 month.

Fifty-one percent of patients had at least one member of family with similar symptoms. Forty-six patients (38.6%) had clinically visible bacterial infections at the time of the OPD visit, and 63% of patients had all limbs and trunk affected with scabies. The overall impairment in quality of life (QoL) was 'very large' with a mean total DLQI score of 12.91 ± 5.93. Males had slightly higher scores. Symptoms and feelings sub-domain were the most affected with 68% impairment, while personal relationships sub-domain was the least affected with 27%.

Our results show that patients with scabies have a significant decrease in their QoL. In our study, majority of the scabies affected patients were males, living singly and were students. The total DLQI score in our study of 12.91 was higher than in a study from China with mean DLQI of 10.

A similar other study from Brazil using modified DLQI showed that majority of Brazilian patients had moderately reduced QoL.

In summary, our study highlights the greatly impaired QoL in scabies even in the case of a short

duration of the disease.

Acknowledgments

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Skin NTDs and/or integration – Keywords

DLQI, quality of life, scabies

Buruli ulcer and yaws in Ghana: Stigma experiences, impacts and coping among patients and past patients

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Introduction

For several decades, stigma related to Neglected Tropical Diseases (NTDs) has been recognized as a global concern, especially those that present on the skin ("skin NTDs"). Despite this, it has remained a problem, contributing to poorer health outcomes and posing significant psychosocial burden to patients and their care-givers. Yet, studies have remained focused on investigating stigma in selected individual skin NTDs within limited social contexts. Meanwhile, in line with WHO call for integration, more holistic body of evidence comparing the forms and types of stigma in skin NTDs that co-occur within same geographical settings may be crucial to inform integrated interventions aimed at improving health and wellbeing in affected people within specific settings. This study therefore aimed to holistically explore stigma associated with two important skin NTDs - Buruli ulcer and yaws - within selected districts in Southern Ghana to find out community stigma predictors, patient experiences, impacts and coping strategies.

Methods

A concurrent mixed methods design was employed. Data was collected within a two-month period (June-July 2022) for both components of the study.

First, using the multi-stage sampling method, a total of three-hundred and eighty-four (384) community members from 16 communities within the Atwima Mponua district were surveyed and analyzed using SPSS to understand community knowledge, beliefs and attitudes reinforcing stigma.

In addition, face-to-face interviews were conducted with 31 past and active Buruli ulcer (15) and yaws (16) patients within Atwima Mponua and the Upper Denkyira west districts in Ghana. Interviews were conducted and thematically analyzed to explore the experiences, effects and coping strategies used in managing disease related stigma. To identify participants, health facility records were consulted, however, data saturation was used as a guide to regulate the number of participants, who were largely young (24 years and below), partaking in this component of the study.

Results

Our survey revealed that misconceptions in community knowledge about disease causation, transmission, cure and prevention were correlated with stigmatizing attitudes towards people affected by Buruli ulcer and yaws. From the patient interviews, Buruli ulcer recorded more enacted stigma in the forms of exclusion, name-calling, teasing and discrimination. However, internalized and felt stigmas were more frequently associated with yaws as compared to buruli ulcer. Affected people reported that both community and self-stigma experiences led to negative impacts such as psychosocial burden,

academic underachievement and strained social relationships. However, due to the fear and experiences of stigma, many patients were noted to seek and adhere to healthcare, digressing from some mainstream past evidences, where poor health seeking behavior was associated with stigma. Patients coped with stigma through concealment, religion, confrontation, selective disclosure and information management.

Discussion/Conclusion

As shown in other NTDs like Cutaneous leishmaniasis, community education strategies (posters, campaigns, jingles, video vignettes, etc.) alongside other interventions are crucial in promoting community knowledge and awareness of diseases, contributing to reduced stigmatizing behaviors.

Also, as proposed in other chronic diseases associated with internalized stigma like HIV, where counselling has helped reduce anxiety and encourage social integration, we encourage the incorporation and strengthening of psychosocial measures, in the management of affected persons as substantial self-stigma was associated with both diseases in the study.

Acknowledgments

We wish to thank the individuals and communities for their participation in the work of the Skin Health Africa Research Programme.

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The funder had no role in study design, data collection and analysis.

Skin NTDs and/or integration – Keywords

Buruli ulcer, yaws, stigma, integration, macro, micro, internalized

Session 5 : Disability, rehabilitation, stigma, mental health, and inclusion – Other abstracts

Podoconiosis: A neglected disease

Authors: Aldo Morrone, Mauro Berta, Ottavio Latini, Alessandra Scarabello, Francesco Vaia, Hagos Godefay, Esayas Haregot, Antonio Cristaudo

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Podoconiosis, also referred to as endemic non-philarial elephantiasis or Elephantiasis nostras is a geochemical inflammatory disease that occurs in people living in contact with soils composed of red clay, derived from alkaline volcanic rocks. Podoconiosis was identified by the World Health Organization (WHO) as a neglected tropical disease in 2011, but still no global target has been set for its elimination. In recent years, however, there has been considerable progress in scientific research on podoconiosis and the commitment of endemic countries to control the disease has increased, and its elimination has now been placed on the global health agenda. It is a chronic and debilitating disease that, although rarely reported outside endemic regions, is considered a major health problem in at least 10 countries in Tropical Africa, Central and North America. In Ethiopia alone, about 11 million people (10% of the population) are at risk, and a recent estimate based on prevalence data in an endemic area of southern Ethiopia suggests that between 500,000 and one million individuals are affected in this country. Social stigmatisation of those affected is high and leads to severe social, educational and religious limitations.

The impact of podoconiosis is not clearly defined at present, although available estimates seem to indicate that globally there are more than 4 million people affected by podoconiosis, mainly in the tropical countries of Africa, Central and South America and South-East Asia. Tropical African countries bear the highest burden of disease. Scientific research identifies at least 32 countries as endemic or suspected to be endemic.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Podoconiosis, integration, Italia, Ethiopia

Tungiasis stigma and control practices in a hyperendemic region in Northeast Uganda

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Skin NTDs are highly stigmatised due to their visibility and association with poverty and often hygiene. But how does stigma play out in communities where the majority is affected?

This household-based study investigates tungiasis-related stigma and control practices in the impoverished rural district of Napak, northeast Uganda, where tungiasis is hyperendemic. We conducted a community-wide Knowledge, Attitudes, and Practices (KAP) questionnaire survey with the main household caretakers (n=1,329) in 17 villages and clinically examined our respondents for tungiasis. Questions from the KAP questionnaire that related to stigma and control practices, as well as socio-demographic data, were selected for this presentation.

Prevalence of tungiasis among our respondents was 61.0%. Most respondents had no formal education (84.7%) and described their occupation as casual labour (43.2%), small-scale crop farming (14.9%), or ‘none’ (29.1%) Tungiasis was perceived as a serious and debilitating condition tungiasis-related stigma was common in this hyperendemic setting. Respondents expressed judging attitudes (42.0%), frequently associating tungiasis with laziness, carelessness, and dirtiness, but also compassionate attitudes (36.3%), such as feeling sorry for people with tungiasis or stating that they needed help. While respondents indicated that they made an effort to keep their bodies and house floors clean (important tungiasis prevention measures), lack of access to water and soap was common. The most frequent local treatment practices were hazardous manual extraction of sand fleas with sharp instruments (89.8%) and application of various and sometimes toxic substances (58.4%).

Reliable access to safe and effective treatment and water are key to reducing the burden of tungiasis-associated stigma and morbidity, and elimination of dangerous treatment attempts in this hyperendemic setting.

Acknowledgments

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This research was funded by Else-Kröner-Fresenius Foundation (EFKS), a philanthropic institution funding humanitarian projects in Africa, and German Doctors e.V., an NGO aiming at providing treatment for people living in resource-poor settings.

Skin NTDs and/or integration – Keywords

Tungiasis

Preventing & managing impairments in leprosy: Use of assistive devices

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Assistive aids and appliances are and has to be indispensable in the management and prevention of impairments, deformities and plantar ulcers in leprosy. At a tertiary leprosy referral centre in India, assistive aids and appliances had been developed and tried to prevent and manage impairments and disability. The innovative approaches assisted the leprosy affected patients in managing and preventing impairments.

Regular interactions and the identification of challenges faced by the patients affected with leprosy in overcoming impairments have helped in identifying key areas needing assistance. The key assistance was needed for patients with impairments in accessing the health needs, and in the availability of their personal treatment data with them at all times. Developing effective offloading devices after assessing the peak plantar pressures through appropriate cost effective solutions were much needed for leprosy affected patients.

With self-care routine being a challenge for patients with anaesthetic feet and ulcers, **mobile phones and toll free calls** were used to improve adherence. Newer designs were tested using computer based simulation studies to **test efficacy in offloading** an ulcerated or anaesthetic foot. The simulation studies had helped in developing ideal prototypes for offloading the anaesthetic leprosy affected foot.

The peak plantar pressure being one of the key factors in the onset of plantar ulcers in anaesthetic feet. Identifying the **peak plantar pressures using tactile sensory insoles** in real time has helped in reducing the plantar pressures and also in the providing a biofeedback for individual leprosy affected patients. The peak pressures that were identified were also helpful in developing **customised insoles and footwear** using a 3 dimensional computer aided designing and fabrication equipment.

Virtual cloud based data management designed and developed by the institute has helped in the collection, storage and retrieval of patient data both by the health workers and patients from any geographical locations.

The five innovative methods have assisted the leprosy affected patients access their leprosy treatment and their treatment records from anywhere close to the place of stay. Technology has enabled the patients to identify and prevent plantar ulcers in anaesthetic feet. The offloading measures designed and developed have helped protect the foot at risk of ulcers and also help in healing the ulcers that have developed.

The innovative cost effective assistive appliances designed and developed at the institute have helped the patient care in real time. The approaches if further tested, adapted and tried would help in making the leprosy patient care more viable and cost effective.

Acknowledgments

Would like to acknowledge the Leprosy Research Initiative (LRI) and American Leprosy Missions for funding the projects

Skin NTDs and/or integration – Keywords

Leprosy, disability, assistive devices, mhealth

Peer-delivered Basic Psychological Support for Persons affected by NTDs (BPS-N): A proof of concept study

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Persons with disabilities due to leprosy and lymphatic filariasis (LF) are known to suffer from stigma and discrimination and many have poor mental wellbeing. However, there is limited evidence of community-based interventions that address these issues.

Our objective was to provide proof of concept that peer-delivered basic psychological support can reduce stigma experiences and improve mental wellbeing and social participation among persons with leprosy- or LF-related disabilities.

The WHO Psychological First Aid (PFA) for Ebola tool was adapted for use with chronic conditions such as NTDs. The adaptation was done by the study team in consultation with global experts. The adapted version is called Basic Psychological Support for Persons affected by NTDs (BPS-N). The BPS-N was tested in a before-and-after intervention study in Bokaro District, Jharkhand State, India. Fifteen peer supporters with personal experience of leprosy- or LF-related disability were selected and trained in the use of the BPS-N approach. They in turn gave basic psychological support to 87 persons with signs of depression, all of whom also had disabilities due to leprosy or LF. Standard scales were used to measure stigma (SARI Stigma Scale), mental wellbeing (Warwick-Edinburg Mental Wellbeing Scale (WEMWBS)), depression (Patient Health Questionnaire 9 item (PHQ-9)) and participation (Participation Scale Short Simplified (PSSS)) of the clients at baseline and after the intervention.

After 3 months of intervention, the mean of level of stigma decreased from 30.3 to 24.0 ($p<0.001$); poor mental wellbeing decreased from 47% to 13% ($p<0.001$); moderate to severe depression decreased from 27% to zero percent ($p<0.001$). There was no significant change in level of participation restrictions (mean score 20.1 (95%CI 17.4-22.8) vs 19.2 (95%CI 17.2-21.3), $p=0.497$).

We concluded that the study provided proof of concept that the BPS-N intervention administered by peer supporters can achieve substantial improvements in levels of experienced stigma, mental wellbeing and depression in persons with disabilities due to leprosy or LF. The follow-up was too short for this to translate into improved social participation. These findings should be confirmed in a randomized controlled trial. Implementation studies are also needed to find optimal ways of embedding psychological peer support in peripheral health systems and to test the scalability of such approaches.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Leprosy, lymphatic filariasis; integrated intervention

Session 6 : Transmission – Presentations

Wednesday, 29 March 2023 **Chair: Lydia Mosi**		
Time	**Subject**	**Presenters**
14:00 – 14:20	**Keynote presentation:** Understanding transmission of Buruli ulcer in Australia: progress and challenges	Tim Stinear
14:20 – 14:35	Transmission status of neglected tropical diseases with skin manifestations in Sri Lanka	Dilini Muthukumari Wijesekara
14:35 – 14:50	Establishing a controlled human infection model of Buruli ulcer	Stephen Muhi
14:50 – 15:05	Peak transmission of Ross River/Barmah forest virus infections and Buruli ulcer in temperate Victoria are aligned and strongly influenced by season	Paul Johnson
15:05 – 15:20	Evolutionary ecology literacy is important for improving the understanding and management of mycobacterial skin diseases	Jean-François Guégan
15:20 – 15:40	**Discussions**	**All**
15:40 – 15:55	Detection of *Mycobacterium ulcerans* among Aedes albopictus (Skuse 1894) emerged from *M. ulcerans* contaminated water	Heather Jordan
15:55 – 16:10	Genomic approaches to predict the origins of Buruli ulcer cases	Andrew Buultjens
16:10 – 16:25	Environmental risk factors associated with the presence of *Mycobacterium ulcerans* in Victoria, Australia	Bridgette McNamara
16:25 – 16:40	BCG vaccination of possums against *Mycobacterium ulcerans*	Daniel O’Brien
16:40 – 17:00	**Discussions**	**All**

Key presentation – Understanding transmission of BU in Australia: Progress and challenges

Authors: Timothy P Stinear (on behalf of the ‘Beating Buruli’ research team)

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BU has been endemic to rural regions in Australia for decades. In the 1990s BU epidemiology changed and cases began to increase and occur around the major metropolitan city of Melbourne and the regional center of Geelong in the state of Victoria, in southeast Australia. BU has been a notifiable disease in Victoria since 2004 and data from the Department of Health shows there has been on average 300 confirmed BU cases per year since 2017. Our research consortium has been attempting to address the key question of how BU is spreading.

Using structured wildlife excreta and mosquito surveillance combined with a molecular diagnostic test for *Mycobacterium ulcerans* (the causative agent of BU), we have explored the roles of Australian native possums and mosquitoes in transmission. With statistical modelling methods, we assessed if environmental surveillance provided useful information for predicting future human BU case locations. Metagenomic approaches were also used to examine bacterial variation and mosquito bloodmeal content.

We found 11% of >2500 possum excreta specimens collected in an area spanning 350km^2 were positive for *M. ulcerans*. Mapping the origin of these positive specimens allowed us to observe co-clustering of *M. ulcerans* positive possum excreta and human BU. We trained a statistical model with possum excreta survey data and then predicted the future likelihood of human BU cases with a precision superior to a null model trained using the previous year’s human BU case data. Mosquito surveillance of more than 50,000 insects revealed a non-random association between one mosquito species and *M. ulcerans*, and spatial clustering analysis also suggested an overlap with human BU cases and mosquitoes harboring *M. ulcerans*. Bloodmeal analysis identified individual mosquitoes that had fed on both humans and possums, further implicating mosquitoes as potential (probably mechanical) vectors.

This research confirms BU as a zoonotic infection in southeast Australia, with native possums a major wildlife reservoir. The association of *M. ulcerans* with mosquitoes confirms earlier field surveys and combined with the bloodmeal, implicates mosquitoes as vectors between possums and humans. These findings represent new opportunities to intervene in the transmission of BU, such as by preventing BU in possums or undertaking mosquito control measures.

Acknowledgments:

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Skin NTDs and/or integration – Keywords

Buruli ulcer

Transmission status of neglected tropical diseases with skin manifestations in Sri Lanka

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Introduction

Three neglected tropical diseases in Sri Lanka; Lymphatic Filariasis (LF), Leprosy and Leishmaniasis are associated with skin involvement at different stages of presentation. Leprosy and LF have been eliminated as a public health problem in 1995 and 2016 respectively. Mass drug administration in LF and multi-drug treatment together with social mobilization in leprosy contributed to achieved successes. However, these diseases show continuous low-grade transmission since then. Two diseases have embarked on total interruption of transmission by 2030. Leishmaniasis being a newly emerged disease in the country is still in the phase of control and needs more attention.

Methods

LF and leprosy diseases are controlled by designated disease control programs; Anti Filariasis Campaign and Anti Leprosy Campaign. Leishmaniasis does not have a separate control program. Recently, control of leishmaniasis was taken up by the Anti Malaria Campaign. Out of all, only the leprosy program has been integrated into general health services and patients are treated and followed up in skin clinics in curative health care institutions. All three diseases maintain disease surveillance systems to assess the burden and monitor trends. Secondary data on surveillance from three control programs were analyzed to describe the epidemiology and transmission status of diseases. Results are presented as numbers and percentages.

Results

LF was endemic in three out of nine provinces in the country: Western, North-Western, and Southern. Sri Lanka maintains microfilaria rate of LF below 0.05 since stopping of mass drug administration in 2006. Mosquito indices show higher transmission thresholds in few localities in formerly endemic districts. Reporting of child cases (20% in 2022) shows ongoing transmission. Majority of asymptomatic carriers are male (74% in 2022). Patients with lymphoedema do not show differences between sex.

Nearly half (55%) of the Leprosy cases reported from two provinces: Western and Eastern. The new case detection rate in the year of 2020 was reported as 5.53 per 100,000 population and it shows a downward trend. However, the percentage of child leprosy cases (10%) and the grade two disabilities (G2D) (5-7%) have been static for the past two decades. The higher percentage of child cases indicates an active transmission of leprosy in the country. Males contribute to most cases (63% in 2021).

Total of 19361 clinically confirmed leishmaniasis cases have been reported in Sri Lanka from 2001–2019. Five districts in Sri Lanka in Central and North Central Provinces reported >1,000 cases, which accounted for 84.5% of all cases. With reporting of 3228 cases in 2022, an increasing trend is observed in some areas. Vector indices show abundance of sand fly, which has increased the transmission of the disease among the vulnerable groups.

Discussion and conclusions

Low grade transmission occurs in leprosy and LF for decades in Sri Lanka. Elimination of diseases as public health problems do not warrant natural dying of diseases. Intensive interventions together with integration with other health and non-health organizations are required to reach total transmission interruptions. Vector surveillance of leishmaniasis should be integrated into other vector-borne disease programs.

Acknowledgments

We would acknowledge the Ministry of Health for sustaining financial allocation for diseases that have been eliminated as public health problems in the country.

Skin NTDs and/or integration – Keywords

Transmission, lymphatic filariasis, leprosy, leishmaniasis

Establishing a controlled human infection model of Buruli ulcer

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Buruli ulcer is a neglected skin and soft tissue infection, caused by *Mycobacterium ulcerans*. Its incidence is increasing in Victoria, Australia, with transmission now reported in metropolitan regions of the state's two largest cities, Geelong and Melbourne. Several early stage candidate vaccines have emerged, although other than *M. bovis* BCG, none have progressed to clinical testing. We are developing a controlled human infection model (CHIM) for Buruli ulcer (BU), with the aim to accelerate understanding of host immunology, identify correlates of protection and response to vaccination, and facilitate the development of diagnostics and therapeutic interventions. Our efforts to date have focused on selecting and characterising a suitable strain and developing a consistent method for cell bank preparation which deals with the organism's slow growth (and concomitant contamination risk), its propensity to form large aggregates in liquid culture, and includes standardised antibiotic susceptibility testing.

Here we report the identification of a candidate strain that meets the requirements we have identified for a BU CHIM, and an innovative manufacturing process that enables the manufacture of a cell bank suitable for preparation of challenge inocula. Characteristics of the strain we have selected (JKD8049) include: (1) it is not epidemiologically associated with severe clinical disease (either in its individual provenance or in geographically associated cases), (2) it has a typical infection phenotype, (3) it is susceptible to clinically relevant antibiotics, (4) it is amenable to a biologically plausible route of entry (subcutaneous injection in a murine model), (5) it can be cultured in a non-toxic, animal-free medium without genetic or chemical modification, (6) it can be accurately enumerated to ensure consistent challenge dosing, (7) it retains viability after cryopreservation, (8) it produces the key virulence factor after *in vitro* culture (*i.e.* mycolactone), (9) it maintains a conserved repertoire of genes encoding candidate vaccine antigens, and (10) it remains genetically stable during manufacture and challenge. Quality control processes are underway, with final pre-clinical studies in a murine model planned for 2023, in anticipation of seeking regulatory approval for production of human challenge doses in accordance with Good Manufacturing Practice, and ethical approval to begin first-in-human studies in healthy adult volunteers. We believe that our BU CHIM has the potential to accelerate all aspects of translational research in Buruli ulcer disease.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Buruli ulcer, *Mycobacterium ulcerans*, vaccine, prevention, human challenge

Peak transmission of Ross River/Barmah River Virus infections and Buruli ulcer in temperate Victoria are aligned and strongly influenced by season

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Ross River Virus and Barmah River Virus infections (RRV/BFV) have short incubation periods and are transmitted to humans by mosquitoes[7]. Buruli ulcer (BU) has a much longer incubation period[8] and its mode of transmission is still under investigation. We analysed the month and season of notification of RRV/BFV and BU in the Australian state of Victoria.

We accessed state-wide human notification data for RRV/BFV and BU by month over a 6-year period (calendar years 2017-2022 inclusive). The disease groups were analysed in terms of month and season of notification. We inferred month and season of likely transmission from the previously established incubation periods for RRV/BFV and BU.

In the study period there were 3839 cases of RRV/BFV notified. Cases were strongly clustered by month and season (figure above). For summer-autumn there were 3503 notifications of RRV/BFV compared with 336 in winter-spring, ratio 10.4:1. For BU there were 1761 notifications and much less variation across the 6 calendar years. In marked contrast to RRV/BFV, BU was 2.9 times more likely to be notified in winter-spring (1307) than summer-autumn (454). However, when adjusted for the previously established much longer incubation period of BU (median 5 months) peak likely transmission periods of these two conditions align.

We have shown that while peak notifications for RRV/BFV and Buruli ulcer in Victoria are separated by several months, adjustment for the long delay between exposure and notification of BU causes the peak transmission of both conditions to align. Transmission of both RRV/BFV and BU in temperate Victoria peaks in summer-autumn (December to May) and reaches a nadir in winter-spring (June to November).

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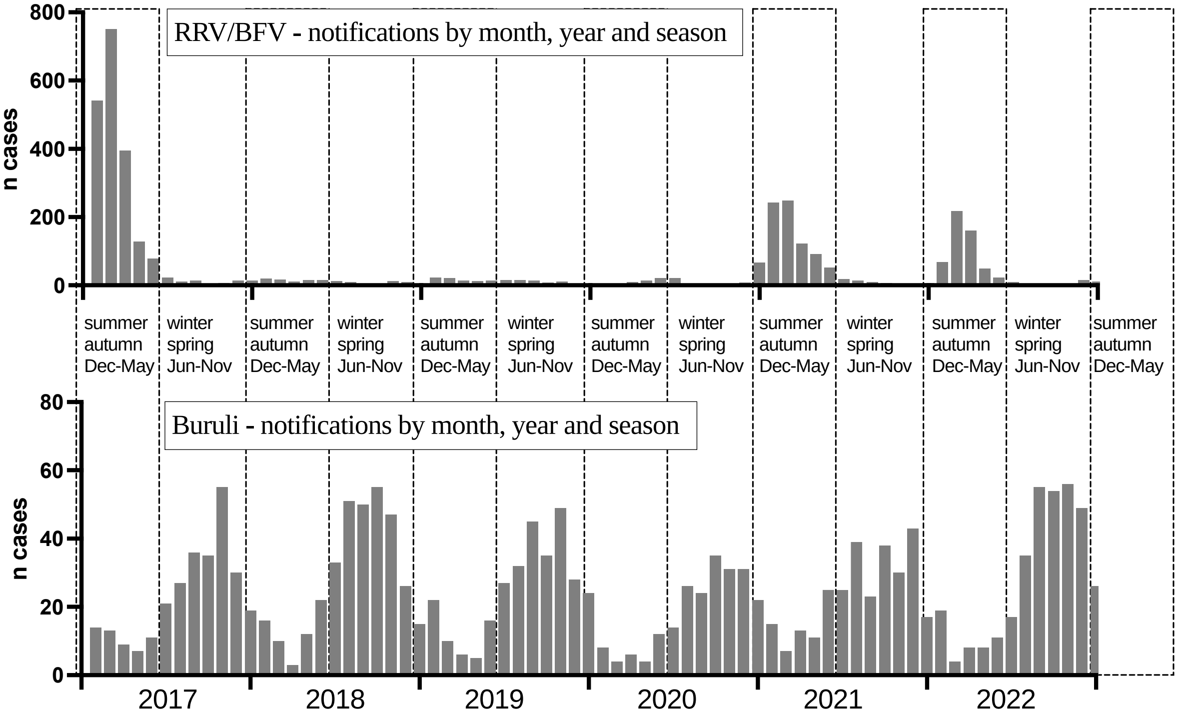
[7] Harley et al. 2002; PMID: 11585790

[8] [8] Loftus et al 2017 PMID: 29554096



Skin NTDs and/or integration – Keywords

Buruli, transmission, mosquitoes

Evolutionary ecology literacy is important for improving the understanding and management of mycobacterial skin diseases

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In disease ecology, research is investigating the role of ecological heterogeneity in time and space in the maintenance and spread of pathogenic agents, and in having shaped their life-history traits. It allowed contrasting cases where host-pathogen interactions are directly responsive for pathogenicity from other situations, today largely demonstrated, where pathogenicity arises as a coincidental supply-side effect of the pathogen responses to host-independent ecological challenges. Coupling a bibliometric review and a data reinterpretation through the lens of disease ecology and evolutionary biology, we have investigated the relevance of such alternative scenarios for *Mycobacterium* species, including the agent causing the Buruli ulcer skin disease.

We started the investigation at the *Mycobacterium* genus level. The recent development of high-throughput genomic techniques had come along with merging environmental isolates in big datasets, whereas previously medical (and veterinary) research was exclusively interested in vertebrate pathogen isolates. This has drastically inflated the number of new mycobacterial species and shed new light on the phylogenetic relatedness among pathogenic and non-pathogenic taxa. Two important characteristics emerge at genus level. First, poorly related vertebrate species, such as human and fish, are sharing similar susceptibility to infection by diverse mycobacterium species. Second, mycobacterial pathogenicity has recurrently arisen along the diversification of mycobacteria, i.e., since about 100-400 million years ago. This is in agreement with the 'coincidental evolution of virulence' hypothesis: responses to common ecological challenges initially shaped generalist and plastic traits in mycobacteria, lately recruited by the bacilli infecting vertebrates.

We pursued at interspecific level. In *Mycobacterium tuberculosis complex* (MTBC), the intra-specific diversity includes adaptations to human or animal genetic backgrounds that actually have played a key role in determining tuberculosis epidemiology and pathogenicity. By contrast, enlarging the nature of analyzed samples to soil, water and diverse vertebrate species made ecological and epidemiological studies seriously challenging the possibilities that *M. leprae* adaptation to human or the adaptation to cattle or sheep in *M. avium paratuberculosis* have played any role in the selection of pathogenicity in these bacilli. This let thus the coincidental virulence hypothesis as most probable explanation for these bacilli. Now, regarding opportunistic pathogens, *M. marinum*, *M. chelonae* and *M. ulcerans* illustrate cases where the correlation between mycobacterial abundance and pathogenicity can be either positive or negative across environmental conditions.

All these findings militate together to accept the idea that research on mycobacteria has been strongly biased towards looking at several vertebrate host species of economic or social importance, including human, only, and not tackling the problem outside the projector light for identifying the existence of environmental reservoirs and evaluating their contributions to disease life-cycles. This also raises the importance to address the role of environmental variability in time and space not only in the abiotic parameters but also in species community diversity with which mycobacteria are interacting in nature.

Overall, these findings provide new guidelines for settling studies able to improve the understanding and management of mycobacterial diseases. This also stands for the newly emerging diseases whose numbers are predicted to increase due to global changes.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Integration of Buruli ulcer, leprosy and other mycobacterial diseases

Coincidental virulence hypothesis; adaptive virulence; transmission; pathogenicity, mycobacterial diseases

Detection of *Mycobacterium ulcerans* among *Aedes albopictus* (Skuse 1894) emerged from *M. ulcerans* contaminated water

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Mycobacterium ulcerans is an environmental mycobacterium that is the causative agent of Buruli ulcer, a necrotizing skin disease prevalent in subtropical areas around the world. The transmission route for *M. ulcerans* is unknown, but many insects have been hypothesized as being part of, or driving transmission dynamics, including those in the families Belostomatidae, Naucoridae, and in particular, Culicidae mosquitoes. *M. ulcerans* DNA has been detected in wild caught larval and adult mosquitoes, and studies have shown mycolactone can impact mosquito behavior. However, there have been no laboratory studies using a more natural means of mosquito exposure to *M. ulcerans*, such as hatched and emerged from *M. ulcerans* contaminated water. In this study, *Aedes albopictus* was selected where first-generation larvae emerged from *M. ulcerans* contaminated water, and mosquitoes were reared through the third generation to measure *M. ulcerans* presence and abundance across life stage and generation. Using qPCR, second and third generations showed *M. ulcerans* positivity (22% and 5.6% respectively), possibly implicating a means of *M. ulcerans* dispersal. *M. ulcerans* were also detected among water and exuviae samples. Data from this study opens multiple avenues of further investigation into dispersal and transmission mechanisms, and *M. ulcerans* ecology.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Buruli ulcer, *Mycobacterium ulcerans* dispersal

Genomics and machine learning to infer the geographic origin of human Buruli ulcer cases

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Buruli ulcer (BU) is an infection of subcutaneous tissue caused by *Mycobacterium ulcerans* and for which the mode(s) of transmission are only beginning to be understood. Exposure to specific geographic areas is a major risk factor to disease acquisition and several whole genome-based studies have highlighted the strong spatial clustering of *M. ulcerans* genotypes according to location of origin. In south eastern temperate Australia BU is becoming a significant public health problem with transmission occurring in multiple discrete geographically defined clusters. Mapping endemic areas and understanding how they arise is a major component of our public health and research response to the increasing incidence of BU.

Recognising new endemic areas as they arise enables early direct messaging to local doctors and affected populations which greatly assists early diagnosis (harm reduction). Current case origin investigations make use of patient histories. However, this can be difficult due to lengthy disease incubation periods (median 5 months), leading to poor patient recall and often new cases have come into contact with multiple endemic areas during the exposure interval. Bacterial genomics can greatly inform epidemiological investigations but interpreting phylogenetic relationship diagrams can be subjective.

Here, we have trained machine learning models with *M. ulcerans* whole genome data from both directly sequenced environmental and cultured clinical samples. The bacterial genomes were recovered from environmental samples collected as part of large-scale structured field surveys and served as spatial calibrations for model training. A trained model was then used to prospectively predict the geographical origins of human Buruli ulcer cases with a level of prediction accuracy that permits an endemic area to be pinpointed. This genomic approach provides an objective inference method that does not rely on patient histories and has the potential to improve disease management and reduce the incidence of Buruli ulcer.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Buruli ulcer, *Mycobacterium ulcerans*, genomics, machine learning, source attribution

Environmental risk factors associated with the presence of *Mycobacterium ulcerans* in Victoria, Australia

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Despite cases of Buruli ulcer (BU) increasing dramatically in temperate Victoria, Australia in recent years, how the agent of this disease, *Mycobacterium ulcerans* (MU), circulates in the environment and transmits to humans is still not fully understood. As the endemic area expands into increasingly urban environments, including regions of the state's two largest cities, Melbourne and Geelong, it is becoming increasingly critical to better determine the local ecology and epidemiology of BU. This large-scale, property-based case-control study sought to examine the relationships between MU presence and human BU-acquisition with fine-scale environmental characteristics to determine potential risk factors that could help inform the development of future intervention strategies.

We recruited a subset of participants from a larger questionnaire-based case-control study conducted in the Victorian endemic area, comprising 115 adult BU cases from those notified to the Victorian Department of Health from June 2018 to June 2020 and 115 postcode-matched controls. Environmental surveys were conducted at properties owned by participants in the endemic area. During each survey environmental samples (mammalian faeces, water, soil, plants, biting insects) were collected, and a range of property characteristics recorded (property size, location, presence of powerlines etc.). All samples were analysed by quantitative PCRs for MU and soil samples were analysed for additional characteristics (bulk density, pH, conductivity, salinity). Descriptive statistics were used to investigate if MU-positive samples were more commonly found at case versus control properties and to identify differences in PCR CT values by sample type. The relationships between each of the property outcomes (MU- and case-status) with environmental variables were initially investigated using descriptive statistics, followed by both univariable and multivariable logistic regression models.

A total of 4,363 environmental samples were collected during the field surveys, with 10.9% (n = 475) positive by *IS2404* PCR. Faeces were the sample type most commonly positive (20.5%), especially those from ringtail possums (23.9%; n = 1182) and red foxes (30.0%; n = 20). Collectively faecal samples had statistically lower CT values than other sample types and were the only type that tested positive using a PCR that analysed bacterial viability. MU-positive samples generally were more likely to be found at case properties (p=0.007) and this relationship held when analysis was restricted to MU-positive faecal samples (p=0.002) and MU-positive ringtail possum faecal samples (p=0.025) specifically. Alongside MU-positive possums, case properties were more likely to contain overhead powerlines and less likely to contain *Melaleuca lanceolata* (a native plant) than control properties. In comparison, MU-positive properties were larger, at lower elevations and were more likely to contain ringtail possums, native vegetation, overhead powerlines and saline soil than MU-negative properties.

Our findings suggest that ringtail possums and the landscape features they utilize (native vegetation, overhead powerlines) play an important role in the environmental circulation of MU in Victoria. Evidence of viable bacteria in their faeces also indicates these could be a source of human infection. Intervention measures that raise public awareness of this association and minimize human-possum interactions could help reduce human case numbers in Victoria.

Acknowledgments

This study was funded by National Health and Medical Research Council Partnership Project Grant (GNT1152807).

Skin NTDs and/or integration – Keywords

Buruli ulcer, *Mycobacterium ulcerans*, temperate climate, Australia, risk factors

BCG vaccination of possums against *Mycobacterium ulcerans*

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In recent years, cases of Buruli ulcer (BU) have increased dramatically in Victoria, Australia, and the epidemic area has now expanded to include regions of the state's two largest cities, Melbourne and Geelong. In Victoria there is increasing evidence that *Mycobacterium ulcerans* (MU), the agent of BU, is zoonotic, with native common ringtail possums the most likely reservoir and a primary driver of its environmental circulation. Preventing disease transmission between possums and humans would be a prime target for public health intervention against BU. BCG vaccination has been associated with protection against BU in humans and mouse-model studies have found that the BCG vaccine shows some effectiveness against *M. ulcerans*. Vaccination of possums using the BCG vaccine is one such method that has potential. Previous studies have found that common brushtail possums can be successfully vaccinated against a related mycobacteria (*M. bovis*) using oral bait containing the BCG vaccine. We propose to investigate the potential for oral bait BCG vaccination to prevent MU infection in possums.

To further investigate the potential of BCG to control *M. ulcerans* in possums, we are in the process of developing a common ringtail possum model of *M. ulcerans*. A housing and husbandry experiment has identified suitable conditions to house ringtail possums long-term under high containment conditions, alongside methods to successfully trap wild *M. ulcerans*-negative possums. The first proposed experiment will source six *M. ulcerans*-negative ringtail possums from the Geelong region, house these, and challenge these animals intradermally with an Australian strain of *M. ulcerans*. These animals will then be monitored to assess the success and consistency of the infection and to establish how long post-challenge animals begin to shed *M. ulcerans* and develop clinical signs. If successful, this will provide the basis for developing BCG vaccine-challenge experiments for assessment of its effectiveness in preventing BU in possums.

Skin NTDs and/or integration – Keywords

Buruli ulcer, *Mycobacterium ulcerans*, BCG, vaccine, transmission, prevention, possum

Session 6: Transmission – Posters

Teledermatology in Nepal

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Background

Almost 3 billion people lack basic care for skin diseases, especially in developing low-income countries. Of the almost 30 million people of Nepal, almost 80% live outside the major cities in rural tropical and subtropical areas (Terai), where Neglected Tropical Diseases (NTD's) are prevalent and medical care is difficult to access. Under these conditions, teledermatology has become a useful tool for providing dermatology services, which has been accelerated by the COVID-19 pandemic.

Objectives

The aim of the study was to assess the feasibility of teledermatology in a country with extreme geographical challenges, from mountainous to tropical regions. Besides satisfaction of patients utilizing teledermatology services, clinical and epidemiological data were assessed.

Methods

Retrospective, observational, single-center study on 122 patients using teledermatology services. Demographic data was analyzed, and a questionnaire survey was conducted through phone calls.

Results

The mean age of the patients was 33.48 ± 17.89 years. Out of 122 teleconsultations, 89 patients could be contacted again for feedback. 81 of the 89 (91%) patients found the service easy to use, 75 (84.3%) were able to express their problems similarly to visits in person, 49 (55.05%) regarded teleconsultation as the same as an in-person visit, 80 (89.9%) were satisfied, and 85 (95.5%) agreed to use the service in the future. Superficial fungal infection was the most common diagnosis (24.6%). Newly registered patients were more satisfied in comparison to follow-up patients (96.36% of new cases vs. 79.41% of follow-up cases, $p = 0.01$).

Discussion

A systematic literature review, performed before the Covid-19 Pandemic has discussed recommendations for the improved effectiveness of telemedicine programs in Developing Countries. In a recent paper, telemedicine and community health projects in Asia were analyzed and an example program in Nepal by C.H.E.S.T. (Community Health Education Services by Telehealth), was presented, contributing to local collaboration, financial sustainability, and integrated community development. In the current study, teledermatology was well accepted by the patients and provides important information for its implementation in low-income countries.

Conclusion

Telehealth services have a promising role in the future in fulfilling public health demands in low-income countries.

This abstract is based on the following publication: K. Jha K, & A.K. Jha. (2022). Teledermatology and COVID-19 in a resource-limited country such as Nepal. Our Dermatol Online (4), 352-358.

Skin NTDs and/or integration – Keywords

Teledermatology; tropical and subtropical regions

Mycobacterium ulcerans not detected by PCR on human skin in Buruli ulcer endemic areas of south eastern Australia

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Mycobacterium ulcerans (MU) causes Buruli ulcer (BU), a geographically restricted infection that can result in skin loss, contracture, and permanent scarring. Lesion-location maps compiled from more than 640 cases in south eastern Australia suggest biting insects are likely involved in transmission, but it is unclear whether MU is brought by insects to their target or if MU is already on the skin and inoculation is an opportunistic event that need not be insect dependent.

We invited volunteers in Buruli-endemic and non-endemic areas to sample their skin surfaces with self-collected skin swabs tested by IS2404 quantitative PCR. We validated the PCR swab detection assay and defined its dynamic range using laboratory cultured *M. ulcerans* and fresh pigskin.

Fifty-seven volunteers returned their self-collected kits of 4 swabs (bilateral ankles, calves, wrists, forearms), 10 from control areas and 47 from endemic areas, timed to coincide with the known Buruli peak-transmission period. Pigskin validation experiments established a limit-of-detection of 0.06 CFU/cm^2 at a qPCR cycle threshold (Ct) of 35. All swabs from human volunteers tested negative (Ct $\geq$35).

M. ulcerans was not detected on the skin of humans from highly BU endemic areas.

Acknowledgement

We thank the volunteers in this study who generously agreed to participate and to recruit friends and relatives to assist us.

Funding

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Ethics approval and Clinical Trial Registration

The study was approved by the Austin Health research ethics committee under reference number HREC/17/Austin/58. This observational clinical study was registered with Australia and New Zealand Clinical Trial Registry (ACTRN12619000998145).

Skin NTDs and/or integration – Keywords

Buruli, transmission, mosquitoes, endemic, observational clinical study, IS*2404* PCR

Protective and risk factors for Buruli ulcer in South-Eastern Australia

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* These senior authors contributed equally to this research.

Transmission pathways for Buruli ulcer (BU) are not fully understood. Greater understanding of environmental and behavioral risks across geographic regions and climates is required to inform mitigation strategies globally. BU incidence in South-Eastern Australia is increasing, with spread to new geographic areas, including increasingly urban environments. This comprehensive case-control study in Victoria, Australia, examined relationships between BU and health, socio-environmental and behavioral factors to aid understanding of the risk and protective factors for BU important for informing effective intervention and control strategies.

We recruited 245 adult BU cases from those notified to the Victorian Department of Health from June 2018 to June 2020 and 481 postcode-matched controls from endemic areas of Victoria, Australia. Participants (residents or holiday homeowners) reported data on environment factors including wildlife, animals, insects, water sources, and earthworks at the residence, as well as outdoor activities and prevention behaviors on self-administered questionnaires. Age- and sex- adjusted odds ratios (aOR) were obtained using conditional logistic regression, and clustering of potentially protective behaviors were examined.

We found the likelihood of BU was higher for individuals with diabetes mellitus, aOR 2.25 (95% CI 1.13, 4.48), but lower among those with a history of BCG vaccination (aOR 0.60 (0.40, 0.90)). Working outside with soil contact had higher odds of BU than working indoors in endemic areas (2.89 (1.01, 8.25)). A strong dose-response relationship was observed between the number of possums at residential properties and likelihood of BU; aOR 4.58 (1.50, 13.98) in residents with 1-2 possums, aOR 6.09 (1.86, 19.90) with ≥ 5 possums. BU was associated with tea trees (1.72 (1.10, 2.69)) ponds (1.69 (0.99, 2.42)) and bore water use (1.56 (0.98, 2.50)) at the residence. Insect repellent use, covering arms and legs during outdoor activity and immediately washing wounds were protective; undertaking multiple protective behaviors was associated with the lowest odds of BU (aOR 0.22, (0.10, 0.48) for ≥ 6 compared to 0-1 protective behaviors). No association was found between BU and pet-ownership, local sewerage, earth works, presence of insects or frequency of insect bites.

Our findings suggest that a combination of prevention measures - skin hygiene and protection behaviors and previous BCG vaccination - may provide protection against BU in endemic areas, especially for those at increased risk due to health, occupational, or environmental risks. The findings will aid in the implementation of evidence based public health measures to help address the increased incidence of BU in this region.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Buruli ulcer, *Mycobacterium ulcerans*, temperate climate, Australia, risk factors

Persistence of onchocerciasis and associated dermatologic and ophthalmic pathologies after 27 years of ivermectin mass drug administration in the middle-belt of Ghana

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There is a need to regularly evaluate the effectiveness of onchocerciasis elimination programmes to quickly identify and mitigate threats to the elimination of transmission targets. We determined the prevalence of onchocerciasis and associated dermatologic and ophthalmic pathologies in six endemic communities in the Bono Region of Ghana after 27 years of ivermectin mass drug administration. In a cross-sectional study, 503 participants, at least five years old, from six communities were enrolled; 256 (50.9%) were males and 247 (49.1%) females; the median age of the study population was 26 years (interquartile range, 13-43). In a limited number of participants, skin snip testing to detect skin microfilaria and Ov16 rapid diagnostic testing were performed. The overall microfilaria infection prevalence of the study communities was 12% (34/284). The overall *Onchocerca volvulus* seroprevalence was 19.8% (49/248). Of the 503 participants, severe itching was reported by 20.7%, skin atrophy present in 14.9%, acute papular dermatitis in 11.1%, palpable nodules in 5.2%, chronic papular dermatitis in 4.5%, skin depigmentation in 1.4% and lichenified onchodermatitis in 0.6%. Of the 303 persons in which visual acuity was examined, 13.6% were visually impaired and 5% blind, 43.6% presented conjunctivitis. Palpable nodules, chronic papular dermatitis, depigmentation, and lichenified onchodermatitis, visual impairment and pterygium were significantly associated with presence of skin microfilaria and Ov16 seropositivity. The persistence of onchocerciasis-associated dermatologic and ophthalmic pathologies shows the need to include morbidity management in onchocerciasis elimination programmes.

Acknowledgments

This research was supported by a small grant awarded to KBO by the Royal Society of Tropical Medicine and Hygiene/National Institute of Health Research, UK.

Ski Skin NTDs and/or integration – Keywords

Prevalence, onchocerciasis, onchocercal skin disease, dermatitis, nodules, seroprevalence

Molecular evolution of *Mycobacterium ulcerans* subsp. *shinshuense*, the causative agent of Buruli ulcer in Japan

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Mycobacterium ulcerans is the causative agent of Buruli ulcer (BU), and its first case in Japan was reported in 1980. The mycobacteria recovered from this patient were named *M. ulcerans* subsp. *shinshuense* (hereafter *M. shinshuense*) because it is closely related to *M. ulcerans* but showed certain phenotypic differences by conventional methods. Of note, all BU cases to date reported in Japan have been caused by *M. shinshuense*, implying that *M. shinshuense* is a geographical variation of *M. ulcerans*. To genetically characterize *M. shinshuense*, we compared the whole-genome sequence (WGS) data of *M. shinshuense* and that of *M. ulcerans* from 19 countries. We newly sequenced 43 *M. shinshuesnse* and 14 *M. ulcerans* clinical isolates and combined them with publicly available WGS data for 548 *M. ulcerans* clinical isolates. We identified seven sequence clusters (SCs) using a hierarchical Bayesian clustering method. We found that SC1, SC4, SC5, SC6, and SC7 were composed of *M. ulcerans* distributed in Oceania (SC1), East Asia (SC4), South America (SC5), and Africa (SC6 and SC7), respectively. SC3 contained *M. ulcerans* distributed in Oceania and Southeast Asia, and SC2 contained *M. ulcerans* distributed in Oceania and Africa. A time-resolved phylogeny suggested that the East Asian cluster (SC4, corresponding to *M. shinshiuense* clade) diverged from the common ancestor with *M. ulcerans* from all other areas about 19,000 years ago. Comparative genomic analysis revealed that *M. shinshuense* has a larger chromosome size, more coding sequences, and fewer pseudogenes than *M. ulcerans* distributed in Oceania and Africa. Differences were also observed for insertion sequences: *M. shinshuense* isolates tended to have a similar number of copies of IS*2404* on its chromosome compared to *M. ulcerans* but a significantly lower number of copies of IS*2606*. We also observed differences in the N^6-methyladenine modification state in *M. shinshuense* and *M. ulcerans*, possibly due to *M. ulcerans* lineage-specific mutations in a DNA methyltransferase-encoding gene. These results suggest that *M. shinshuense* is less reductively evolved than *M. ulcerans* distributed in other regions. Using both short and long-read WGS data, a comparative analysis of the virulence plasmid between *M. shinshuese* and *M. ulcerans* from other areas is in progress. At this meeting, we would like to present and discuss the results of the above analyses. (367 words)

Acknowledgments

Japanese Agency for Medical Research and Development (AMED), Japanese Society for the Promotion of Science (JSPS)

Skin NTDs and/or integration – Keywords

Buruli ulcer

Session 6 : Transmission – Other abstracts

Intersectoral coordination to reduce NTD transmission and morbidity in Bihar, India

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Jagruti (awakening in Sanskrit) is a 3-year, women-led, digital technology supported, integrated WASH & NTDs project in one administrative Block of 130 NTD-endemic, WASH-poor villages with 63,630 households, population 380,000 in Bihar, India. The project is funded by ALM, and collaboratively implemented by ALM, LEPRA India, and HiRapid Lab, Public Health Foundation of India. It aims to reduce the risk and negative impact of NTDs through WASH behaviour change, NTDs prevention and care, and advocacy for essential services. WASH access in the Block is poor. One Community Health Centre serves the entire population of 380,000. Each of the 130 villages has people with leprosy and lymphatic filariasis (LF) disabilities, however, there is no primary level NTD care available at the CHC. Governmental stakeholders and national programmes for Leprosy and for Vector Borne Diseases for the most part, operate in silos.

130 local women, one per village, were trained and mentored as Community Resource Persons (CRPs) in WASH and NTDs. They use an integrated health education flip chart linking the endemic NTDs to WASH for household education. They use a smartphone-based platform, DHARA (Digital @ Home, Artificial Intelligence-enabled, Real-time Appropriate interventions) for universal household geotagged photographic data collection for evidence-based interventions and advocacy for essential services. NTD new case detection with referral for confirmation and treatment, and homebased management of chronic NTDs is ongoing. To improve integration, coordination and mainstreaming, the project has integrated NTDs and WASH interventions as an effective model to the community, local government, Village Health Sanitation & Nutrition committees (VHSNCs), and national programmes in the district.

The project has detected 81 new cases of leprosy, 12 new cases of visceral leishmaniasis, and line listed 62 leprosy G2D cases, 951 LF Gr3 + lymphedema cases, and 1808 LF hydrocoele cases since 2022, data previously unknown to the health system. Coordination with the Rural Development Department has resulted in 4324 of 12000 HHs without safe water access, receiving piped water connections under Bihar’s Har Ghar Nal Ka Jal (tap water in every home) programme. Sensitization of 31 VHSNCs has resulted in 391 of 22500 HHs without toilets constructing toilets with government funding. Coordination with the Education department has resulted in NTDs & WASH education sessions in 42 of 255 schools reaching 5142 children, 200 teachers, and 2500 members of the School Education committees. Coordination with the district administration for government health insurance cover has enabled 51 men to undergo hydrocoele surgery in the private sector with no out-of-pocket expense. Coordination with the District Health Society has resulted in 37 hydrocoele surgeries at the district hospital, with more planned.

Intersectoral coordination is particularly important in India where existing government benefits and programmes can be leveraged for WASH & NTDs. Integrating prevention, early detection, treatment, and long-term care of chronic NTDs like leprosy and LF is a model to the health system in optimum resource utilization. These are key approaches to reducing risk of acquiring and transmitting NTDs and improving the quality of life for individuals living with chronic NTD disability.

Skin NTDs and/or integration – Keywords

Leprosy, lymphatic filariasis (lymphoedema and hydrocele), integrated management, intersectoral coordination

Some NTD’s must not longer be neglected, when served by teledermatology

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Introduction

Teledermatology has been used mostly for military purposes during the past 60 years and has experienced a significant boost during the pandemic since 2019. In Nepal however, a country with difficult to reach rural areas, teledermatology has been practiced already over the past 10 years.

Methods

The Community Health Education Services by Telehealth (C.H.E.S.T.), is a nongovernment organization established in 2009 whose mission is to provide telemedicine services and vocational training to Nepalese citizens who live in remote areas without access to health care. C.H.E.S.T. Nepal selected 3 pilot villages (Gerkhutar (middle hill), Babhangama (flat, subtropical), and Mudikuwa (mountainous)) to operate its services through live and/or store-and -forward teleconferencing. The program provides weekly teledermatology services on diagnosis, treatment and monitoring for various kinds of dermatoses with more than 2000 patients consulted till 2021

Results

Anecdotal reports will be given on diagnosing, treating, and monitoring NTD’s, including ulcers, cutaneous leishmaniasis, leprosy, lymphoedema due to filariasis, mycetoma, scabies, tungiasis, and fungal diseases.

Discussion

Teledermatology provides an opportunity to deliver quick and reliable health care services in up to 80% of patients including NTD’s and is a valuable tool especially in difficult to reach rural areas of low-income countries. Limited trained manpower and lack of availability of modem and innovative ICT tools in these locations are the most important challenges for the effectiveness and the sustainability of future teledermatology programs.

Conclusions

Besides general dermatoses, many NTD’s have been diagnosed, treated and monitored by teledermatology centers like C.H.E.S.T. Nepal in the past.

Skin NTDs and/or integration – Keywords

Neglected tropical diseases (NTDs), dearmatoses, teledermatology

Session 7 : Diagnostics and laboratory capacity strengthening – Presentations

Thursday, 30 March 2023

Chair: Tim Stinear

Time	Subject	Presenters
09:00 – 09:20	**Keynote presentation:** Diagnostics - Review of current diagnostic tests for skin NTDs and laboratory capacity strengthening – opportunities, challenges, and priorities	Isra Cruz
09:20 – 09:40	Buruli ulcer laboratories network for Africa: progress, challenges, and perspectives	Sara Eyangoh
09:40 – 10:00	Point-of-care and field compatible qPCR based molecular diagnostics for skin neglected tropical diseases; assay development and evaluation in Buruli ulcer and leprosy	Sundeep Vedithi Michael Frimpong
10:00 – 10:20	Developing a rapid diagnostic test for Buruli ulcer: challenges and prospects	Dziedzom de Souza
10:20 – 10:40	Capacity building in yaws reference laboratories in Cameroon, Côte d'Ivoire and Ghana	Serges Tchatchouang
10:40 – 11:00	External quality assurance in the fight against neglected tropical diseases: The LAMP4yaws Project	Sascha Knauf
11:00 – 11:20	Molecular diagnostics for mycetoma	Wendy van de Sande
11:20 – 11:40	Laboratory support for the control and elimination of skin neglected tropical diseases in Ghana	Abigail Agbanyo
11:40 – 12:00	SwiftX DNA – a versatile tool for extraction of DNA from various skin disease agents	Andy Wende
12:00 – 14:00	**Lunch**	

Key presentation – Review of current diagnostic tests for skin NTDs and laboratory capacity strengthening – opportunities, challenges, and priorities

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Diagnostics play a critical role in patient care and disease control at the program level, and recent developments, including the launch of the WHO Essential Diagnostics List, have demonstrated a growing momentum in this area, particularly for neglected tropical diseases (NTDs). The WHO Road Map for NTDs acknowledges the importance of diagnostics in accelerating programmatic actions, with integration being one of its pillars. The proposed skin NTDs framework is an excellent example of this approach. Integration of diagnosis, including clinical and laboratory aspects, supply chain, and training, is essential for effective skin NTDs programs, promoting health systems strengthening and Universal Health Coverage. Common platforms and multiplexing tools would benefit the integration of diagnosis, and several examples will be presented in the meeting session, such as the use of Apps and AI-powered tools for clinical diagnosis, as well as miniaturized multiplex nucleic acid amplification tests for laboratory confirmation. Collaborative networks and actions, such as the Africa Buruli Ulcer Laboratory Network or the Africa CDC Laboratory Systems and Networks, also support the integration of diagnostics.

However, funding for NTDs, particularly for WHO NTDs, has decreased, which presents a challenge for the development of new diagnostic tools to address gaps in achieving Road Map targets. To support the prioritization and development of diagnostics for NTDs, the WHO created the Diagnostic Technical Advisory Group for NTDs (DTAG). The DTAG subgroup on skin NTDs has developed target product profiles for priority use cases for various skin NTDs, such as Buruli ulcer, dermal leishmaniasis, mycetoma, scabies, yaws, and leprosy), to inform researchers and industry and to facilitate the pathway to development. Another DTAG subgroup is focused on laboratory capacity building, working on training packages, quality assurance and control and support to integration. The DTAG is also working on other complementary aspects that will help addressing the challenges to diagnostic test development, such as bio banking, harmonization of evaluation processes, and regulatory aspects.

Buruli ulcer laboratories network for Africa: Progress, challenges and perspectives

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In 2019, WHO created the BU-LABNET, a network of African laboratories involved in the molecular diagnosis of Buruli ulcer (BU), comprising 11 laboratories in 9 countries (Benin, Cameroon, Côte d'Ivoire, Democratic Republic of Congo, Gabon, Ghana, Liberia, Nigeria and Togo), coordinated by the Pasteur Center of Cameroon. The objective was to introduce a novel External Quality Assurance (EQA) program to improve the BU diagnostic performance, ensure quality results for patients and accurate reporting of data to WHO.

Prior to the EQA implementation, we developed a harmonized standard operating procedure (SOPs) and disseminated to all member laboratories. In addition, with the support of partners, withal the laboratories received the same reagents for BU PCR testing to ensure a standard implementation of the SOPs.

For the proficiency testing, 10 coded specimens were distributed to the 11 laboratories and asked to process the samples using the BU-LABNET SOPs. Of the 10 participating African laboratories that completed the EQA in 2021, 7 had 100% concordant results, 1 with 90% concordant results, and 2 with 70% concordant results. In line with quality assurance, laboratories that scored <80% in the scheme benefitted from online troubleshooting and mentoring from network experts, including a newly prepared batch of samples to retest. A remarkable performance improvement (100%) was achieved by all the low performing laboratories after the troubleshooting exercise.

The EQA program in 2022 showed an overall improvement of the 13 participant laboratories scoring > 80%; 9 scoring 100% concordant results, 1 with 91% concordance, 3 with 81% concordant results.

Also, onsite assessment visits have been performed for all the laboratories as part of the ongoing capacity building to enhance the continued high performance of the network laboratories. Overall, we found motivated staff and adequate infrastructure; however, equipment maintenance/calibration /certification remained a challenge.

Since its commencement in 2019, 2 new laboratories from Ghana and Nigeria joined the BU-LABNET. Personnel from two other laboratories (Congo Brazzaville and Central African Republic) received a one-week BU PCR training at the Pasteur Center of Cameroon.

The main challenge of the network is sustaining reagents/consumables supply and coordination with the BU national Programs for samples transfer.

In line with WHO skin NTDs approach, we are expanding the network to integrate other diseases such as yaws, cutaneous leishmaniasis, mycetoma and leprosy in the same molecular platform.

Acknowledgments

WHO, American Leprosy Mission, Fondation Française Raoul Follereau, ANESVAD, Members of the BU-LABNET. BU-LABNET Experts and Advisory board

Skin NTDs and/or integration – Keywords

Buruli ulcer, diagnostic, network, EQA program

Point-of-care and field compatible qPCR based molecular diagnostics for skin neglected tropical diseases

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Introduction

Confirmatory diagnosis of skin neglected tropical diseases (skin NTDs) at a point-of-care or in field setting enables health professionals to take rapid and accurate treatment decisions which prevents morbidity and disease progression. Quantitative real-time PCR based technologies enable detection of pathogen nucleic acids in host tissues with high sensitivity and specificity. Considering recent advancements in point-of-care compatible qPCR technologies, it is increasingly important to apply these technologies for effective diagnosis of skin NTDs. In this context, we explored the utility of Biomeme Franklin^{TM} Three-Nine qPCR system for molecular diagnosis of Buruli Ulcer (BU) and Leprosy in Asian and West African Countries. Biomeme qPCR is a handheld, battery operated, three plex qPCR that is operated by a mobile phone app and enables remote monitoring and collection of data on a cloud platform. With premixed and lyophilized assays for qPCR and cartridge-based (M1 Prep) DNA extraction in 1-2 min from many human clinical isolates, Biomeme qPCR systems offers a promising solution to point-of-care diagnosis of skin NTDs.

Methods

For leprosy, the utility of qPCR was tested for the detection of *Mycobacterium leprae* specific *RLEP* (repetitive gene sequence of 69bp) using earlier published primers and probe combinations in 171 leprosy cases (across the RJ classification), 57 household contacts of leprosy cases and 30 controls at SIH-R&LC. The qPCR was assessed for its ability to distinguish leprosy cases and their household contacts from controls. For Buruli Ulcer (BU), DNA extracted from 50 confirmed cases of BU that are biobanked at KCCR were used in the development of Biomeme BU assay, a standardized and lyophilized combination of primers, probes and mastermix suitable for detection of *Mycobacterium ulcerans* specific insertion sequence *IS2404* in clinical isolates. The assays were further manufactured by Biomeme Inc. and evaluated at KCCR, NMIMR and CPC. Biomeme qPCR was conducted on ulcer swab DNA samples (100 each at KCCR and NMIMR, and 132 at NMIMR) to compare threshold cycle (CT) values of Biomeme qPCR with that of the standard BioRad CFX96 qPCR system. Additionally, M1Prep DNA extraction was evaluated on 111 swab samples across the three sites.

Results

For leprosy, using the Biomeme qPCR system, we noted an average CT value of 28.12 for leprosy cases, 33.86 for household contacts of leprosy cases and 36.13 for controls. Kruskal Wallis Test across the study groups revealed a *p-value* of 1.632^{-10} indicating that the differences are statistically significant, and the qPCR was able to differentiate the infection levels between leprosy cases, their household contacts and controls. For BU, we noted an average sensitivity of 98% and specificity of 96% for the ability of Biomeme qPCR to detect *M. ulcerans* DNA in clinical isolates in comparison to BioRad CFX96 qPCR system. With M1 Prep kits, we noted a sensitivity of 82% and specificity of 95% when PCR is conducted on DNA isolated from samples with known prior results.

Conclusion

Biomeme qPCR system is a potential point-of-care compatible molecular diagnostic system for further testing and implementation in Skin NTDs in the resource limited settings.

Acknowledgments

This study was funded by the American Leprosy Missions. We thank the partner organizations, SIH-R&LC, KCCR, NMIMR and CPC for their involvement in data collection, analysis and dissemination of findings.

Skin NTDs and/or integration – Keywords

Buruli ulcer, leprosy, India, Ghana, Cameroon

Multi-centric evaluation of Biomeme Franklin Mobile qPCR for rapid detection of *Mycobacterium ulcerans* in clinical specimens

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The gold standard for *Mycobacterium ulcerans* detection is PCR due to its high accuracy in confirmation of suspected cases. But the available PCR assays are design for standard size thermocyclers which are immobile and suited for reference laboratories far away from endemic communities. This makes it a challenge to obtain immediate results for patient management. A multi-country, singled-blinded, phase 2 diagnostic study was conducted in three Buruli ulcer reference laboratories to evaluate a dried reagent-based PCR assay adapted for a handheld, battery-operated, portable thermocycler with the potential of extending diagnostics to endemic communities with limited infrastructure. The diagnostic accuracy of the assay with over 300 clinical samples showed sensitivity and specificity of 100% - 97% and 100% - 94% respectively. This assay coupled with a field-friendly extraction method fulfill almost all the target product profile of Buruli ulcer for decentralized testing at districts, health centres and community level. A key critical action for achieving the NTD Road Map 2030 target for Buruli ulcer.

Acknowledgments

American Leprosy Missions (ALM) provided the funding for this study.

Skin NTDs and/or integration – Keywords

Buruli ulcer, PCR, point-of-need

Developing a rapid diagnostic test for Buruli ulcer: Challenges and prospects

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Buruli ulcer (BU) remains one of the neglected tropical diseases in need of improved diagnostic tests. With oral antibiotic treatment available, decentralizing diagnosis would facilitate strategies for early detection, treatment and management of cases. Here we describe the development of the first rapid diagnostic test for BU, alongside its challenges and prospects. The RDT is a competitive assay, configured to detect mycolactone using novel magnetic gold nanoshells, mycolactone-specific monoclonal antibodies and a biotinylated probe. Unlike normal RDTs, a mycolactone concentration step is required. A feasibility evaluation was conducted in Cameroon and Cote d'Ivoire to evaluate the performance of the test in the field. The development of the test using synthetic mycolactone showed the test to be sensitive, detecting as low as 2ng of mycolactone in spiked sample. Evaluation of the test using swab samples from patients showed 100% validity, under development conditions. However, the concentration of mycolactone in the swab sample was barely detectable, rarely in excess of 7 ng of mycolactone and never above 15 ng. In determining the diagnostic performance of the test, challenges relating to the use of PCR as the reference test were observed, as there were discrepancies in the PCR results between labs reinforcing the need to use multiple diagnosis methods to confirm BU cases, as false positive and negative PCR results are not uncommon. When the optimized RDT prototypes were evaluated on field samples, the results indicated on average a 92% specificity (range: 81% – 97%) and 38% sensitivity (range: 31% - 56%) using the most trusted PCR data as reference standard. Using composite PCR data from different sites, the specificity ranges from 71% – 100% and the sensitivity from 21% to 61%. Thus, the sensitivity of the RDT is at best comparable to the minimal BU TPP sensitivity of microscopy. We hypothesize that the poor sensitivity of the test is linked to the swab processing procedures which may affect the concentration of mycolactone. The need for the concentration of mycolactone may add further variability in the performance of the test. Further the challenges with the PCR results revealed the need for true negative samples from disease endemic communities. Nonetheless, a possible use case of the RDT will be to use as a screening tool for suspected BU patients, with only swabs from those patients with RDT negative results being forwarded for PCR at the reference facilities. This would reduce the number of cases being forwarded for PCR, while enabling RDT positive patients to be put immediately on treatment.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Buruli ulcer

Capacity building in yaws reference laboratories in Cameroon, Côte d'Ivoire and Ghana

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To support eradication of yaws by 2030, accurate diagnostic testing is important to confirm the aetiologies of yaws like lesions. To support this, we aimed to strengthen diagnostic testing capacity in three african countries: Cameroon, Ghana and Côte d'Ivoire through the LAMP4YAWS consortium.

We selected standardised targets for qPCR and conducted a technical verification of these assays. Based on existing data, we used amplification of the RNAse P gene to assess quality of the sample, the polA gene for diagnosis of yaws and Hd16sV8 for diagnosis of *H. ducreyi*.

As part of our capacity building work, lab staff in each country received standardised training which allowed us to order to harmonize all laboratory based procedures for the LAMP4YAWS project. This training process included an inventory of study sites and the establishment of diagnostic platforms. We assessed the current capacity of each laboratories across several levels including; number of staff and their functions within the laboratory; competence of personnel in conducting all aspects of qPCR; the equipment, consumables and reagents available; and whether an adequate infrastructure was available. We implemented activities in each reference laboratory through a combination of observed, supervised and non-supervised activities.

Alongside laboratory training, we embedded activities focused on competencies established in the Good Clinical Laboratory Practices (GCLP) guidelines.

Following the training sessions, the teams in each country were able to carry out all steps of the diagnostic process in compliance with the GCLP requirements. This has successfully resulted in newly establishing enhanced capacity to support national yaws eradication programmes. The LAMP4YAWS project could be expanded into all yaws endemic areas so that diagnostic approaches are harmonized.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Yaws, capacity building, sub-Saharan Africa

External quality assurance in the fight against neglected tropical diseases: The LAMP4yaws Project

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Diagnostic limitations of existing serological tests, the emergence of antimicrobial-resistant strains and the discovery of *Haemophilus ducreyi* (HD) causing yaws-like skin lesions in children demand new diagnostic solutions for the eradication of human yaws. The disease, caused by *Treponema pallidum* subsp. *pertenue* (*TPE*), is currently subject to global eradication efforts. As an NTD, new tools must be affordable in low resource settings and accurate under tropical conditions. In laboratories of the Global North, proficiency testing (PT) is primarily organized using certified reference materials according to ISO/IEC17043. However, these high standards are not achievable in many sub-Saharan Africa's resource-limited laboratory settings at the district level. Our study aimed to establish an external quality assurance program to maintain proper diagnostic performance for detection of yaws cases in Cote d'Ivoire, Ghana and Cameroon using qPCR standard in reference laboratories and the newly designed LAMP4Yaws assay at the district level.

Swabs loaded with lyophilized plasmids containing either the *T. pallidum polA* gene target, *H. ducreyi* 16SrRNA gene (V8) target, both or no gene targets were prepared. All swabs were also spiked with human HEK293 cells to simulate the genetic background of clinical samples. In the first experiment, we tested the stability of the PT items for storage under a variety of different environmental conditions (e.g. dry/moist/wet; 37°/56°C; one/three months). Subsequently, two rounds of PT were performed in three reference (qPCR) and two district-level laboratories (LAMP).

Compared to freshly prepared and extracted *TPE* or *HD* plasmid samples, swabs kept dry at 56°C for 3h or at 37°C for 1 or 3 months showed no significant loss of copy numbers. When stored in moist conditions, slightly lower copy numbers were gained. Wet conditions resulted in higher loss of copy numbers.

In the currently analyzed first PT round, all participating reference laboratories achieved similar qPCR results compared to the provider laboratory with non-significant differences. Compared to the qPCR results, LAMP results were more variable with unstable detection of lower DNA contents ($<10^2$ copies).

Despite challenges with the LAMP assay performance in PT items, the qPCR results indicate that our newly designed PT items are suitable for yaws-EQA programs. Such prepared test panels can be sent without the need of cooling and show a stable quality under tropical conditions. While our EQA program does not strive to replace accreditation according to ISO/IEC17043, it supports the quality assurance in resource-limited laboratory settings. Strengthening all levels of laboratory diagnostics is essential for early detection especially in NTD eradication programs. In conclusion, the use of dried swab samples resulted in cost effectiveness and high sample stability required for EQA testing in low resource settings. Our EQA program is suitable to be adapted to other disease programs in the tropics.

Acknowledgments

EDCTP

Skin NTDs and/or integration – Keywords

Yaws, EQA, diagnostics, capacity development

Molecular diagnostics for mycetoma

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Introduction

Mycetoma is a Neglected Tropical Disease of the subcutaneous tissue. It can be caused by at least 70 different causative agents of either fungal or bacterial nature. Most laboratories in the endemic regions rely on culture and histopathology for the identification of the causative agent. However, in the past it was already demonstrated that misidentifications were common. Molecular identification seemed to be the only way to reliable identify the causative agent to the species level.

Methods

Since one of the hallmarks of mycetoma is the formation of grains, the first step was to develop a method in which DNA could be isolated directly from the grains. For this we focused on the most common causative agent *Madurella mycetomatis.* First several destruction methods were tried, including beat-beating and commercial DNA isolation kits. The next part was to develop a DNA amplification method. For this classical PCR, real-time PCR and isothermal PCRs were developed. The classical PCR was also evaluated in the Mycetoma Research Centre in Sudan.

Results

For DNA isolation directly from the grains beat-beating with metal beads was essential. This combined with the Zymo DNA isolation kit gave the most optimal DNA isolation protocol. Two classical PCRs were developed for *M. mycetomatis,* however one of them seemed to cross react with *M. pseudomycetomatis,* for the other one no cross-reactivity was noted. The time to identification by PCR tests was only 2.76 hour, while histopathology and culture took 204.4h and 508.5h, respectively. For *Madurella* species also a real-time PCR was developed. Isothermal amplification techniques such as RPA and LAMP were developed, but RPA seemed to be the easiest to use with the shortest time to identification.

Discussion

Since most molecular diagnostic tools were developed for *M. mycetomatis,* and at least another 69 different causative agents are able to cause mycetoma, we are currently working on developing molecular tools for the other causative agents. For this we first focused on the other common causative agents and will move later to the more rare causative agents. The tools currently developed can be can run on multiple platforms so that they can be used in each laboratory setting, even in the field and point-of-care.

Conclusions

Molecular diagnostic tools had a rapid turn-over time and a high sensitivity and specificity. They are the future for mycetoma species identification.

Acknowledgments

This abstract is the result of more than 20 years research on the development of molecular tools for mycetoma. Many people and funders have contributed to this. This work was not been possible without the close collaboration between ErasmusMC and the Mycetoma Research Centre in Sudan. Part of the work has been funded by the Netherlands Scientific Foundation, Drugs for Neglected Diseases *initiative*, Dioraphte and the Erasmus University.

Skin NTDs and/or integration – Keywords

Mycetoma, PCR, qPCR, RPA, fungal, bacterial

Laboratory support for the control and elimination of skin neglected tropical diseases in Ghana

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Introduction

Skin related Neglected Tropical Diseases (skin-NTDs) express significant cutaneous manifestations that are correlated with long-term disfigurement, disability, and poverty in endemic countries. The 2030 WHO road map sets out an integrated approach as the best in addressing the scourge of skin NTDs like Buruli ulcer (BU) and yaws. An integrated approach to identifying these diseases is warranted due to their co-endemicity, similarity in their clinical signs and to facilitate optimal utilisation of limited financial and human resources.

An integrated case management programme implemented for Buruli ulcer, Yaws and Leprosy in collaboration with the Ghana Health Service sponsored by ANESVAD, mandated the Kumasi Centre for Collaborative Research in Tropical Medicine (KCCR) to offer laboratory support and technical assistance to seven skin NTD endemic districts (Asante Akim North (AAN), Sekyere Afram Plains (SAP), Upper Denkyira East (UDE), Upper Denkyira West (UDW), Wassa Amenfi East (WAE), Nkoranza South, and Wa Municipal) in Ghana.

Method

Actions implemented included training district-level laboratory technicians and health workers on specimen collection, storage, and transport to reference laboratories; continual monitoring and supervision at the district level for trained health workers; laboratory confirmation of BU and Yaws samples and providing results of the analysed samples to health facilities, districts, and national control programs. To increase testing capacity, two Public Health Reference Laboratories (PHRLs) were trained for diagnostic confirmation. An external quality assurance (EQA) was instituted for the PHRLs. All cases of skin NTDs identified were treated as per national guidelines.

Results

From July 2018 - October 2022, we received 1004 clinical samples [929 suspected BU (median age 28 (IQR 12-39) years and 75 DPP positive yaws cases (median age 11 (IQR 9-14) years)]. Of the BU samples, 156 (84 females and 72 males; 28% <15 years) were confirmed positive by IS2404 PCR, giving a positivity rate of 17%. BU lesions were ulcers (80%), nodules (6%), plaques (12%) and oedema (2%); category I (37%), category II (34%) and category III (29%). Most confirmed BU cases (29%) were from AAN (29%), WAE (23%), UDW (19%) and UDE (15%). Results were sent to the district within a mean/SD of 4.5±2.6 days after receipt of samples at the KCCR laboratories.

The multiplex PCR assay identified 9 DPP positive yaws cases as *Treponema pallidum*, 29 as *Haemophillus ducreyi* (69% of these were from SAP district) and 5 as *Treponema pallidum/Haemophillus ducreyi* coinfection.

A total of 114 personnel including health staff, lab technicians and CBSVs received training. After the PHRLs attained a score of 90% on the EQA. Further, standard operating procedures were established at all stages of the project.

Discussion and conclusion

In this project, we show that implementing integrated diagnostic confirmation was feasible. Timely results were transmitted to stakeholders in less than a week. Multiplex diagnostic tools differentiated *T pallidum* and *H ducreyi*. Laboratory staff had high scores in EQA following training. The nearly equal proportions of Cat I, II and III lesions found signify a need for sustained outreach activities for BU.

Acknowledgments

We are grateful to staff of the seven selected districts those of the Buruli ulcer and Yaws Control Programmes of the Ghana Health Service for their support. We are grateful to ANESVAD foundation for financial support for this project.

Skin NTDs and/or integration – Keywords

Skin NTDs, integration, Ghana, Buruli ulcer, yaws, *H ducreyi*

SwiftX DNA – a versatile tool for extraction of DNA from various skin disease agents

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Extraction of nucleic acids is the first step of every molecular diagnostic workflow. Depending on the pathogen and the specimen, DNA and RNA extraction can be challenging and crucial for successful diagnosis. Molecular detection of pathogens of skin-related neglected tropical diseases (NTDs) requires a high performing DNA extraction due to their low concentration in clinical specimens as well as their resistance against cell lysis. Furthermore, currently used products are specialized in extraction of particular disease agents and are often not suitable for use at the point of care, which usually lacks a proper laboratory infrastructure. While several approaches to field-friendly detection methods are available, a field-friendly DNA extraction protocol for skin NTDs is still missing. Current methods are usually laborious, expensive and require a well-equipped diagnostic laboratory. However, effective control of skin NTDs requires the implementation of diagnostic tools on all levels of the health system – from the point-of-care through health outposts up to routine diagnostic laboratories.

SwiftX DNA nucleic acid extraction leverages Xpedite Diagnostics' cell capture and reverse purification technology. The reagents require no refrigeration and the workflow can be performed with inexpensive equipment. Thus, SwiftX technology enables laboratories across all levels of the healthcare system to perform DNA extraction for molecular diagnostics. SwiftX DNA is suitable for sensitive molecular diagnosis of the majority of skin NTDs. This talk reviews protocols and existing data on the use for Buruli ulcer, leishmaniasis, leprosy, and fungal diseases. Furthermore, the same technology can be applied to diagnostics of further skin NTDs such as yaws, onchocerciasis, filariasis and others. Collaborations to gather further experimental data have been initiated. SwiftX DNA allows for the use of harmonized protocols for DNA extraction from various pathogens and specimen types, which significantly reduces staff training needs and facilitates an effective routine use. The extracted nucleic acids can be used with various molecular technologies such as real-time PCR, isothermal amplification, and sequencing. SwiftX DNA is fully scalable and can be applied in settings without any laboratory infrastructure as well as in higher throughput in centralized laboratories.

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Skin NTDs and/or integration – Keywords

Integrated diagnostics across multiple diseases (Buruli ulcer, cutaneous leishmaniasis, post-kala azar dermal leishmaniasis, leprosy, yaws, fungal diseases)

Session 7 : Diagnostics and laboratory capacity strengthening – Posters

Leprosy: still with us and why it is being missed in our environment

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Hansen’s disease is a chronic infectious disease caused by Mycobacterium Leprae. It affects people of all races all around the world but is most common in warm, wet areas in the tropics and subtropics. It affects the nerves, skin, eyes and nasal mucosa, upper resp tract, bones and testes. The bacteria attack the nerves and this results in nerve damage and disabilities. Elimination of leprosy as a public health problem was achieved globally in the year 2000 (defined as a registered prevalence of <1 case per 10 000 persons) and more than 16 million leprosy patients have been treated with MDT over the past 20 years. Data however shows that although the overall number of cases is slowly declining, the number of new cases does not align with global efforts and resources deployed to interrupt transmission.

Over the period of 12 months, 8 cases of Hansen’s disease were identified at the Dermatology clinic of Lagos University Teaching Hospital in Lagos.

We report the clinical findings of a 27-year-old housewife who presented with a 2-year history of papules and nodular lesions on the face that were firm in consistency, not painful, nor itchy. The lesions were initially the same color as her skin, but over the period became reddish in color. Similar lesions were found on both her arm and legs and these lesions were said to be recurrent. She had swelling of the nose and ears, with associated bleeding from the nose and a foul-smelling discharge from the ulcerations that developed on the palms and soles. A clinical diagnosis of leprosy was made and acid-fast bacilli (4+) were identified. Over the period of 2 years, she had visited chemists and patent drug stores, had home treatment with tablets and injectables by a health care worker, and at the last resort sought help spiritually at a church.

Discussion

Cultural norms and beliefs, poverty, in addition to inappropriate health care-seeking habits and attitudes, and late presentation all contribute to the problems that we encounter with Hansen’s disease in our environment.

For healthcare workers in the community to improve their diagnostic acumen, they need to know what to look for and how to integrate the clinical signs to reach a diagnosis. The best way to diagnose cases is from clinical experience and paying particular attention to dermatological and neurological findings

There is a dire need to increase the diagnostic ability of health workers for all stages and types of Leprosy as this will contribute to a prompt diagnosis, enable the commencement of therapy and ultimately reduce the spread of leprosy.

Conclusion

It is well established that early diagnosis and multidisciplinary care of leprosy survivors improves outcomes and reduces the spread of the disease. Optimization of existing tools, such as contact tracing, active case-finding, and provision of MDT services are critical activities to interrupt the transmission. The scale-up of leprosy prevention alongside integrated active case detection in the community is key to the success of the elimination of leprosy.

Skin NTDs and/or integration – Keywords

Skin findings, leprosy, early diagnosis, case detection, and contact tracing

Dermatomycoses: Practical clinical cases

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Dermatomycoses include all skin pathologies caused by fungi classified into 3 groups: dermatophytes, yeasts and moulds. They represent a very frequent reason for consultation in dermatology, paediatrics, general medicine and requests for advice in pharmacies. If in the majority of cases the diagnosis and management presents no difficulty, in some instances a precise diagnosis using additional laboratory tests is recommended in order to choose the most suitable therapeutic approach. Through clinical cases of dermatomycosis collected in Algeria and Guinea, we will illustrate the full complexity of the diagnostic management that patients may encounter in their course of treatment, whether in common or rarer cases, and highlight the need to raise awareness among health workers of this type of disease.

Skin NTDs and/or integration – Keywords

Dermatomycose, diagnosis

Dermatophytoses Severity Score (DSS) – A novel scoring system to assess the severity of dermatophytoses

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Introduction

The increasing prevalence of dermatophytosis in tropical countries coupled with rising drug resistance necessitate an objective system to define the severity, monitor therapeutic response,predict prognoses and also as a research tool specially in clinical trials. We attempted to establish and validate a new scoring system -

Dermatophytoses severity score (DSS), for dermatophytoses involving non-glabrous skin.

Methods

A consensus group was convened to develop an objective and reproducible scoring system to describe the extent and severity of dermatophytosis of 200 consecutive patients with dermatophytosis. A second assessment entailed independent DSS scoring of the same patients by dermatologists and residents who were not part of the consensus group. The main outcome measured was index reliability, assessed in two steps, between the observers.

Results

The reliability of the DSS system was done in 2 steps. A 2 step assessment and DSS grading of 200 consecutive patients with clinically diagnosed dermatophytoses showed high reliability (Cronbach α test and intraclass correlation coefficient (ICC).

Conclusions

The DSS has demonstrated high reliability and it could serve as a novel, reproducible and objective scoring tool for dermatophytosis which will help in managing this mammoth neglected tropical disease.

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Skin NTDs and/or integration – Keywords

Dermatophytosis, dermatophytoses severity score

Usefulness of qPCR in confirming clinical cases of paucibacillary leprosy

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Leprosy, a neglected tropical infectious disease caused by *Mycobacterium leprae*, is still a public health problem in some countries around the world. In Côte d'Ivoire, there has been a recrudescence of grade 2 leprosy cases due to a delay in clinical diagnosis and certain socio-anthropological factors. National laboratory diagnosis is essentially based on microscopy examination. This makes it possible to confirm cases of multibacillary (MB) leprosy but it is hard to detect paucibacillary (PB) forms of the disease. PCR, a more sensitive and more specific molecular diagnostic tool than the traditional method, could be used to confirm cases of *M. leprae* infection when the microscopy examination is negative.

This study aims to demonstrate the usefulness of PCR in confirming clinical cases of leprosy in PB patients.

The study was carried out on 30 patients clinically diagnosed with leprosy. Microscopic examination was performed on all specimens to categorize patients according to pauci- and multibacillary forms. For the molecular biology analyses, the isolation of the DNA from the specimens was carried out using a commercial extraction kit and the detection of *M. leprae* was carried out using real-time PCR on Quantstudio5 (Thermofisher Scientific) targeting repeated *RLEP* sequences

Microscopy examination revealed 20 PB patients whose AFB could not be observed and 10 MB patients with a bacilloscopy index ranging from 1+ to 4+. Sixty (60)% of smear-negative PB patients and all MB patients were qPCR positive.

qPCR confirmed the presence of *M. leprae* in PB patients with negative microscopy. This test could be an alternative to microscopic diagnosis for laboratory confirmation of PB leprosy cases pending the implementation of a Rapid Diagnostic Testing (RDT).

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Skin NTDs and/or integration – Keywords

Leprosy, *Mycobacterium leprae*, diagnosis, microscopy, qPCR, paucibacillary

Differential diagnosis of cutaneous ulcers: Yaws like-lesions

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Epidemics of cutaneous ulcers similar to yaws (yaws-like lesions) are regularly reported in tropical and subtropical countries. In Cameroon, as in other countries, they occur mainly in poor and remote communities lacking access to health infrastructures, and living in poor hygiene conditions. In this context, the diagnosis was until recently, essentially clinical and sometimes based on serology which has proven to be limited. These cutaneous ulcers have long been attributed to yaws caused by *Treponema pallidum* subsp. *pertenue*. The integration of molecular tools into yaws control efforts by the WHO has made it possible to describe *Haemophilus ducreyi* as the major cause of cutaneous ulcers in many endemic countries. *Haemophilus ducreyi* is generally susceptible to azithromycin, the reference molecule adopted by WHO in the yaws eradication strategy; but cutaneous ulcers caused by *Haemophilus ducreyi* persist after mass azithromycin administration. This persistence raised the possibility that this bacterium may exist in a natural reservoir. Even if evidence of zoonotic transmission have not been clearly demonstrated, it appears plausible that animals and environment/ fomites play an important role in the transmission chain.

In Cameroon, the Centre Pasteur has been designated as the national reference laboratory for the confirmation of yaws/ related ulcers and is involved in the eradication process. To better understand the dynamic of transmission of *Haemophilus ducreyi* and to refine the national control strategy, differential diagnostics of yaws-like lesions have been developed and method of screening for *Haemophilus ducreyi* DNA on non-human matrices has been designed. We set up a nucleic amplification-based test for its detection. Analysis performed over the past 3 years confirmed the predominance of *Haemophilus ducreyi* in yaws-like lesions in children with more than 20% (ranging from 0 to 73% in health districts) detection rate. *Haemophilus ducreyi* DNA was not detected in environmental samples analysed but positive amplifications were obtained in samples collected from clothes and bed linens of patients with *Haemophilus ducreyi* cutaneous ulcers. Flies were the only animal on which we had positive amplification to *Haemophilus ducreyi*, with a detection rate ranging from 15 to 27%. To improve the accuracy of results, we also set up isolation on culture media. First results obtained from culture confirmed the relative abundance of this microorganism in skin lesions and ruled out the hypothesis of commensalism.

The molecular tool already implemented for *Haemophilus ducreyi* associated with culture constitutes more reliable technical approaches for skin lesion management. This technical combination ease pathogen detection, viability and evaluation of antibiotic resistance profile, really important after azithromycin mass drug administration in the endemic areas. This progress in the diagnostics of cutaneous ulcers similar to yaws constitutes a further step in supporting the efforts of the national skin-NTDs control programme.

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Skin NTDs and/or integration – Keywords

Cutaneous ulcers, differential diagnosis, *Haemophilus ducreyi*

Bioengineered production of PGL-I antigen that leads to sustainable supply of antigen for leprosy serodiagnosis

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Phenolic glycolipid-I (PGL-I) is a specific cell-wall component of *Mycobacterium leprae*, the causative agent of leprosy. PGL-I has been implicated as a pathogenic factor involved in peripheral neuropathy and also used as an important antigen for serodiagnosis. However, the supply of PGL-I is limited because *M. leprae* cannot be cultured *in vitro*, so that currently it is produced via a complicated chemical process. Alternatively, we focused on the bioengineered supply of PGL-I by construction of genetically modified *Mycobacterium marinum* strain that stably produces PGL-I and evaluated the reactivity with patient serum of leprosy with the aim of application to serodiagnosis.

M. marinum originally produces the phenolic glycolipid-marinum (PGL-M), which is an intermediate of PGL-I. For elongation of the sugar moiety of PGL-M which has a monosaccharide to a form that is identical to PGL-I having a trisaccharide moiety in *M. marinum*, we selected a group of putative PGL-I-biosynthetic genes from *M. leprae* genome and introduced various combinations of genes into *M. marinum*. Glycolipid components were extracted from the recombinant *M. marinum* strain, and each product were purified and analyzed by TLC and MALDI-TOF/MS. Reactivity with patient serum was assessed by ELISA.

TLC and MALDI-TOF/MS analysis showed that one of the major products purified from the recombinant *M. marinum* was structurally identical to the sugar moiety of PGL-I. This result demonstrated that the sugar moiety of PGL-I, which are known to play important role in pathogenicity and immune response, could be biosynthesized in recombinant *M. marinum*. Furthermore, the recombinant PGL-I from *M. marinum* was found to specifically react with patient serum of leprosy, indicating that it could be used as a specific antigen in the same way as chemically synthesized or *M. leprae*-produced PGL-I. These results suggest that bioengineered production of PGL-I by genetic modification might be an alternative source of antigen for leprosy serodiagnosis.

Acknowledgments

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Skin NTDs and/or integration – Keywords

leprosy, *Mycobacterium leprae*, glycolipid, serodiagnosis

Dissemination of mhealth apps: A systematic review

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Introduction

Millions of mobile applications exist, and thousands of them fall under the category of mobile health (mhealth). mhealth apps have demonstrated their utility for disease diagnostic, management of treatment data and health promotion strategies. To reach potential users and convert them to final users, a marketing strategy should be used. This will define the target end users, the communication channels, the content, and timeline to effectively reach the users and motivate them to adopt the mhealth apps. This study aimed to systematically review and report all available data on how mhealth apps are promoted to raise awareness, and long-lasting engagement of end users.

Methods

A systematic review was conducted from PUBMED, EMBASE, Scopus and CINAHL databases over 5 years (January 1, 2018 - September 30, 2022). Eligible sources were academic papers. The main outcome was dissemination strategies for mobile health apps. Retrieved records were imported to Rayyan for duplicate management and paper screening.

Results

A total of 638 studies were retrieved from selected databases, among which only 10 were eligible for the review. Both paid and unpaid marketing strategies are used to inform the potential users of existence of mhealth apps and motivate them to download the apps. These strategies use different channels including social media, e-mailing, paper and face-to-face communication. TV and radio broadcasting are also used but in rare cases. Advertising messages included instructions on where and how to download and install the apps. In most of the papers, instructions were oriented on how to use the app and stay engaged with the health intervention. The most frequent paid marketing platforms were Google Universal App Campaigns and Facebook Ads Manager which are used to oversee paid digital marketing campaigns across Google and Facebook platforms respectively.

Advertising performance was influenced by many factors including but not limited to ad content. Animated graphics may generate the greatest number of clicks when compared with other types of images.

Metrics commonly used to assess the effectiveness of the marketing strategies were number of downloads, nonusage rate, dropout rate, adherence rate, and usability of the app over days, weeks, or months. Additional indicators like cost-per-click, cost-per-install and click-through rate were mainly used to assess cost-effectiveness in paid marketing campaigns.

Successful adoption of mhealth apps may be dependent on ease of downloading, thus some patients would need technological assistance with downloading the app and starting to use the features. Some additional potential barriers to user engagement to a specific app would be the use of other health apps that better suit user needs, and not enough interactive features in the app.

Conclusion

Peer-reviewed literature on dissemination strategies for mhealth apps is scarce. Healthcare managers, IT professionals and marketing designers should work together to develop a framework defining how mhealth apps could optimally reach potential users and efficiently lead their onboarding and engagement to the use of mhealth apps. Findings and recommendations of this review will serve to implement the WHO SkinNTD app for the diagnosis of skin related neglected tropical diseases.

Acknowledgments

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Skin NTDs and/or integration – Keywords

mHealth; mobile apps; marketing strategies

10 years of experience as a reference laboratory for the microbiological confirmation of Buruli ulcer

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Buruli ulcer (BU) is an infectious skin disease caused by *Mycobacterium ulcerans.*

In Gabon, the first cases of *M. ulcerans* infection were reported in the 1960s.

In view of its extent, socio-economic consequences and permanent cosmetic sequelae, BU is now considered a public health problem in Gabon.

Diagnosis is based mainly on clinical and epidemiological features. There are 4 methods of confirmation - microscopy, polymerase chain reaction (PCR), histopathology and culture, but PCR is the most rapid and widely used method.

Since 2013, WHO recommended that national control programs should strengthen laboratory confirmation of cases in order to confirm with a positive PCR result at least 70% of notified cases. The laboratory therefore has a central role in the optimal management of BU patients.

In Gabon, the CIRMF Bacteriology Laboratory is the reference laboratory for microbiological confirmation of *M. ulcerans* infection.

In this study, we report some data from 10 years of experience in the microbiological confirmation of BU cases in Gabon.

Between 2012 and 2022, the analysis results of the patient samples as well as the socio-clinical-demographic parameters were recorded in a 2013 excel file. Samples were tested according to the current recommendations of the National BU Control Program. Testing methods included: Ziehl Neelson bacilloscopy, conventional IS*2404* MU1/MU2 PCR, PGP3/PGP4 nested PCR, and more recently IS*2404* RT-PCR.

Regarding the socio-clinical-demographic parameters, we indexed the individual patient records completed by the clinicians. Different data were recorded (sex, age, clinical information, location of the ulcer or nodule, case classification, treatment, patient's address, treatment center, date of sampling, type of sampling, results of microbiological analyses).

All statistical analyses and graphs were performed with R software, version 4.0.2.

A total of 377 samples from patients with presumptive *M. ulcerans* infection were analyzed. The mean age of the patients was 31, 21 years. The majority of patients were new cases from the city of Lambarene and ulcer was the most representative clinical form (79.31%). The annual distribution of cases shows a peak during the year 2017 with 28.75% of cases. Microbiological analyses showed that 28.49% of cases were positive on bacilloscopy after Ziehl-Neelsen staining. Regarding the PCR analyses of the samples, 46.94% of the samples were positive in PCR IS*2404* MU1/MU2 against 63.39% of the positives in PGP3/PGP4 Nested PCR with an estimated average amount of DNA at 41, 07 ng/µl. Genotyping of *M. ulcerans* strains showed that the VNTR4 genotype was the most prevalent at 10.87% followed by the MIRU9 genotype at 10.46%.

These results consolidate the place of the CIRMF Bacteriology Laboratory and PCR in the diagnosis and optimal management of patients clinically affected by Buruli ulcer in Gabon.

Skin NTDs and/or integration – Keywords

Buruli ulcer, diagnostic, PCR, *M. ulcerans, g*enotypes.

Cutaneous leishmaniasis misdiagnosed as cutaneous tuberculosis: A case series of unusual presentation from a single tertiary care center and a need of more sensitive diagnostics techniques

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Cutaneous leishmaniasis misdiagnosed as cutaneous tuberculosis: A case series of unusual presentation from a single tertiary care center and a need of more sensitive diagnostics techniques

Introduction

Cutaneous leishmaniasis(CL) is a vector-borne disease caused by Leishmania protozoa transmitted through a bite sandfly. Nepal, previously non-endemic for CL has been reporting high number of cases mostly from hilly regions. However, due to the similarity of presentation and biopsy findings they have been reported as cutaneous tuberculosis which creates confusion among the treating physician. Here, we will be presenting 5 case series that were reported as cutaneous tuberculosis but in fact were of CL.

Case series

All of these cases were from hilly regions as well as the capital. All of the lesions were of a long duration, non-painful and without discharges. The morphology of lesion included were ulcerative plaque over the nose, indurated plaque over the forearm, erythematous plaque over nipple, verrucous plaque over forearms and ulcerative pyoderma-like lesion over the thighs. It was confusing when lesions were present over covered regions. All of the lesions were negative for amastigotes forms both in smears and biopsy. All of the biopsies were reported as cutaneous tuberculosis due to the well-formed granulomas. All of the patients had Mantoux test more than 10mm induration. Polymerase chain reaction test for both Tuberculosis and Leishmaniasis were both negative from lesion. rk 39 tesing was negative in all cases.

Results

Two among the five cases were treated with anti-tubercular medications for 6 months without relief. Others were put on close monitoring despite the reports. All of cases improved at end of a year period.

Conclusion:

CL is recently being reported from Nepal more frequently but it has also been been misdiagnosed. The similarity of CL with cutaneous tuberculosis clinically and histologically has been causing misdiagnosis and being overtreated as cutaneous TB. We need efforts to create awareness among public and there a need to improve efforts of developing proper diagnostic mechanism in the country. CL Detect was trialed in Sri Lanka with limited efficacy and accuracy. CL is a disease which can be managed without any treatment but cutaneous tuberculosis need a six month course of anti-tubercular medications. So, a need is there for better and accurate diagnosis of cutaneous leishmaniasis.

Skin NTDs and/or integration – Keywords

Cost-effectiveness; applications; inclusive; integration; online training; skin diseases

Evaluation of point of care tests for the diagnosis of cutaneous leishmaniasis

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Cutaneous leishmaniasis (CL) is a serious health problem in Suriname. To expand the diagnostic options, two newly developed diagnostic tests, i.e. the rapid diagnostic test CL Detect™ Rapid Test (CL Detect) and the Loopamp™ *Leishmania* Detection Kit (Loopamp) were evaluated.

Diagnostic test performance was compared to the routine diagnostic approach in place, i.e. clinical symptoms combined with microscopy, and to polymerase chain reaction (PCR), which was used as a reference standard. The study population (n=93) was a typical representation of the CL affected population in Suriname and mainly infected with *Leishmania guyanensis*.

CL Detect had a very low sensitivity compared to microscopy (36.7%) or PCR (35.8%), due to a high number of false negative results. The specificity of the CL Detect compared to microscopy and PCR was 85.7% and 83.3% respectively. Loopamp sensitivity was 84.8% compared to microscopy and 91.4% compared to PCR. The Loopamp test had a moderate specificity (42.9%) compared to microscopy, but a good specificity compared to PCR (91.7%).

The CL Detect is not likely to be a good replacement for the routine diagnostic procedure for CL in Suriname. The high sensitivity of the easy to perform Loopamp enables the implementation of sensitive molecular diagnosis in resource limited settings.

Acknowledgments

We are indebted to the patients, nurses and technical staff who contributed to the study.

Skin NTDs and/or integration – Keywords

Leishmaniasis, diagnostics, Suriname

Post-Kala-azar Dermal Leishmaniasis: A case series

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Introduction

Post-Kala-azar Dermal Leishmaniasis (PKDL) is considered as sequel of visceral leishmaniasis (VL). It is recognized as a distinct clinical entity separate from other forms of cutaneous leishmaniasis. The disease is mainly encountered in Indian subcontinent and Africa. The pathophysiology of the disease is thought to be an inadequate immune response and treatment to visceral leishmaniasis and possible genetic predisposition. Clinically, skin lesion in any PKDL patient can vary from macules, papules, nodules, to plaques or mixed form so it can be easily misdiagnosed as other skin conditions

Methods

Retrospective review of all PKDL cases presented to Anandaban hospital, a leprosy referral center was done. We reviewed patient's demographics, history, laboratory investigations, clinical photographs and treatment.

Results

There were total of four cases, among which three were male and one was female. All of them had asymptomatic papule and nodular skin lesion on face, upper limb and trunk but two patients also had hypopigmented macules on trunk. Among them one patient had undergone the treatment for VL, however three had no history of VL in the past. All four of them were RK39 strip test positive. Three patients were referred to our center with suspicion of leprosy and one with a suspicion of cutaneous malignancy. All the patients were histologically confirmed for cutaneous leishmaniasis. Slit skin smear for AFB was negative in all patients. Each one of them received miltefosine for 12 weeks

Discussion and Conclusion

Although PKDL is considered a dermal complication of VL it can appear even in the absence of past evidence of VL, just as the three cases in our series. This makes these lesions even harder to diagnose and can even be misdiagnosed as leprosy in endemic countries like Nepal. Since an infected individual can act as a reservoir of the disease, an active surveillance and a high index of suspicion is required to stop the transmission .The importance of making the clinicians and pathologists of endemic counties like Nepal, aware about this disease cannot be over emphasized, as these cases can easily be confused with other skin diseases especially leprosy, and the price to pay for delayed diagnoses is very high. There are already various programs against leprosy, a major skin NTDs in Nepal, so incorporating other skin NTDs like PKDL along with these programs may be very effective in spreading the awareness against such rare and confusing entity.

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Skin NTDs and/or integration – Keywords

Post-kala-azar dermal leishmaniasis

Performance of a rapid serological test in the differential diagnosis of yaws in patients with suspicious skin ulcers

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The eradication of yaws, an NTD caused by Treponema pallidum subsp. pertenue, has been included in the WHO roadmap for NTDs. The diagnosis of yaws in patients with tropical ulcers is challenged by clinical similarities between yaws and non-yaws ulcers. Furthermore, laboratory confirmation by PCR of the ulcer or serological tests like the Rapid Plasma Reagin (RPR) are often not available at the point-of-care in yaws-endemic areas. The DPP is a rapid serological test for the simultaneous detection of treponemal (T-line) and non-treponemal (NTline) antigens that can be read by the naked eye or using a density micro-reader for quantitative results. However, its ability to discriminate yaws in patients with skin ulcers has not been assessed. We used data from a phase 3 community trial in Namatanai (Papua New Guinea) to assess the performance of DPP for yaws diagnosis in PCR-tested ulcers.

The analysis included 995 ulcers, with 287 testing positive for yaws in the PCR. When reading the DPP result by the naked eye, the highest sensitivity compared with PCR was observed for the NT-line alone (84.0%); sensitivity for the T-line alone and the combination of T- and NTlines was 79.2% and 74.6%, respectively. Specificity was 60.7%, 49.6%, and 68.6% for the NTline, T-line, and the combination of both, respectively. The density reader at the cut-off of $T \geq 1$ and $NT \geq 28$, which maximized the sum of sensitivity and specificity, achieved a sensitivity of 75.7% and specificity of 77.6%. We observed slight differences in the performance of the test according to patient and ulcer characteristics, including age, ulcer duration, number of ulcers, and number of episodes.

Our results show that the DPP test has a relatively high sensitivity to diagnose yaws in patients with tropical ulcers testing positive for yaws on the PCR. Although the density reader remarkably improves the trade-off between sensitivity and specificity, the overall performance of the DPP test suggests its unsuitability for using it as a sole strategy for active surveillance of yaws in eradication campaigns. Therefore, a new point-of-care test that provides a combination of higher sensitivity and specificity in detecting true cases of yaws in individuals with suspicious ulcers would be invaluable for the final phase of the eradication strategy.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Yaws; diagnosis; point-of-care; cutaneous ulcer

Atopic follicular eczema co-occurring with scabies in a 9-year-old child

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The prevalence of scabies in Guinea, and the difficulty of diagnosing scabies with atypical localization associated with other chronic dermatoses, motivated the choice of this case.

Scabies is a significant, commonly encountered, and highly contagious health condition which, if not treated in a timely manner, can significantly affect quality of life in the areas of working conditions, sleep disorders and psychosocial problems in patients and their family members. This could easily be avoided if scabies patients were identified and treated early. A high level of awareness is essential to avoid recurrences.

A 9-year-old child with predominantly nocturnal itching was referred to us. Dermatological examination revealed dry skin with papular and follicular rash, blistering and impetiginizations located in the creases of the elbows, abdomen, buttocks, genital tract and creases of the knees. We also noted lichenifications at the elbow and knee folds. The history of the disease indicates a family contamination and a history of rhinitis in the child.

A diffuse itchy rash predominantly at night in two or more family members in a country like Guinea indicates scabies with a sensitivity of 100% and a specificity of 97%. The presence of itchy follicular papules plus a history of allergic rhinitis indicates atopy. The clinical characteristics of the lesions and the dermatological history thus reveal an atopic follicular eczema exacerbated by scabies.

For management, we recommended 5% permethrin for all family members who had been in prolonged contact with the child exhibiting predominantly nocturnal pruritus. We also explained the hygienic measures that should accompany the medical treatment and took steps to raise awareness with a view to limiting the spread of scabies, and in the context of prevention.

For the management of the follicular eczema we recommended emollients and hydrocortisone 0.5% occlusive ointment for application once daily in the evening for 7 days. To reduce the pruritus, we recommended cetirizine tablets for 3 days. Cloxacillin-type antibiotics were also prescribed.

Overcrowding, late diagnosis, late treatment and low levels of awareness are probable causes of the high prevalence of scabies worldwide and in Guinea.

Scabies must also be differentiated from other pruritic conditions for proper management because any diagnostic error can lead to chronic pathologies that are difficult to manage such as glomerular diseases, renal insufficiency, etc.

Scabies can also exacerbate pre-existing chronic dermatoses and it is very helpful to carry out the necessary investigations to avoid any diagnostic oversights.

Scabies also appears to be age-related and groups of children deserve special attention as they present with atypical localizations.

Acknowledgements

United Mining Supply, La Source University Guinea

Skin NTDs and/or integration – Keywords

Atopy, eczema, scabies, follicular

Evaluation of less invasive sample collection tools for the diagnosis of cutaneous leishmaniasis

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Cutaneous leishmaniasis (CL) diagnosis is traditionally done on invasive samples tested by microscopy, but in recent years, a shift towards moleclar methods on less-invasive samples has taken place. Most research focused on samples that can only be taken from ulcerated lesions, but in many parts of the world, lesions are dry and therefore unsuited for such methods. Therefore, we tested three less invasive sample methods which could be used as an alternative for skin slit sample collection for all types of CL lesions.

A prospective diagnostic accuracy study was done in consecutively enrolled CL-suspected patients in Ethiopia. Dental broach, tape disc and Harpera microbiopsy with PCR as index tests were primarily compared to PCR on skin slit as a reference test. Exploratory analyses with different (composite) reference tests were also explored. PCR results were categorized as positive, negative, invalid (<3ct difference with contaminated negative extraction control), or undetermined (negative Leishmania PCR and negative HBB PCR). Sensitivity, and specificity with 95% confidence intervals (95% CI) were assessed, as well as pain scores per sample type. Differences in pain scores and Ct-values were evaluated using the Mann-Whitney test, and the Spearman-rank test was used to check correlation between Ct-values.

Positivity rates were 82.0% for skin slit, 80.1% for dental broach, 92.8% for tape discs, and 68.0% for Harpera microbiopsy devices. Using skin slit as reference test, sensitivity of dental broach was 89.0 (95% CI 84.8–92.1), with specificity of 58.1 (95% CI 45.7–69.5). Tape disc had very high sensitivity (96.1%, 95% CI 93.2– 97.8) but low sensitivity (27.4, 95% CI 17.9 –39.6), whereas microbiopsy had a sensitivity of 74.8 (95% CI 66.3–81.7) and specificity of 72.7 (95% CI 51.8–86.8). Some skin slit negative patients were consistently positive on all other tests and therefore composite reference tests were explored. With a composite reference test including all sample types, sensitivity of skin slit was 90.6 (86.8 – 93.3) and specificity 86.4 (73.3 – 93.6), which was similar to dental broach with sensitivity 90.9 (87.1 – 93.6) and specificity 93.2 (81.8 – 97.7). All samples were significantly less painful than the skin slit ($p<0.001$). Correlation was strongest between skin slit and dental broach (rho=0.71), while microbiopsy has consistently higher Ct-values than other sample types. Contamination was common, but mostly occurred at Ct-values above 35.

Dental broach samples could be a more patient-friendly alternative to diagnosis on skin slits. They have a similar positivity rate and diagnostic performance when using a composite reference tests, are strongly correlated to skin slit, while they are significantly less painful. Tape discs lack specificity and do not seem suitable for routine diagnosis.

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Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis

Pathogen and microbiome factors contributing to Buruli ulcer disease severity

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Buruli Ulcer is a neglected tropical disease caused by the flesh-eating bacterium *Mycobacterium ulcerans, resulting* in subcutaneous necrotic skin infections. If not treated promptly, the disease could result in prolonged morbidity including disfiguring lesions requiring corrective surgery. According to the World Health Organisation, 33 countries have reported the disease, with 98% of reported cases corresponding to the African region. Seasonal outbreaks predominantly occur in Victoria, Australia. The exponential growth of Buruli Ulcer cases in the Bellarine since 2004 and spread into the Mornington and Bellarine Peninsulas, Geelong and inner Melbourne suburbs has called for an urgent scientific response. The reason for the epidemic is unclear but may relate to genotypic changes in *M. ulcerans* that have made it more pathogenic or transmissible, or a permissive transmission environment. There is currently no information available on the relationship between the genotype of an isolate or that of the patient (or both) and the clinical severity of the disease. In addition, there have been numerous reports of secondary infections by opportunistic pathogens which makes treatment complicated. In this study, we aimed to investigate the relationship between pathogen genotype and wound microbiome with regards to disease severity.

Swabs of seventy patients were obtained through the University Hospital Geelong Infectious Diseases Clinic. Twenty samples (20) were subjected for unbiased Illumina metagenomic sequencing. Of the 20 samples, three samples were taken during treatment and four samples were taken after treatment. Targeted culture-independent whole genome sequencing of *Mycobacterium ulcerans* was performed on the remaining fifty samples using the Agilent SureSelect platform.

Metagenomic sequencing of pre-treatment samples showed the presence of *Staphylococcus*, *Enterobacter*, *Pseudomonas* and *Enterococcus* species in addition to *Mycobacterium ulcerans*. Samples taken during treatment showed significantly less microbial diversity but *Enterococcus* spp, *Corynebacterium* spp and *Mycobacterium ulcerans* were identified. Swabs taken after treatment did not show *Mycobacterium ulcerans* but the presence of *Staphylococcus* spp was identified in some samples. All sequencing data samples contained high human DNA contamination limiting in-depth analysis of *M. ulcerans*.

Targeted sequencing of *M. ulcerans* resulted in 10 to 100X increased sequencing depth compared to metagenomic sequencing and substantially improved sequencing coverage across the genome. Results are currently underway and will be presented.

There are no published studies on the Buruli ulcer microbiome in Australian patients. Therefore, this study provides preliminary data that will broaden the understanding of the secondary organisms present in the ulcer. Furthermore, targeted sequencing of *M. ulcerans* is a viable alternative compared to standard culture-based sequencing, with results obtained in a few days.

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Skin NTDs and/or integration – Keywords

Buruli ulcer

Body distribution of impetigo and association with host and pathogen factors

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Impetigo or skin sores are estimated to affect >162 million people worldwide. Detailed descriptions of the anatomical location of skin sores are lacking.

We used prospectively collected data from a randomised control trial of treatments for impetigo in Aboriginal children in Australia. We generated heatmap distributions of skin sores on the human body from 56 predefined anatomical locations and stratified skin sore distribution by sex, age, causative pathogen and co-infection with scabies, tinea and head lice. We compared the distribution of sores between males and females, between sores with only *Streptococcus pyogenes* and sores with only *Staphylococcus aureus*; and across age groups with a Fisher's exact test.

There were 663 episodes of impetigo infections among 508 children enrolled in the trial. For all 663 episodes, the lower limbs were the most affected body sites followed by the distal upper limbs, face and scalp. On the anterior surface of the body, the pre-tibial region was the most affected while on the posterior surface, the dorsum of the hands and calves predominated. There was no observable difference between males and females in distribution of sores. Children up to 3 years of age were more likely to have sores on the upper posterior lower limbs and scalp than older age groups, with the distribution of sores differing across age groups ($p = 3 \times 10^{-5}$). Sores from which only *Staphylococcus aureus* was cultured differed in distribution to those with only *Streptococcus pyogenes* cultured ($p = 3 \times 10^{-4}$) and were more commonly found on the upper posterior lower limbs.

Skin sores were predominantly found on exposed regions of the lower leg and distal upper limbs. The distribution of sores varied by age group and pathogen. These results highlight key areas of the body for clinicians to pay attention to when examining children for skin sores.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Impetigo, scabies, skin sores, *Staphylococcus aureus* infections, *Streptococcus pyogenes* infections, Spatial analysis, group A Streptococcus, heatmap, infectious diseases, anatomical distribution, *Staphylococcus aureus*

Session 7 : Diagnostics and laboratory capacity strengthening – Other abstracts

Memory B-cells and regulatory B-cells as markers for treatment monitoring in Buruli ulcer disease

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Introduction

B-cells are likely indispensable to host immunity in Buruli ulcer disease (BUD) as in other mycobacterial infections. However, research describing the B-cell repertoire and memory generation in BUD and during therapy is scarce.

Methods

Using flow cytometry, we investigated the adaptive cell repertoire in children with BUD, healthy age-matched contacts, and a study group of children with tuberculosis. We also performed analyses before BUD treatment, and at three time points during BUD treatment (i.e., week 8, 16, and 32). Additionally, we analysed BUD disease severity and treatment response for association with the B-cell repertoire differences.

Results

Interestingly, whereas children with BUD had comparable total B- and T-cell proportions, B-cell subsets differed significantly relative to healthy contacts and tuberculosis patients. Memory B-cell proportions were higher in children with BUD while regulatory B-cell proportions were lower compared to healthy contacts and tuberculosis patients. Compared to TB patients, children with BUD had lower naive and higher transitional B-cell proportions. Under treatment, memory B-cell proportions decreased significantly whereas proportions of regulatory B-cells and naïve B-cells increased concomitantly in children with BUD. Also, we found significant correlation between lesion size and memory B-cells as well as regulatory B cell proportions. However, we did not detect associations between treatment efficacy and B-cell proportions.

Discussion and conclusion

The recorded higher peripheral memory B-cell proportions may be due to insufficient migration of this subset into the affected skin tissue, while regulatory B-cells were lower in BUD patients because of enhanced recruitment of this subset into affected skin lesions caused by *M. ulcerans*. The increase in the regulatory B-cells proportion during treatment is in line with the modulation of systemic inflammatory response *within* the context of healing. These findings suggest a role of B-cell subsets in host immune response against *M. ulcerans* and the alterations in B-cell subgroup proportions qualify as markers for treatment monitoring in BUD.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Buruli ulcer

Laboratory confirmation of Buruli ulcer in Côte d’Ivoire, 2020-2022

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Introduction

Buruli ulcer (BU) is a neglected tropical disease (NTD) caused by *Mycobacterium ulcerans* affecting rural regions of Central and West Africa. Laboratory confirmation of BU requires a molecular diagnostic test. Since 2009, the number of BU cases in Côte d'Ivoire has increased to more than 15 000. A number of countries have instituted active surveillance with the support of the World Health Organization with a view to controlling and eradicating this disease. The clinical course of the disease has two stages: the appearance of nodules, followed by the development of ulcerative and disabling forms. To improve the diagnosis and surveillance of BU infection, WHO recommends laboratory confirmation of 70% of suspected clinical cases. The objective of this study is to present the molecular laboratory diagnosis of *Mycobacterium ulcerans* in Côte d'Ivoire between 2020 and 2022.

Material and method

Specimens were collected between 2020 and 2022 from suspected BU cases in all health districts by focal points from the National Buruli Ulcer Control Programme. Patients received treatment from the National Programme, NGOs or other clinical facilities. The harmonized BU-Labnet protocol was applied for DNA extraction and quantitative PCR targeting the IS2404 sequence. Quality and analysis controls were routine for the validation of the quality of the results.

Results and conclusion

A total of 1303 specimens from the period 2020-2022 were analyzed. The positivity rate was 53% (697/1303) for the molecular biology technique. Category 1 and 2 ulcers accounted for 95% of the specimens. The epidemic health district areas were former BU foci. The national distribution of positivity showed that 10 districts were endemic: Bas-Sassandra, Comoé, Goh Djiboua, Lacs, Lagunes, Montagnes, Sassandra-Marahoué, Vallée du Bandama, Woroba and Zanzan The turnaound time for the results was under 10 days. The laboratory confirmation rate in Côte d'Ivoire is 100%. Active surveillance is urgently required for early diagnosis.

Skin NTDs and/or integration – Keywords

Buruli ulcer, *M. ulcerans*, PCR, Côte d’Ivoire, West Africa

Detection by LAMP-PCR of *Treponema pallidum ssp. pertenue* and *Haemophilus ducreyi* in children yaws-type ulcerations in rural areas, Côte d'Ivoire

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Introduction

Yaws is a Neglected Tropical Disease (NTD) caused by *Treponema pallidum ssp. pertenue* and is one of the four treponemal diseases affecting humans. It affects mostly children between 2 and 15 years of age and is transmitted by direct contact. The goal of the World Health Organization (WHO) is to eradicate yaws by 2030 through the mass administration of azithromycin. To achieve this goal, new diagnostics are needed to support the eradication campaigns. Thus, a loop-mediated isothermal amplification test (TPHD-LAMP) for the simultaneous detection of *Treponema pallidum* (TP) and *Haemophilus ducreyi* (HD), the agents causing yaws, has been developed which might allow molecular diagnostics to be conducted closer to patients.

Côte d'Ivoire is an endemic country for Buruli ulcer and leprosy and yaws. The objective of this work is to contribute to the control of yaws in endemic areas by evaluating the rapid diagnosis combining serology and TPHD-LAMP as a diagnostic tool for surveillance and eradication programs of neglected tropical diseases in Côte d'Ivoire.

Methods

Five health districts have been selected following the recommendations of the National Buruli Ulcer Control Program (PNLUB) to evaluate the new diagnostic method between April 2021 to decembrer 2022. These are the health districts of Yamoussoukro, Divo, Tiassalé, Vavoua and Daloa.

The study was conducted in 5 stages : (i) identification of potentially endemic communities; (ii) training of community health workers and laboratory technicians; (iii) recruitment of participants and sample collection; (iv) laboratory analysis; and (v) data processing.

Results

During the campaigns, 1156 children with yaws ulcers were recruited with informed consent from villages and schools in the districts. Eighty-seven (85) children tested positive for SD Bioline and DPP serology. Among these children, the analysis of ulcer swabs by the TPHD-LAMP test in the district laboratories allowed the rapid detection of 23 cases of yaws (27%) and 19 cases of HD (22%) of the tested swabs. The highest number of Yaws and HD cases were found in the Tiassalé health district at 32% and 13% respectively. No cases of yaws were confirmed in the Vavoua district. Several cases of co-infections of *Treponema pallidum ssp. pertenue* and *Haemophilus ducreyi* were detected in the children with ulcerations in health districts of Divo (1 case), Tiassalé (3 cases) and Daloa (1 case).

Conclusion

The detection of yaws cases in these health districts has led to mass treatment campaigns in the communities affected by PNLUB.

Acknowledgments

This study is part of the EDCTP2 programme supported by the European Union (LAMP4YAWS), grant number [RIA2018D-2495]

Skin NTDs and/or integration – Keywords

Yaws, skin NTDs, endemicity, Côte d'Ivoire

Gynaecothelia in leprosy a common finding

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Introduction

Leprosy is an infection caused by Mycobacterium Leprae . Skin Lesions vary from hypopigmented patches to infiltrated skin lesions and nodular lesion. Gynaecomastia is a known finding in leprosy

Methods

We report 10 cases of leprosy with Gynaecothelia . The material for this report consists of ten clinico-bacteriologically and histopathogically proven Boderline Lepromatous /Lepromaous Leprosy and Histoid Leprosy. Most patients were adult male leprosy patient .

Results

We noticed gynaecothelia was present without any evidence of gynecomastia in most of our patients . Gynaecothelia was present bilaterally in many of the patients .

Discussion

There are very few reports on gynaecothelia dated in 1924 and 2012 . The exact cause of gynaecothelia is explained by infiltrative disease process. There is increased fibrous tissue and some oedema with sparse bacilli as explained by Powell et all. All the patients were started with multibacillary drug therapy for leprosy .

Conclusion

Gynaecothelia is a common sign which is commonly ignored seen in leprosy patients. It should be sought in all leprosy patients.

Skin NTDs and/or integration – Keywords

Leprosy, gynaecothelia

Use of dermoscopy to identify animal acquired tinea

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Introduction

Tinea is a common dermatolphyte infection seen in our country . The traditional methods to diagnose tinea include fungal scrapping and fungal culture .With the covid epidemic and patients restricted activity there is a rise in the number of pet animals seen in human houses which has given rise to animal acquired tinea . Use of dermoscope can diagnose tinea infections with a non-invasive test and also help in monitoring their improvement post treatment .

MethodsWe used Dermlite Dl4 with a Plastic cover to examine the lesion . The plastic cover can then be discarded to prevent spread of infection via fomites,

Results

Tinea capitis and Tinea corporis very common infections seen in our patients.

Many patients reported they had contact with pet cats and stray cats . Dermoscopy is new accessory which helps in early diagnosis of fungal infection also there is no need to go for invasive fungal culture (which can be expensive) in resource poor setting and countries like India .   Discussion

Dermoscopy helps in early diagnosis and also helps in ruling out other Dermatological causes . It is a Simple instrument which can be handy and easily carried anywhere even on the fields . Only expertise is required to read and analyze Dermoscopy images .Also treatment can be started early after Dermoscopy while waiting for culture and scraping report which may take few days to weeks .

Conclusion

Dermoscopy is a quick tool to be used in identifying various tinea infection and onychomycosis while we wait for fungal scraping and fungal culture report.

Acknowledgments

No funding sources

Skin NTDs and/or integration – Keywords

Dermoscopy, animal acquired tinea

Sporothricosis : Main clinical features and diagnosis tools

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Sporothricosis is one of the implantation mycosis included in the major Neglected Tropical diseases (NTDs), as stated by the WHO for 2021–2030. It is in general a subacute or chronic subcutaneous infection caused by a dimorphic fungus of the *Sporothrix* genus. Though typical cases are easy to diagnose, few physicians throughout Madagascar, especially in highly endemic regions, are used to do so.

We aim to report two typical cases to raise clinical awareness among practitioners and to review the main clinical and mycological features.

The first patient was a 24 year-old man working as a charcoal transporter in the city of Antananarivo, Analamanga region, who had presented with painful ulcero-nodular lesions of the left upper limb for at least 12 months. Initial lesion appeared on the 4th ray of the left hand as a papulo-nodular one and progressively disseminated along the length of the limb. Lesions became ulcerated and oozing and could not have been cured despite multiple antibiotherapies before referring to our department. A skin biopsy was performed and culture was suggestive of *Sporothrix sp*. PCR and sequencing identified *Sporothrix schenkii* on skin sample and specimen culture. Complete healing of the lesions could have been obtained after completion of a 6 months course of oral itraconazole 200mg/day associated with absorbent dressings.

The second patient was a 65 year-old retired teacher, practicing woodcutting in the region of Anjozorobe, northern part of Analamanga region. He reported an injury with a splinter in the dorsum of his right foot, followed after one month by nodular lesions. They disseminated along the right lower limb within a few weeks and became ulcerative, painful and oozing. He reached our department after 3 months of disease duration. Clinical sampling was made. Direct examination was negative but skin biopsy’s culture were suggestive of *Sporothrix sp*. Maldi-tof® mass spectrophotometry identified *Sporothrix schenkii* on specimen culture. Lesions completely cured after a six-months course of oral itraconazole 200mg/day.

Typical sporothrichosis should first come to Malagasy physicians’ mind in the presence of those cutaneolymphatic forms, known as sporothrichoid arrangement. Moreover, if the patient comes from the central highlands, first focus of the disease in Madagascar, and reports a previous injury that could have inoculated the fungus. Mycological and biomolecular tools, though not available throughout the country, could formally identify the fungus and help for epidemiological follow up.

Acknowledgements

Thanks to Charles Mérieux Infectious diseases Center, Antananarivo, for the financial support of clinical sampling and lab tools

Skin NTDs and/or integration – Keywords

Sporothricosis ; cutaneolymphatic forms ; PCR ; Maldi-tof© ; Madagascar

Cutaneous leishmaniasis: experience from a tertiary care center in North India and challenges in the management in resource poor settings

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An upsurge in the cases of cutaneous leishmaniasis over the past few years in hitherto nonendemic areas for the disease has sparked concerns.

Methods

A bi-centric, hospital-based, cohort study was conducted at two main tertiary care hospitals of Jammu and Kashmir over a period of 10 years Demographic data was recorded on a proforma from patients presenting with lesions suggestive of CL, along with a meticulous examination. Slit skin smear (SSS) and histopathological examination were performed. An intralesional pentavalent antimonial, sodium stibogluconate (SSG), was administered three times weekly to patients with smaller lesions, and intravenously or intramuscularly to those with larger lesions. The response to treatment was assessed by total re-epithelialization of lesion and an absence of infiltration and erythema. Clinical follow-up was performed and final response to treatment was assessed at 6 months.

Results

A total of 1300 patients with a mean age of 26.7 18.5 years and mean disease duration of 28.52 13.5 weeks were included. Face was the most commonly affected site (89.00%). Noduloulcerative plaques were the predominant lesion type observed (73.92%). The presence of Leishman– Donovan bodies could be demonstrated on SSS and histopathology in 60.69% and 39.54% of patients, respectively. The presence of a recognizable histological pattern conforming to CL and a response to a therapeutic trial of SSG was considered to be confirmatory in the remaining patients. Complete cure was achieved in 84.23% of cases.

Conclusion

With the disease showing an escalating trend in Jammu and Kashmir,the possibility of a new focus of endemicity and its impact on public health need to be contemplated, and appropriate measures should be initiated to contain its spread.

A comprehensive and exhaustive clinicoepidemiological profile of CL is presented to guide further studies in this direction, especially those discerning predominant Leishmania species, disease reservoirs, and vector control strategies in the region.

In resource poor settings, confirmation of diagnosis is based on Giemsa stained slit skin smears (L.D bodies), and H and E stained skin biopsy sections. Studies to improve diagnostic algorithms, including identification of vector and vertebrate host(s), and the diversity of leishmania species responsible for disease are warranted. Funding/ attention by world health agencies to carry out research for species identification (DNA based tests) in newly identified endemic foci for the disease is required.

Different treatment options available must be based on leishmania species, geographic regions and clinical presentation. Reports about spontaneous resolution and effectiveness of local therapies have resulted in local / intra-lesional therapies being considered as a preferential form of treatment for OWCL, thus evading the toxicity associated with systemic administration of drugs

Non-availability of drugs is a major issue in developing countries. Antimonials are still one of the most effective modalities to treat cutaneous leishmaniasis, if given under supervision and with proper monitoring carried out. World health agencies need to give attention to the disease and make drugs available (on the lines of MDT in leprosy) especially in resource poor countries.

Outstanding challenges and possible solutions related to drug resistance and other causes of treatment failure need to be addressed.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Leishmaniasis, cutaneous, non-endemic, slit-skin smears, L.D bodies, epitheloid granuloma, sodium stibogluconate, intra-lesional, non-availability, resistance

Session 8 : Treatments – Presentations

Thursday, 30 March 2023 Chair: Michele Murdoch		
Time	**Subject**	**Presenters**
14:00 – 14:20	**Keynote presentation:** Drug treatment: Review of current drug treatments for skin NTDs – opportunities, challenges, and priorities	Richard Phillips
14:20 – 14:40	Results of the 2022 global WHO online survey on diagnostic capacities and treatment practices for implantation (deep) mycoses	Barbara Milani
14:40 – 15:00	Safety of bedaquiline plus rifampicin for leprosy post-exposure prophylaxis – preliminary results	Bouke de Jong
15:00 – 15:20	Cutaneous leishmaniasis patient characteristics and treatment outcomes, Quetta, Pakistan, 2014–2021	Koert Ritmeijer
15:20 – 15:40	Basic infrastructure requirements for WHO-recommended wound management including ulcerative skin NTDs in rural setting in Côte d'Ivoire	Bognan Valentin Koné
15:40 – 16:00	The WAWLC kit: a way to bring standardized basic dressing material for adapted modern wound care to low-resource settings	Michele Murdoch Hubert Vuagnat
16:00 – 16:20	Control of tungiasis through systematic diagnosis and treatment of humans and animals using dimeticone oil in a resource-poor nomadic setting in Uganda	Hermann Feldmeier
16:20 – 16:40	Secondary bacterial infections and antibiotic resistance among tungiasis patients in Western Kenya	Ruth Nyangacha
16:40 – 17:00	Beta-lactam containing regimen for the shortening of Buruli ulcer disease therapy (Phase II in Benin): Clinical Trial update	Christian Johnson

Results of the 2022 global WHO online survey on diagnostic capacities and treatment practices for implantation (deep) mycoses

Authors: Barbara Milani[1], Daniel Argaw Dagne[2], Marco Schito[3], Heather Stone[4]

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Between January and March 2022, WHO conducted a global online survey on implantation mycoses to collect data on diagnostic capacities and treatment practices in different settings for four implantation mycoses: eumycetoma, actinomycetoma, cutaneous sporotrichosis and chromoblastomycosis. The survey was conceived as part of a WHO collaborative project with the US FDA to identify priority disease areas for pilot testing of CURE ID, a web and mobile-based application, developed to help clinicians share their experiences in managing difficult-to-treat infectious diseases and thereby inform clinical research needs to support repurposing approved drugs for new clinical uses.

The WHO survey was conceptualized using a mix of information sources (published literature, key informant interviews). It was designed using multiple-choice options, with the possibility to provide additional entries and comments for every question. To overcome language barriers, the survey was made available in three UN languages: English, French and Spanish.

142 respondents from 47 countries, including all continents, contributed data: 60% were from middle-income countries, with 59% working at the tertiary level of the health system and 30% at the secondary level. The survey results provide information on the current diagnostic capacity and treatment trends for both pharmacological and non-pharmacological interventions.

In terms of diagnostic methods, respondents reported clinical features/visual inspection being used at 86%; grains direct microscopy and histopathology on skin biopsy was available for respectively 79% and 72%. Fungal culture was available to 85% of respondents, while bacterial culture for actinomycetoma to 67%. Molecular diagnosis is reported as available to 42%, while serology and dermoscopy both available to 23% of respondents. The survey confirms that drug repurposing is occurring for fungal diseases beyond itraconazole as first choice (85–90%) and terbinafine for refractory cases (44–56%). For eumycetoma and chromoblastomycosis, newer generation azoles (posaconazole and voriconazole) were also reported to be used (27-41%). Amphotericin B injectable is used for eumycetoma (36%). For chromoblastomycosis, there is a lower but consistent use of flucytosine (14%) and topical imiquimod (11%). For cutaneous sporotrichosis, a considerable use of oral potassium iodide is reported (44%). For actinomycetoma, several antibiotics from several classes are used in oral and injectable forms, suggesting a high level of drug repurposing for this bacterial infection. In terms of non-pharmacological interventions, 82% of respondents indicated that surgery is applied in their setting for the treatment of eumycetoma. For chromoblastomycosis, 53% of respondents reported the use of non-pharmacological interventions including: heat therapy (24%), cryotherapy/cryosurgery (14%), surgery/surgical excision (15%). In addition, the survey provided insight on refractory case rates, as well as other challenges, such as availability and affordability of medicines.

The implementation of an global case report registry for implantation mycoses could contribute to address the gap in epidemiological information and collect valuable observational data on treatment outcomes to inform treatment guidelines and clinical research. The pilot testing and use of the openly accessible publicly funded CURE ID platform (https://cure.ncats.io), supported by the implantation mycoses community of practice, offers an opportunity to collect data in a consistent and structured manner.

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The US FDA provided the financial support to implement this survey through a WHO–USFDA collaborative agreement.

Skin NTDs and/or integration – Keywords

Actinomycetoma, eumycetoma, cutaneous sporotrichosis and chromoblastomycosis

Safety of bedaquiline plus rifampicin for leprosy post-exposure prophylaxis: Preliminary results

Authors: Bouke C. de Jong (presenter), Zahara Salim, Said Nourdine, Silahi Grillone, Sofie Braet, Mohamed Wirdane, Auke Bergeman, Rian Snijders, Maya Ronse, Carolien Hoof, Achilleas Tsoumanis, Nimer Ortuno Gutierrez, Younoussa Assoumani, Epco Hasker

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In 2018 WHO issued a conditional recommendation to prevent leprosy in contacts of leprosy patients with post-exposure prophylaxis (PEP) using single dose rifampicin (SDR), which reduced incident leprosy by 57% in the next two years. Preliminary results from a cluster randomized trial in Comoros and Madagascar suggest a more modest reduction of incident leprosy by SDR, prompting the need for alternatives. We tested the safety of the combination of bedaquiline and rifampicin based PEP in an age de-escalation Phase 2 study, randomizing leprosy contacts in the Comoros to two arms; single doses of (a) rifampicin 600mg + bedaquiline 800mg (intervention arm, SDR +SDB) or (b) rifampicin 600mg (SDR, control arm).

Consenting participants were screened for eligibility, including an ECG heart rate-corrected QT interval (QTc) <450ms and liver function tests (ALT/AST) below 2.5x the upper limit of normal. Follow up was done at day 1 post-dose (including ECG) and day 14 (including ALT/AST), with repeat of ALT/AST on day 30 in case of elevation on day 14.

Of 408 screened participants, 313 were enrolled, including 187 adults, 38 adolescents (aged 13-18 years), and 88 children aged 5-12 years. A technical error led to a false elevation in the lower range of ALT/AST values in the adults, with external quality assurance showing valid ALT/AST results in the elevated range, supporting correct classification of adverse events (AEs). Results from adolescents and children are pending. In the control group, 45 participants showed an AE, including 1 serious AE, deemed not related to rifampicin. In the intervention group, 55 participants experienced an AE, and no SAEs. There was no difference between the intervention and control groups in ALT/ AST or QTc.

In adults, safety of single dose bedaquiline 800mg in combination with rifampicin is comparable to rifampicin alone; results in adolescents and children are pending. Provided bedaquiline enhanced PEP is safe in the final analysis, we will proceed with a Phase 3 cluster randomized efficacy trial in the Comoros.

Acknowledgments

Study participants. Funded by Janssen.

Skin NTDs and/or integration – Keywords

Leprosy

Cutaneous leishmaniasis patient characteristics and treatment outcomes, Quetta, Pakistan, 2014–2021

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Cutaneous leishmaniasis (CL) is highly endemic in Pakistan, and causes a large public health burden, with an estimated 50-100,000 new cases annually. The most affected provinces are Balochistan and Khyber Pakhtunkhwa, where *Leishmania tropica* is the predominant species, transmitted by phlebotomine sandflies. At the location of the sandfly bite, a nodule appears, which typically develops into an ulcerating wound with secondary infections. Resulting disfiguring wounds and scars often lead to stigmatization and (psycho-)social problems. Pentavalent antimonial drugs, the mainstay treatment, is scarcely available in public hospitals in Pakistan. In the private health sector, if the drugs are available, it is provided at high costs, often resulting in sub-standard dosing. Since 2008, Médecins Sans Frontières (MSF) supports the Ministry of Health with specialised CL clinics providing free CL diagnosis and treatment services in Khyber Pakhtunkhwa and Balochistan. In Quetta, Balochistan, MSF have treated more than 26,000 CL patients in these 14 years. An electronic patient line lists with patient characteristics, treatment and outcomes, have been maintained since 2014.

The aim of the retrospective observational study was to describe patient characteristics, analyse trends over the years, and to identify risk factors for negative treatment outcomes, i.e. treatment failure or relapse in CL patients treated with the meglumine antimoniate.

Retrospective analyses were performed of the CL patients cohort treated between 2014 and 2021. The database consisted of key dates, demographic, diagnostic and clinical characteristics of patients, treatment regime, initial treatment outcome, and follow-up outcome. The data were analysed by descriptive statistics and by logistic regressions with Wald statistics using chi square and Fisher's exact test for statistical significance difference. Variables were dichotomised in 'initial response' and 'no response' to treatment at the end of treatment, and 'final cure', 'treatment failure' or 'relapse' at follow-up, six weeks after discharge.

Of 22,789 patients with complete records, 46.8% were female, median age was ten years, 51.1% had facial lesions, and male patients presented with larger lesions. The proportion of patients receiving systemic treatment with intramuscular injections vs. local intralesional injections increased from 12.1% in 2014 to 42.1% in 2021. Poor initial response rate was 5.6%. Lesions with high parasitaemia had more than 2-fold higher odds of poor initial response (OR 2.37 (95%CI 1.93-2.90). Final treatment failure rate was 3.4% and relapse rate 1.8%. Logistic regression showed that being female, age <15 years, lesion duration two months or shorter, facial lesions, and high parasitaemia, were associated with treatment failure.

This is the first analysis conducted on such a large cohort of CL patients who received pentavalent antimonial treatment. An increase in patients requiring systemic treatment could indicate that patients come with more severe and larger lesions, which cannot be treated with intralesional injections. The insights gained from this research could be used to improve the treatment algorithms and patient follow up strategies. Further research is required to better understand the risk factors for failure and to develop appropriate preventive control measures against cutaneous leishmaniasis.

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Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis, treatment

Basic infrastructure requirements for WHO-recommended wound management including ulcerative skin NTDs in rural setting in Côte d'Ivoire

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Skin wounds including ulcerative skin NTDs are neglected in rural West Africa. The burden of wounds is linked to failure of early detection, access bottlenecks to wound care at health services (economic, sociocultural), lack of training and material supply and infrastructure deficits in the health care services. This leads to chronic wound development, sufferance, and high direct and indirect costs of care for patients affected.

The objective of this study was to assess the requirements and improve the infrastructure of primary health centers and the wound management unit (WMU) to meet the demands of high- quality wound care as part of the ongoing prospective community-based wound management study at three levels (community, health center, district hospital where the WMU is located).

A systematic assessment of the primary health care center (Ahondo Health Centre) and the WMU prior to the implementation of the ongoing wound management study based on WHO-recommended wound management (WHO-RWM) was conducted. We assessed the basic infrastructural requirements to implement the WHO-RWM. The items assessed were grouped into water supply, sanitation, hygiene (WASH) including wound showers, wound care equipment, waste disposal, toilets, and electricity supply.

The infrastructure did not meet the requirements for standard wound care or had become dysfunctional: supply with water of drinking-water quality including a piped supply system, wound showers and water basins, wastewater disposal systems and incinerators, functioning toilets, lighting of the wound care area. The infrastructure assessment tool is presented, and the upgrading and maintenance of the basic infrastructure, including support by community engagement, is illustrated. Problem areas are highlighted.

The results of our ongoing prospective community-based wound management study at three levels (community, health center, district hospital) show that basic infrastructure development and maintenance is one of the important pillars for successful wound management. The supply of water of drinking-water quality and its monitoring and maintenance are the major challenges to be solved requiring community and health system engagement. The development of the basic infrastructure for wound care fits well into the spirit of UHC.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Chronic wounds, basic infrastructure, wound management, water, wound showers, sanitation, hygiene, waste removal, skin NTDs, Buruli ulcer, yaws, lymphatic filariasis, common skin conditions

The WAWLC kit: A way to bring standardized basic dressing material for adapted modern wound care to low-resource settings

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Providing efficient, good quality, wound care in low-resource settings is challenging.

To address this, the World Alliance for Wound and Lymphedema Care (WAWLC) has designed a ‘Teach the Teachers” course following its six basic principles enabling improvement in wound care issues. Another challenge is to provide basic standardized dressing materials needed both for teaching and patient’s care. Thus, based on a modified DELPHI process, the WAWLC has designed a basic wound care kit. Containing very simple materials, mainly petroleum jelly gauze, plain gauze, disinfectant, elastic bandages, tape and other useful items (to be further detailed in the communication), these kits bring key elements to make dressings adapted to wound healing in a moist, physiological, environment, a crucial principle for adapted modern wound care.

This kit is designed to be part of NGO and government standard issue to support integrated wound care whatever the wound etiology. Weighing around 16 kilograms and of medium-sized bulk (40x30x60 centimeters), it’s easy to handle and store. Its simple content is practical for local availability and use in most low- or middle-income countries. Many items can also be substituted by locally available resources (e.g. palm oil instead of petroleum jelly). Items from within each kit can be given to individual patients as needed for ongoing self-care.

Containing 100 pieces of petroleum jelly impregnated gauze, plus 200 sterile gauze and extra petroleum jelly and non-sterile gauze, it will allow between 100 to 300 non-stick dressings of a 10x10cm size (with the total number depending on the patient’s total wound surface area and exudate). Piloted successfully in Cameroon and Togo, it supports the integrated wound care teaching programme, as well as providing the required materials for ongoing patient care.

Skin NTDs and/or integration – Keywords

Skin NTD’s, wound, wound care, dressing material, Buruli ulcer, cutaneous leishmaniasis, leprosy, lymphatic filariasis (lymphoedema), podoconiosis, mycetoma, tungiasis, yaws

Integration across multiple diseases or multiple countries

Control of tungiasis through systematic diagnosis and treatment of humans and animals using dimeticone oil in a resource-poor nomadic setting in Uganda

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Tungiasis is a neglected zoonotic disease which predominantly affects people living in extreme poverty. Severe tungiasis is responsible for poor school outcomes of children, low economic productivity of adults and a reduced merchantability of domestic animals. In none of the endemic areas control strategies are currently in place. We implemented a community-based tungiasis control strategy based on One Health principles in Napak District, Karamoja Region, Northeast Uganda. All humans and animals were examined at regular intervals by trained local health workers and, if tungiasis was diagnosed, treated with a formula of two dimeticone oils with low viscosity (NYDA®). Systematic treatment with dimeticone oils prevents the production and excretion of eggs by embedded sand fleas and thereby hinders the completion of the off-host cycle of the parasite. At reach round of diagnosis and treatment, health promotion meetings were organized. Health promotion messages focused on daily washing of feet with soap, hardening dirt floors by smearing floors with soil mixed with cow dung, regular sweeping of the houses and compounds, and keeping animals outside human dwellings.

The intervention started with a census in December 2020. A total of 5,482 residents living in 1,334 households were identified. The prevalence in the general population was 62.8% and 70.2% in children. Transmission occurred mainly inside the house when people slept on the dirt floor without bedding. After eight rounds of systematic and synchronous diagnosis and treatment, the prevalence of tungiasis dropped to 5.7%. Very severe cases (> 100 lesions) decreased from 3.8% at baseline to zero after 18 months. The median number of lesions was 11 at baseline but dropped to 3 after 18 months. Only 5 cases of mobility impairment were observed after eight rounds of treatment; at baseline the number was 464. 13.5% of animals present on the compound showed tungiasis at baseline. No more cases were observed during follow up.

The results show that regular systematic treatment of tungiasis with the dimeticone formula NYDA® together with improvement of hygiene reduced the prevalence of tungiasis to a very low level and prevented the development of severe disease manifestations in a setting characterized by a nomadic lifestyle and extreme poverty.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Tungiasis, One Health approach, control

Secondary bacterial infections and antibiotic resistance among tungiasis patients in Western Kenya

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Tungiasis is a parasitic disease caused by the female sand flea *Tunga penetrans*. Secondary infection of the lesions caused by this flea is common in endemic communities. This study sought to shed light on the bacterial pathogens causing secondary infections in tungiasis lesions and their susceptibility profiles to commonly prescribed antibiotics. Participants were recruited with the help of Community Health Workers. Swabs were taken from lesions which showed signs of secondary infection. Identification of suspected bacteria colonies was done by colony morphology, Gram staining, and biochemical tests. The Kirby Bauer disc diffusion test was used to determine the drug susceptibility profiles. Out of 37 participants, from whom swabs were collected, specimen were positive in 29 and 8 had no growth. From these, 10 different strains of bacteria were isolated. Two were Gram positive bacteria and they were, *Staphylocccus epidermidis* (38.3%) and *Staphylococcus aureus* (21.3%). Eight were Gram negative namely *Enterobacter cloacae* (8.5%), Proteus species (8.5%), Klebsiellla species (6.4%), *Aeromonas sobria* (4.3%), Citrobacter species (4.3%), Proteus mirabillis(4.3%), *Enterobacter amnigenus* (2.1%) and *Klebsiella pneumoniae* (2.1%). The methicillin resistant *S. aureus* (MRSA) isolated were also resistant to clindamycin, kanamycin, erythromycin, nalidixic acid, trimethorprim sulfamethoxazole and tetracycline. All the Gram negative and Gram positive bacteria isolates were sensitive to gentamicin and norfloxacin drugs. Results from this study confirms the presence of resistant bacteria in tungiasis lesions hence highlighting the significance of secondary infection of the lesions in endemic communties. This therefore suggests that antimicrobial susceptibility testing may be considered to guide in identification of appropriate antibiotics and treatment therapy among tungiasis patients.

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Skin NTDs and/or integration – Keywords

Tungiasis, Tunga penetrans, skin NTDs, secondary infection, antibiotic resistance

Beta-lactam containing regimen for the shortening of Buruli ulcer disease therapy (Phase II in Benin): Clinical trial update

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Current antibiotic therapy for Buruli ulcer combines rifampicin with clarithromycin for 8 weeks. The purpose of this study is to evaluate whether the co-administration of amoxicillin/clavulanic acid to the current treatment can reduce this duration from 8 weeks to 4 weeks.

We propose a randomized, controlled, open label, parallel-group, non-inferiority phase II, multi-centre trial in Benin (NCT05169554), in the Centers for Detection and Treatment of Buruli ulcer of Lalo, Allada and Pobè. Patients who meet the inclusion criteria are enrolled in the study. They are stratified according to Buruli ulcer category lesions and randomized to two oral regimens: (i) Standard: rifampicin plus clarithromycin therapy for 8 weeks; (ii) Investigational: standard plus amoxicillin/clavulanate for 4 weeks.

A total of 48 patients were eligible, and 42 were included in the clinical trial from December 2021 to November 2022, according to World Health Organization Buruli ulcer score "Very Likely" and "Likely". Females predominated (64.3%) and the mean age of participants was 22 years old. Most participants had a World Health Organization Buruli ulcer score of "Very likely" (59.5%), with a single lesion (92.9%), ulcerated type (85.7%), and located in the lower limbs (69.0%). Participants with category 3 lesions were the most represented (52.4%). Polymerase Chain Reaction confirmation was positive for 38 patients (90.5%). Of the 42 patients included, 22 (52.4%) were put on the experimental treatment. The Center for Detection and Treatment of Buruli ulcer of Pobè recorded the most patients (76.2%). No side effects due to the treatment were reported.

These prelimiary data give information on the first epidemiological and clinical trends. The predominance of category 3 lesions reiterates the need for further efforts in early detection.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Buruli ulcer, treatment shortening, drug combination, amoxicillin, clavulanate

Session 8 : Treatments – Posters

Wound measurements and baseline characteristics as predictors of slow and fast healing in Buruli ulcer disease

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Introduction

Delayed healing of Buruli ulcer (BU) can be a source of frustration to many patients and their caregivers and increase the duration and cost of treatment. Wound measurements are relevant in monitoring the rate of healing (RoH) and may predict time to healing. Predicting the time to healing using markers such as wound measurements and other factors can help improve the management of lesions. Approaches to assess RoH include the absolute area, percentage area reduction and the linear methods as defined by Gilman (2004).

Here, we examine the various methods for the determination of RoH and its use as a predictor of time to healing. To determine biological markers of healing in BU, baseline characteristics were assessed.

Methods

Data for 536 patients with PCR-confirmed BU treated from 2007 – 2017 were included. Fast healers were those whose lesions healed by 8 weeks following antibiotic treatment initiation.

Lesion measurements were obtained with acetate sheet tracings (2D) or Aranz software (3D) fortnightly during treatment. RoH was determined using the absolute area (AA), percentage area reduction (PAR) and linear (LM) methods at 4 weeks post-antibiotic treatment. The methods were used to predict the time to healing and compared to the actual healing time. Baseline characteristics of slow and fast healers were assessed to find their associations with the RoH.

Results

There were 375 (70%) slow healers and 161 (30%) fast healers. The median RoH assessed by AA [117.4. mm^2/week; IQR (-15.76 – 412.3)]; PAR [0.075%/week; IQR (-0.02 -0.16)] and LM [0.60mm/week; IQR (-0.96 – 2.41)] was lower for slow healers compared to AA [165.2mm^2/week; IQR 76.252 – 378.8)]; PAR [0.25%/week; IQR 0.20 -0.25)] and LM [2.79mm/week; IQR 1.23-4.96)] for fast healers ($p < 0.0001$). The predicted healing time for the LM was comparable to the actual time to healing ($p = 0.34$). The rate of healing is highly influenced by the form of lesion, with plaques (OR 2.09;95% CI 1.20 -3.61; p=0.009) and oedema (OR 8.49;95% CI 1.95 – 36.91; p=0.004) strongly associated with delayed healing. The proportion of patients with a higher baseline bacterial load (75/104;72% vs 21/47;45%; p=0.001), developed paradoxical reactions (60/375; 16% vs 5/161; 3%, p <0.0001) and a delay in the clearance of viable organisms (71/104;68% vs 9/47;19%, p<0.0001) were significantly higher in the slow healers than the fast healers. Measurements from acetate tracings and Aranz software were comparable.

Conclusion

The RoH of Buruli ulcers computed for slow healers using various wound measurement methods was lower compared to those in fast healers. The LM was useful in predicting fast healers while the PAR provided the best guide in determining the approximate time to healing in patients with Buruli ulcer. Further work is needed in determining baseline characteristics or markers for healing that should be considered in the development of an improved disease management plan. Such tools would aid in treatment and reduce patient and caregiver anxiety.

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Skin NTDs and/or integration – Keywords

Buruli ulcer

Buruli-RifDACC: Evaluation of the efficacy and cost-effectiveness of high-dose versus standard-dose rifampicin on outcomes in *Mycobacterium ulcerans* disease, a protocol for a randomised controlled trial in Ghana

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Introduction

Buruli ulcer (BU), a necrotizing skin condition caused by *Mycobacterium ulcerans* (MU) is endemic in tropical Africa and can lead to disfiguring ulcers and permanent disability. The 2030 World Health Organization (WHO) road map for Neglected Tropical Diseases (NTDs) has advocated for major scaling up of diagnosis and management to facilitate elimination of BU related disability. Current treatment is with daily oral rifampicin (10mg/kg dose) and clarithromycin (15mg/kg dose) for eight weeks combined with standard gauze wound dressings. Secondary infections and paradoxical reactions may cause variability in healing rates, and additional antibiotics may be prescribed, leading to a risk of antimicrobial resistance. Wound dressings with antimicrobial properties may help to improve outcomes. A clinical trial is underway to investigate whether combining high-dose rifampicin and Dialkylcarbamoyl Chloride (DACC) dressings may significantly improve time to clearance of viable mycobacteria, reduce paradoxical reactions and secondary infections, and improve outcomes when compared to DACC dressings plus standard dose. Alongside the trial, an economic evaluation will compare the financial and economic costs and outcomes of these two BU treatment strategies from a societal perspective.

Methods

This is a phase 3 individual, multi-center randomized controlled trial currently recruiting participants in three endemic districts in Ghana- Ga West Municipal Hospital, Pakro Health Centre and Wassa Akropong Municipal Hospital (target sample size: 112 individuals). Consented participants are randomly assigned to either the intervention group (HR+DACC) receiving daily high-dose oral rifampicin (20mg/kg) and oral clarithromycin (15mg/kg) for four weeks, with DACC-coated dressing applied to the wound and changed every 48 hours until the lesion heals, or the control group (SR+DACC) receiving the WHO-recommended daily oral rifampicin (10mg/kg) and oral clarithromycin (15mg/kg) for eight weeks, with DACC-coated dressing applied to the wound and changed every 48 hours until the lesion heals.

At each of the 15 scheduled visits following randomisation, data on participant demographic, clinical, cost and health-related quality of life outcomes are obtained along with lesion photograph and measurement taken by the Silhouette Wound Imaging System (ARANZ, Wellington, New Zealand), Visual Analogue Scale (VAS) and pain measurements.

Swab or FNA samples are taken at weeks 0, 2, 4, 6, 8, 12 and 16 (if lesions have not healed), to evaluate the persistence of viable MU during treatment as well as standard microbiological testing when secondary infection is suspected.

Results and discussion

The trial is expected to evaluate the mean time to clearance of viable *Mycobacterium ulcerans*, the proportion of patients with healed wound at 20 weeks, reoccurrence of BU, incidence of paradoxical reactions, incidence of secondary infection and cost-effectiveness of the intervention.

Conclusion

The findings from this trial could lead to a change in how BU is treated. A shorter but more efficacious regimen would lead to improved treatment outcomes and better adherence and potentially substantial financial and economic savings for both patients and the health system.

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*Additional members of the SHARP Collaboration*Armauer Hansen Research Institute, Ethiopia (AHRI)- Endalamaw Gadisa Addis Ababa University (AAU)- Mirgissa Kaba Kumasi Centre for Collaborative Research (KCCR)- Michael Ntiamoah Oppong, Ruth Dede Tuwor, Olivia Dornu London School of Hygiene and Tropical Medicine (LSHTM)- Rachel Pullan, Saba Lambert Jennifer Palmer, Sinead Langan, Katherine Halliday, Joseph Timothy

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Skin NTDs and/or integration – Keywords

Buruli ulcer

Complementary use of oxygen-ozone therapy on patients affected by Buruli ulcer and covid-19

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Intermed Onlus International Health Cooperation

During the acute phase of the Coronavirus pandemic in 2020, some Buruli ulcer patients in sub-Saharan Africa became infected with COVID 19. This case study highlights the efficacy and advantages of ozone therapy in two patients affected simultaneously by SARS-Cov-2 and Buruli Ulcer in Benin (Camillian mission, Zinviè) and in Nigeria (Anambra State).

All BUs were diagnosed and treated according to the WHO guidelines before the patients got infected with COVID-19. After contracting coronavirus both patients were treated with ozone. The gas was produced by a medically classified ozone generator complying with the EU legislation.

The use of ozone as complementary therapy was carried out following the guidelines and good practices of the Italian Federation of Oxygen-Ozone Therapy, Aepromo Spain, the Declaration of Helsinki, the Good practices of the International Conference of Harmonization.

A plastic bag was used to hermetically seal the area around the Buruli ulcers and to confine a mixture of ozone and oxygen at the concentration of 30microgr/ml. The mixture was inflated using the ozone generator and left in contact with the wound for 15 minutes, 3 times a week for 2 weeks.

Furthermore, to address the COVID 19 infection, all patients were treated with endorectal insufflation of a mixture of ozone and oxygen using the same ozone generator and with the aid of a siliconized catheter inserted in the rectal ampulla. The treatment was repeated twice a day for 14 days and involved a progressively higher concentration of ozone (20µg/ml on first and second day, 25µg/ml on the third and forth day, 30 µg/ml on fifth and sixth day, 35µg/ml on the seventh and eighth day and 40µg/ml from day 9 to day 14)

Additionally, the upper respiratory tract was disinfected with 500 ml of bidistilled water ozonated with 25 µg/ml of ozone using the previously mentioned device. 1g of vitamin C i.m. was given to the patient three times a week.

After ozone therapy the sores improved in both patients. Granulation tissues appeared after three sessions. The ozone improved vasodilation and blood flow, it released NO, modulated oxidative stress and reduced oedema and pain (cytokine release modulation). After 14 days of treatment of Buruli ulcers with ozone, samples from the patients were analysed with Ziehl Neelsen and PCR tests and showed a total disappearance of the mycobacterium.

One week after starting the treatment the patients with endorectal insufflation, some of the symptoms associated with the COVID 19 infection, namely cough, dyspnea, fever, respiratory rate, and saturation dramatically reduced. A nasal pharyngeal swab with immunofluorescence resulted negative on both patients 15 days after first testing positive.

Ozone therapy can be a used as a complementary treatment in patients suffering of Covid 19 and BUs thanks to its bactericide and virus static properties. Moreover, it is an inexpensive and effective therapy in countries in which distance and poverty often impede an adequate care.

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Skin NTDs and/or integration – Keywords

Buruli ulcer

Repurposing two FDA-approved wound care antiseptics for the treatment of cutaneous leishmaniasis

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Leishmaniasis affects poor communities worldwide, with about 1 million new cases annually and more than 20 parasite species affecting humans. The disease manifests in 3 clinical forms: Cutaneous (most common), Mucocutaneous and Visceral (most serious). Available therapies are very toxic, expensive, selective for specific species of the parasites/geographical location, and often complex to administer. Hence, effective treatment requires specific identification of parasite specie (difficult in resource-limited areas), long-term administration by adequately skilled personnel and severe side effects, often leading to patient non-compliance. New drugs are desperately needed, and drug repurposing could offer quick intervention. We identified two FDA-approved antiseptics used in wound care and cosmetics that have impressive anti-leishmanial activity.

Anti-leishmanial activity of the drugs was assessed using Alamar blue promastigote assay. Various species of the parasite were cultured in 96 well plate and treated with graded concentrations of the drugs. Alamar blue was added to monitor parasite growth in a spectrophotometer. Results of the assays show that these compounds have anti-leishmanial activity at very ow micromolar concentrations (IC50=2.5-4µM) against all 6 species of Leishmania tested. The test compounds showed better anti-leishmanial activity than most currently available antileishmanial drugs which are often toxic and expensive. Experiments are ongoing to test the compounds in mouse models of Cutaneous Leishmaniasis, and to elucidate their mechanism(s) of action.

These two prospective drug-repurposing candidates identified in this study are cheap, safe, easily self-administered, and have broad-spectrum anti-leishmanial activity that could be effective against various parasite species and disease manifestation across geographical locations. They also have great potentials for combination therapies with other antimicrobials for enhanced treatment and drug delivery, as well as the possibility of expansion to treat Visceral Leishmaniasis (as they are most effective for VL species). This will ultimately enhance patient compliance, improve treatment outcomes and disease control. Hence, we present these two antiseptics as viable drug re-purposing candidates for a cheaper, safer, and easier treatment of Cutaneous Leishmaniasis caused by various species of Leishmania.

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Skin NTDs and/or integration – Keywords

Cutaneous Leishmaniasis, drug repurposing; broad-spectrum; anti-leishmania, promastigotes; wound care

Microbial community dynamics associated with infection and healing in Buruli ulcer and other chronic ulcers

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Background

The introduction of antimicrobial therapy with rifampicin and streptomycin or clarithromycin with complementary wound care or surgery has shown to be somewhat effective against Buruli ulcer (BU). This notwithstanding, treatment failures, various types of secondary lesions and repeat recurrences after apparent cure have been reported, suggesting the need for customized clinical management or other chemotherapy options. While microorganisms, such as pathogenic bacteria, are clearly implicated in wound healing, our knowledge of the microbial composition and its effect on clinical outcomes in BU is limited.

Method

To investigate the role of the microbiome in Buruli ulcer disease presentation, its effect on healing outcomes, and possible cause of other unknown ulcers, we conducted a cross-sectional study using wound swabs from a cohort of Buruli ulcer patients with different disease categories and patients with other chronic ulcers (OCU) of unknown cause. Patient characteristics and data from shotgun metagenomic sequencing were analyzed in association with clinical outcomes.

Results

Analysis of sequencing data revealed polymicrobial communities of bacteria, fungi, protists and viruses in wound swabs. Ulcers, both BU and OCU, were dominated by gram-negative, facultative anaerobic bacteria. Buruli ulcer lesions on the upper limbs showed lower microbial diversity compared those on the lower limbs. Differential analyses showed that fungi, particularly *aspergillus* and *candida* species, were more prevalent in Buruli ulcer lesions. Analysis of metagenomic-based functional data showed antibiotic resistance genes were more prevalent in slow healing wounds.

Conclusion

The complex microbial community in BU lesions, particularly involving fungi, may be contributing to the infection and clinical outcomes and requires further investigation as possible treatment target to improve wound healing.

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Skin NTDs and/or integration – Keywords

Wound microbiome, genomics

Baseline scabies and headlice data from the BOHEMIA trial (ivermectin MDA for malaria)

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Background

Ivermectin Mass Drug Administration (MDA) is currently being considered as a malaria vector control tool. There is substantial overlap between populations at risk of malaria and those at risk of other ivermectin-susceptible parasites including scabies and headlice. In this study, we trained unskilled workers in to diagnose scabies, assessed the accuracy of these diagnoses, and monitored the effect of ivermectin MDA intended for malaria on the prevalence of scabies and headlice in Mopeia, Mozambique.

Objectives

1. to assess the prevalence of scabies and headlice at baseline in Mopeia, Mozambique, and
2. to assess the sensitivity and specificity of minimally trained individuals in scabies diagnosis

Methods

Data collection was integrated into a cluster-randomized controlled trial comparing albendazole MDA vs ivermectin MDA in humans vs ivermectin MDA in humans and livestock for malaria prevention. Unskilled workers were trained by a dermatologist in the diagnosis of scabies and headlice and screened individuals through examination of exposed skin and through asking the participants about history of itch and contact with people with possible scabies/itch. In a subsample of enrolled participants, we assessed the prevalence of scabies and headlice at baseline and followed up the participants after 1,2,3, and 6 months.

Results

We demonstrated high sensitivity and specificity in scabies diagnosis by minimally trained workers. Baseline prevalence of scabies and headlice in Mopeia was 9.83% (8.35- 11.49) and 9.40 % (7.94-11.04) respectively. Risk factors for having scabies included being male and eing aged under 3.

Acknowledgments

This work was supported by UNITAID.

Skin NTDs and/or integration – Keywords

Ivermectin, mass drug administration, scabies, headlice, malaria

Very long-term follow-up of cutaneous leishmaniasis scars: Impact of species and of recidive and time after recovery

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The decision to treat cutaneous leishmaniasis (CL) is based on the need to accelerate the cure and to reduce scarring, and on the risk of dissemination or later progression. Atrophic scars are caused by skin inflammation and result from collagen damage, dermal atrophy, erythema, and fibrosis. CL scars are usually considered permanent, yet they may be either well tolerated or associated to persistent and disfiguring lesions.

The objective of this work was to analyze the evolution of the scars according to the *Leishmania* species, the duration of evolution, the observation of relapse or treatment failure. All patients who were diagnosed and managed for CL in Rennes Teaching Hospital (France) during the last 20 years (from 2000 to 2020), were contacted, by phone or mail. Factors associated with the outcome of the scar (invisible, minimal, or persistent/disfiguring) were analyzed using Chi-square test (qualitative data) or two-way ANOVA or Fischer exact test (quantitative data).

Rennes Teaching Hospital is located in a non-endemic area, and various species from different continents were identified among 142 patients with CL over the study period: *Leishmania guyanensis* (36%), *L. major* (19%), *L. braziliensis* (10%), *L. infantum* (3%), *L. tropica* (3%), *L. mexicana* (3%), *L. peruviana* (2%), and *Leishmania naiffi* (1%). Patients were treated with IV/IM Pentamidine (3-4 mg/kg x3) in case of New World CL or intra-lesional glucantime in case of Old World CL (4x1mL per lesion). We could reach out 89 patients 1-5 years (26%), 5-10 years (30%), 10-15 years (22%) and 15-20 years (22%) after recovery, for interview and photo collection. A total of 56/89 cases (64%) healed without persistent scars after a first course of treatment, and 36% needed further courses because of early failure or late relapse. Twenty three % of the lesions were located on the face, with half of them considered as persistent/disfiguring scars. The proportion of persistent/disfiguring scars was statistically higher in case of failure/relapse (72% versus 25%). *L. braziliensis*, *L. major*, *L. guyanensis* and *L. infantum* were associated to persistent/disfiguring scars in 75%, 62%, 36% and 25%, respectively compared to others (0%)(p=0.002) and to failure/relapse in 50%, 47%, 36% and 25%, respectively compared to others (0%). For cases due to *L. infantum*, *L. tropica*, *L. peruviana*, *L. naiffi* and *L. mexicana*, 92% of scars were considered as invisible or minimal. By contrast, the duration of evolution didn't impact on the final picture that remain stable over the years.

It is usually considered that CL induces persistent scars with a substantial social and psychological burden. However, most of the studies on the evolution of CL scars are monocentric and with a limited follow-up. Here we show that for 57% of patients followed until 20 years after the initial lesion, scars are invisible or with minimal impact/stigma. Significant prognosis factors associated to persistent/disfiguring scars were the species (*L. guyanensis*, *L. braziliensis* and *L. major*) and the need for consecutive courses of treatment due to failure.

Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis, scars, stigma

Can cryotherapy be used to treat biofilms in cutaneous leishmaniasis wounds? A pilot study

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In a clinical study conducted on patients with cutaneous leishmaniasis (CL) in an endemic area in Sri Lanka, it was observed that 61.5% of the wounds carry bacterial biofilms. Biofilms are thought to delay wound healing, and thus might cause cosmetically unacceptable scars and poor quality of life. Cryotherapy with liquid nitrogen is routinely used to treat CL wounds with an efficacy of 27%-95% due to its ablating effect. A recent Romanian study has reported that spray cryotherapy has an efficacy of 70.6% in removing biofilms in chronic rhinosinusitis. Thus, we hypothesized that cryotherapy would be of therapeutic benefit in treating infected CL wounds.

This study was conducted as a continuation of the local investigation on the microbiome and biofilms of CL wounds. Twenty-five patients with CL were enrolled from the Dermatology clinic in Tangalle, Sri Lanka. CL confirmation was done by a *Leishmania* genus-specific polymerase chain reaction and fluorescence *in situ* hybridization assay. These were non-diabetic patients (confirmed by HbA1C test), who were not treated with antibiotics. The group was followed up till complete healing (confirmed by a consultant Dermatologist). Statistical analysis was done using R software (version 4.2.1) and the Two sample t-test was used to test for significant associations.

Of the 25 CL wounds, 15 were biofilm-positive. The average healing time of the biofilm-positive wounds was 34.7 weeks and for the biofilm-negative wounds (n=10) it was 45.7 weeks. Fourteen patients were treated with cryotherapy with liquid nitrogen and one with intra-lesional Sodium Stibogluconate (SSG) administration, which is a pentavalent antimonial acting against the amastigote stage of the parasite. The average healing time of the CL wounds treated with cryotherapy was 36.4 weeks. The one which was treated with SSG healed in 12 weeks. No statistical significance was observed between the treatment modalities, possibly due to the skewed distribution of the treatment mode and the small sample size. The healing process of CL wounds is likely to be multifactorial and the effect of bacterial biofilms on CL wound healing is yet to be fully investigated. Thus, we encourage more research on this aspect.

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Skin NTDs and/or integration – Keywords

Skin NTDs, cutaneous leishmaniasis, biofilm, healing, management, cryotherapy

Study of the effect on scar formation of SRM-1 in association with WHO treatment versus standard WHO treatment in the management of Buruli ulcer

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Introduction

Buruli ulcer is an infectious skin disease caused by *Mycobacterium ulcerans,* that occurs in humid tropical areas of the world. It mainly affects poor people in rural areas. Its preferred targets are children under 15 (50%) who are victims of chronic malnutrition, the rate of which is estimated at 30% in Côte d'Ivoire. This malnutrition further degrades the nutritional status of subjects suffering from ulceration. It constitutes a double burden for these patients.

Method

A 12-month prospective interventional, randomized, single-blind pair study in the most endemic health districts in Côte d'Ivoire (Oumé, Sinfra and Tiassalé). The interventional study had 2 components: the standard protocol of local treatment combined with rifampicin and clarithromycin (the control treatment), versus the test treatment which consisted of combining SRM1 with the standard protocol for Buruli ulcer. All Buruli ulcer patients presenting with uncomplicated category I and II ulceration and no comorbidity were included in the study. The objective was to evaluate the clinical course of Buruli ulcer patients treated with SRM-1 as well as the WHO protocol compared to that of the participants following the WHO protocol only, and to assess the nutritional status of patients under treatment.

Results

Sixty-four patients were recruited into the study: 31 controls and 33 in the test group with an average age of between 6 and 18 years. Haemoglobin levels improved on average from 9.9 g/dl to 12 g/dlL for the controls and from 10.1 g/dl to 14 g/dl for the test group. The PCR confirmation rate for Buruli ulcer was 80%. The control patients developed complete scar formation in 137 days with a closure rate of 19 mm^2 per day and the test group in 98 days with a closure rate of 23.59 mm^2 per day. There was no significant statistical difference in nutritional status between the 2 groups of patients upon completion of the treatment.

Conclusion

This study of the efficacy of SRM1 in association with the WHO protocol compared to the WHO protocol alone was observed to improve the management of a number of Buruli ulcer patients by shortening the healing time of ulcerations. However, a larger sample would be needed to consolidate the advantages of this treatment.

Acknowledgments

International Youth Fellowship, Tiassalé, Oumé and Sinfra health districts

Integrated management of severe chronic wounds, including ulcerative skin NTDs in Tiassalé Health District, Côte d'Ivoire: A case series

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Chronic wounds, including ulcerative skin NTDs, are a neglected problem in sub-Saharan African countries resulting in long-standing sufferance and excessive direct and indirect costs. The objective of the study was to describe patients with chronic wounds treated at the wound management unit (WMU) developed during the past 4 years at the district hospital of Taabo as part of the ongoing prospective community-based wound management study at three levels (community, health center, district hospital where the WMU is located).

The diagnosis and clinical management of nine representative patients with severe chronic wounds selected from the population of the community-based wound management study in Taabo HDSS are described. Wound management followed WHO standard procedures. The infrastructure of the WMU, including high hygienic standards, skin grafting, nutrition, physiotherapy, and psychosocial support have been developed to meet demands. The nursing staff was trained in wound management (baseline and repeated refresher courses and continuing on-site training) supervised by the project MD, a member of the national skin NTD control program. Problems are discussed in weekly zoom meetings between the Taabo WMU clinical and psychosocial team, the clinical team of Heidelberg University Hospital and – for BU diagnostic purposes - the BU laboratory team of Swiss TPH.

The wounds presented include four Buruli Ulcers (f, 7 yrs; m, 13 yrs; m, 13 yrs; m, 16 yrs), two snakebites (Cobra) (m, 52 yrs; m 65 yrs), a traumatic wound (f, 20 yrs), a diabetic foot ulcer (m, 65 yrs) and chronic complications of an erysipelas (f, 25 yrs). All wounds showed healthy granulation tissues by 11 weeks after initiation of treatment consisting of cleaning, debridement of necrotic tissue, control of secondary bacterial wound infection - a very common problem at presentation - and specific treatment (BU) and closed within 23 weeks; five required skin grafting. In patients with wounds involving joints full mobility was achieved.

The severe chronic wounds presented demonstrate that with basic infrastructure for wound management in place, adherence to WHO recommendations, and training of staff, a high success rate can be achieved. Psychosocial support enhances access and adherence to treatment. Physiotherapy is indispensable for functional recovery.

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Skin NTDs and/or integration – Keywords

Chronic wounds, integrated wound management, skin NTDs, Buruli ulcer, yaws, lymphatic filariasis, common skin diseases.

Towards eradication of yaws in Tiassalé health district: The case of the villages of Bocabo and Boussoukankro

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Yaws, the most common endemic treponematosis caused by *Treponema pallidum*, subspecies *pertenue*, is an infectious disease of childhood which affects the skin, bones and cartilage. The reservoir is human. A single oral dose of azithromycin cures yaws. If left untreated, the infection can lead to deformities or mutilations and chronic disability. Côte d'Ivoire is among the countries reporting the highest incidence of yaws cases in sub-Saharan Africa and is a priority for the WHO eradication campaign.

This descriptive cross-sectional study was conducted between 6 May and 27 June 2021. It aimed to ascertain the yaws situation and carry out a mass treatment campaign in the villages of Bocabo and Boussoukankro in Tiassalé health district.

After having identified all the children between 0 and 15 in the 2 villages, serological screening campaigns were carried out, followed by a mass treatment campaign.

The study population consisted of 178 children aged 0-15. Of these, 132 or 74.15% had suspected yaws lesions. And of these, 9 or 6.8% (8 males and 1 female) actually had yaws. In 77.77% of cases the disease was at an ulcerative stage. The average age was 9. One dose of azithromycin was administered to the entire study population.

Yaws is a reality in the health district of Tiassalé and its eradication in this location is now under way.

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Skin NTDs and/or integration – Keywords

Yaws, eradication, Côte d'Ivoire

Post-kala-azar dermal leishmaniasis (PKDL) drug efficacy study landscape: A systematic review of clinical and observational studies to assess the feasibility of establishing an individual participant-level data (ipd) platform

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Post-kala-azar dermal leishmaniasis (PKDL) is a dermatosis which can occur after a conventional treatment for visceral leishmaniasis (VL) and is characterised by macular, papular, nodular, erythematous or polymorphic rashes. Its pathogenesis is unknown but there is cumulative evidence that it is immunologically mediated. PKDL is a public health problem in VL endemic areas, as recent infectivity studies show that *L. donovani* parasites can be found in PKDL lesions, and are a source of infection to sandfly vectors. There are numerous limitations in our knowledge of PKDL, including its pathology, immunology and risk factors. Currently recommended treatments are either expensive (AmBisome), raising safety concerns (antimonials), or are of long durations (miltefosine). We conducted a systematic review to assess the characteristics of PKDL clinical studies, understand the scope of data and to explore the feasibility and value of developing a PKDL individual patient data (IPD) platform.

A review of published literature was conducted to identify PKDL clinical studies by searching the following databases: PubMed, Scopus, Ovid Embase, Web of Science Core Collection, WHO Global Index Medicus, PASCAL, Clinicaltrials.gov, Ovid Global Health, Cochrane Database and CENTRAL, and the WHO International Clinical Trials Registry Platform. Only prospective studies in humans with PKDL diagnosis, treatment and follow-up measurements between 1973 and October 2021 were included. Data was extracted in REDCap capturing variables on patient characteristics, treatment regimens, diagnostic methods, geographical locations, efficacy endpoints, adverse events and statistical methodology.

The literature searches identified 3,217 citations, of which 943 unique articles were independently screened by two reviewers. A total of 54 studies (16 clinical trials and 38 prospective observational studies) met the inclusion criteria and were analysed. The studies were conducted in four countries: India (63%; 1983-2021), Bangladesh (11%; 1991-2019), Nepal (4%; 2001-2007) and Sudan (22%; 1992-2021) and enrolled a total of 2,462 patients. Of the 16 clinical trials, 12 were conducted in India (1987-2021), 3 in Sudan (1993-2021) and 1 in Bangladesh (2018) with a total of 21 arms testing 8 different drugs or combinations involving 891 patients. A wide range of heterogeneity in dosage and duration was observed in the different treatment regimens. Antimony formulations and miltefosine each being tested in 33%

(7/21) of treatment arms, followed by amphotericin B formulations in 14% (3/21) of arms. Paramomycin alone and in combination with miltefosine was tested in 4.8% (1/21) of arms each.

This review provides a landscape of previously and currently tested treatments for PKDL. Only a third of the published studies (and 36% of the patients) were from clinical trials while the other studies were observational. Even in this relatively small number of studies, there is a large variability in treatment regimens tested. Assembling IPD from identified studies can provide granular details on efficacy and safety outcomes and would be a unique resource to answer questions of public health importance that otherwise couldn’t be addressed using standalone trials and aggregated published results. This collaborative approach should help generate stronger evidence to be reviewed by policy makers.

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Skin NTDs and/or integration – Keywords

Post-kala-azar dermal leishmaniasis, PKDL, systematic review, efficacy, IPD

A cohort study protocol for assessing outcomes for cutaneous, mucosal and diffuse forms of leishmaniasis in Ethiopia

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CL is a growing public health problem in Ethiopia, and it is estimated that there are 40000 new cases each year. *L. aethiopica* is associated with three distinct clinical forms of CL: localised CL (LCL), mucocutaneous CL (MCL) and diffuse CL (DCL). The Federal Ministry of Health (FMOH) in Ethiopia has identified an urgent need for treatments of CL to be evaluated.

A Cochrane review demonstrated there is significant heterogeneity of reported outcomes in CL trials. This makes it difficult to interpret and compare the results of treatment studies. An international group of experts reached a consensus on “harmonized” clinical research methodologies for LCL. The document included outcome measures for clinical trials but did not include any patient-reported outcome measures (PROM) or methods for scar assessment, which are both critical for a holistic assessment of CL outcome.

We are conducting a prospective multi-centre cohort study enrolling adults and children with confirmed LCL, MCL and DCL receiving treatment (the standard of care) at ALERT Hospital, Addis Ababa and Boru Meda Hospital, South Wollo. The aims of the study include the collection of robust prospective data on clinical outcomes, PROMs and parasitological outcomes from individuals. The clinical phenotype of CL, symptoms, duration, number, type, size, morphology and location of lesions are recorded. Lesion dimensions are measured. Amharic versions of the 36-Item Short Form Survey (SF-36), Dermatology Life Quality Index (DLQI), Cutaneous Leishmaniasis Impact Questionnaire (CLIQ) and EQ-5D-5L (short EuroQol 5-Dimension, 5-Level) are completed. A scar assessment tool, the POSAS V2 (Patient and Observer scar assessment scale) has been translated and validated to assess scars from day 42.

Individuals are enrolled for a total of 360 days. Assessments are performed on days 14,28,42,90 and 180 days from the start of treatment. Primary clinical outcomes of extent of healing will be assessed at days 42, 90 and 180 along with change in health-related quality of life. Adverse treatment effects experienced by participants are recorded.

We have recruited 273 participants to date and also conducted validation studies of the translated PROMs (except DLQI) and an inter-observer reliability assessment of clinical examination and diagnostic classification.

Univariable logistic regression to examine clinical and demographic variables associated with resolution of CL at Day 42, 90 and 180 will be assessed.

The findings will aid hypothesis testing and form the basis for future studies.

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The funder had no role in study design, data collection and analysis.

Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis, clinical outcomes, patient related clinical outcomes (PROMS), scar assessment

Real life applications of an aminoglycoside-based cream for a painless cure of cutaneous leishmaniasis

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Background

Cutaneous leishmaniasis (CL) presents typically as chronic, infiltrated lesions on exposed parts of the body. Local treatment minimizes side effects and when performed with a cream (rather than with injections) greatly simplifies medical care. In endemic foci, the use of an aquaphilic cream containing paromomycin with/without gentamicin to treat CL is effective and safe. We assessed the efficacy and safety of self-applications of aminoglycoside-based creams in non-immune travelers.

Methods

From 2012 through 2017, travelers with 1-10 lesions of confirmed CL were prospectively treated with the paromomycin-gentamicin formulation used in Phase 2 and Phase 3 trials (WR279396). From 2018 through 2022, patients were treated with a locally produced paromomycin-only cream applied once under supervision, then self-applied daily for 20-30 days. Cure was defined as 100% re-epithelialization at day 42 without relapse at 3 months.

Results

Forty travelers with a median number of 2 lesions were included, 82% of whom were male, 17% children. Patients were infected with *Leishmania major*, *L. infantum*, *L. killicki*, *L. guyanensis*, *L. braziliensis*, or *L. naiffi*. No mucosal involvement was observed on admission or during follow-up. Intention-to-treat and per-protocol cure rates were 75% (30/40) and 81% (30/37), respectively. There was a trend towards better therapeutic outcomes against Old World CL than New World (83.3% v. 60%, p=0.14). Kinetics of lesion progression assessed in 17 patients showed that complete clinical cure was observed between day 42 and day 100, *i.e.* 2 to 11 weeks after the last application of the cream. Adverse events were observed in 25% of patients, very predominantly pruritus and/or pain on lesions, always mild or moderate.

Discussion

In this representative population of travelers who acquired CL either in the Old or New World, the 81% per-protocol cure rate of a self-applied aminoglycoside cream was similar to that observed in previous clinical trials. The unavailability of a standardized industrial formulation lead, to the subsequent use of a locally produced cream, the efficacy of which was high enough to bypass systemic treatment in 75% of treated patients. A standardized, widely available formulation is needed.

methods, results, discussion and conclusions (but do not include subtitles).

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Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis, paromomycin cream, topical treatment

Treat cutaneous leishmaniasis topically to reduce pain, risks and costs: Why, who, how ?

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Cutaneous leishmaniasis (CL), that presents as subacute/chronic, infiltrated skin lesions, with/without mucosal involvement, is transmitted in 98 endemic countries or territories and over 350 million people are at risk. CL severity varies widely, from large chronic lesions of the face, to transient, small lesions of covered areas. Treatment options go from simple dressing to long courses of parenteral drugs, through local therapy with heat, cold, intralesional injections, or application of ointments, alone or combined. Local therapy is now more widely recommended, but not all experts agree with such recommendations. Choose the best treatment for patients with CL is a quandary as no highly effective, safe, and widely applicable option is widely available. Patients and physicians may thus wonder why, in whom, and how local treatment should be used in CL.

Based on a thorough analysis of the literature, and direct experience in hundreds of patients, we will try and clarify the key determinant of treatment decision in CL, including benefit-to-risk ratio, efficacy, applicability and cost, amongst others. In patients with CL, most published reports of severe or life-threatening complications, including exceptional cases of death, are related to the administration of systemic drugs. The use of local therapy has remained controversial for New World CL because of the risk of developing subsequent, metastatic mucosal lesions (ML), especially in patients infected in Bolivia with *L. braziliensis*, or in Europe with *L. infantum*. Nonetheless, the WHO Expert Committee on Leishmaniasis, and the Americas guidelines of PAHO have progressively changed their recommendations, with broader indications of local therapy (LT), considering that the evidence for a high risk of mucosal leishmaniasis (ML) is weak, although geographically very heterogeneous. We will extract meaningful results from comparative, prospective trials, large prospective observational cohorts, and systematic analyses of the literature in endemic areas and in travelers. We will analyze the clinical benefit of topical treatments such as aminoglycoside-containing creams, studied in randomized phase II and phase III trials, as well as how to circumvent the absence of a standardized, industrial, widely available product. Finally, we will open the discussion on potential new, orally-administered treatments for CL.

methods, results, discussion and conclusions (but do not include subtitles).

Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis, treatment, benefit-to-risk ratio, systemic therapy, local therapy, topical therapy

Burden and clinical epidemiology of wounds including ulcerative skin NTDs in Côte d'Ivoire

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Data on the burden and clinical epidemiology of skin wounds in rural sub-Saharan Africa is scant. The scale of the problem including preventable progression to chronic wounds, disability and systemic complications is largely unaddressed.

We conducted a cross-sectional study combining active (household-based survey) and passive case finding (health services-based survey) to determine the burden and clinical epidemiology of wounds within the Taabo Health and Demographic Surveillance System (HDSS) in rural Côte d'Ivoire. Patients identified with wounds received free care and were invited to participate in the wound management study simultaneously carried out in the survey area. The data were analysed for wound prevalence, stratified by wound and patient characteristics.

3842 HDSS-registered persons were surveyed. Overall wound prevalence derived from combined active and passive case finding was 13.0%. 74.1% (403/544) of patients were below the age of 15 years. Most frequent aetiologies were mechanical trauma (85.3%), furuncles (5.1%), burns (2.9%) and Buruli ulcer (2.2%). Most wounds were acute and smaller than 5 cm2 in size. 22.0% (176/799) of wounds showed evidence of secondary bacterial infection. 35.5% (22/62) of chronic wounds had persisted entirely neglected for years. Buruli ulcer prevalence was 2.3 per 1000 individuals and considerably higher than expected from an annual incidence of 0.01 per 1000 individuals as reported by WHO for Côte d'Ivoire at the time of the study.

Skin wounds are highly prevalent in Côte d'Ivoire, where they represent a widely neglected problem. The HDSS-based survey with combined active and passive case finding adopted in this study provides a better estimate than school and health institution-based surveys which underestimate the frequency of skin wounds and, particularly, of neglected tropical diseases of the skin, such as Buruli ulcer and yaws. A comparison with country specific WHO data suggests underreporting of Buruli ulcer cases.

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We are very grateful to the Centre Suisse de Recherche Scientifiques en Côte d'Ivoire, Abidjan, Côte d'Ivoire, Taabo Health and Demographic Surveillance System, Taabo, Côte d'Ivoire, and DELTAS Africa Initiative (Afrique One-ASPIRE/DEL-15-008), Abidjan, Côte d'Ivoire, and Swiss TPH, Basel, Switzerland for infrastructural support of the project. We also thank the Ministry of Health of Côte d'Ivoire for support throughout the study.

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Skin NTDs and/or integration – Keywords

Integrated wound management, wound care, skin NTDs, Buruli ulcer, yaws, lymphatic filariasis, common skin conditions

A randomized, open-label study to evaluate the efficacy and safety of liposomal amphotericin B (AmBisome) versus miltefosine in patients with post-kala-azar dermal leishmaniasis

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Treatment of post-kala-azar dermal leishmaniasis cases is of paramount importance for kala-azar elimination; however, limited treatment regimens are available as of now. To compare the effectiveness of liposomal amphotericin B vs miltefosine in post-kala-azar dermal leishmaniasis patients. This was a randomized, open-label, parallel-group study. A total of 100 patients of post kala azar dermal leishmaniasis, aged between 5 and 65 years were recruited, 50 patients in each group A (liposomal amphotericin B) and B (miltefosine). Patients were randomized to receive either liposomal amphotericin B (30 mg/kg), six doses each 5 mg/kg, biweekly for 3 weeks or miltefosine 2.5 mg/kg or 100 mg/day for 12 weeks. All the patients were followed at 3rd, 6th and 12th months after the end of the treatment. In the liposomal amphotericin B group, two patients were lost to follow-up, whereas four patients were lost to follow-up in the miltefosine group. The initial cure rate by "intention to treat analysis" was 98% and 100% in liposomal amphotericin B and miltefosine group, respectively. The final cure rate by "per protocol analysis" was 74.5% and 86.9% in liposomal amphotericin B and miltefosine, respectively. Twelve patients (25.5%) in the liposomal amphotericin B group and six patients (13%) in the miltefosine group relapsed. None of the patients in either group developed any serious adverse events. Quantitative polymerase chain reaction was not performed at all the follow-up visits and sample sizes. Efficacy of miltefosine was found to be better than liposomal amphotericin B, hence, the use of miltefosine as first-line therapy for post-kala-azar dermal leishmaniasis needs to be continued. However, liposomal amphotericin B could be considered as one of the treatment options for the elimination of kala-azar from the Indian subcontinent.

Skin NTDs and/or integration – Keywords

Post-kala azar dermal leishmaniasis, liposomal amphotericin B

Shortening Buruli ulcer treatment: WHO recommended *vs.* a novel betalactam-containing therapy (the BLMs4BU clinical trial): Phase II and phase III studies in West Africa

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Buruli ulcer (BU) is a skin neglected tropical disease, caused by *Mycobacterium ulcerans (Mul)*, that affects mainly children under the age of 15 years. Current WHO-recommended treatment requires 8-weeks of daily rifampicin and clarithromycin, wound care and, sometimes, tissue grafting and surgery. Healing can take up to one year and may pose an unbearable financial burden to the household.

Recent repurposing studies demonstrated that beta-lactams combined with rifampicin and clarithromycin are synergistic *in vitro* against *Mul* (PMID: 30689630) leading to the hypothesis that the inclusion of amoxicillin/clavulanate may improve and shorten BU therapy.

The aim of the BLMs4BU clinical trial is to evaluate whether co-administration of amoxicillin/clavulanate with rifampicin/clarithromycin can shorten BU treatment from 8 to 4 weeks. A randomized, controlled open label non-inferiority Phase II, multi-centre trial started in Benin in December 2021 (*ClinicalTrials.gov Identifier: NCT05169554*). A Phase III multi-centre trial in Ghana, Togo and Côte d'Ivoire is planned to start in March 2023 (*Pan African Clinical Trials Registry:* PACTR202209521256638). Patients are stratified according to BU category lesions and randomized in two regimens: (i) standard [RC8]: rifampicin/clarithromycin (RC) for 8 weeks; and (ii) investigational [RCA4]: standard RC plus amoxicillin/clavulanate for 4 weeks. Patients will be followed-up for 12 months and managed according to standard clinical procedures. Decision for excision surgery will be made at week 14 after treatment initiation. The primary efficacy outcome is cure (i.e., lesion healing without recurrence) without excision surgery 12 months after start of treatment.

If successful, this study will create a new paradigm for BU treatment, which could lead to a change in WHO policy and practice for this disease. A shorter, highly effective, all-oral treatment will improve the care of BU patients, adherence to treatment and will lead to a decrease in direct and indirect costs; thus contributing to WHO's NTDs Road Map targets for BU. This trial may also provide information on treatment shortening strategies for other mycobacterial infections, such as tuberculosis or leprosy, where rifampicin is the cornerstone drug.

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Skin NTDs and/or integration – Keywords

Buruli ulcer, skin neglected tropical disease, treatment shortening, non-inferiority, drug combination, amoxicillin/clavulanate

In vitro time-kill assays of amoxicillin/clavulanate in combination with rifampicin/clarithromycin against *Mycobacterium ulcerans*

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Rifampicin and clarithromycin for eight weeks with extensive wound care is the currently WHO recommended treatment for Buruli ulcer (BU), a skin neglected tropical disease caused by *Mycobacterium ulcerans (Mul)* that affects people in impoverished settings.

Combinatorial susceptibility assays showed that beta-lactams combined with rifampicin/clarithromycin were synergistic against *Mul* (PMID: 30689630). *In vitro* time kill assays (TKA) provide longitudinal information and quantify the antibiotic concentration-effect relationship in a time-dependent manner. However, TKA are performed by quantifying colony forming units (CFU), a cumbersome methodology in BU research due to the slow growth of *Mul* (1-3 months to form colonies).

The aim of this study was to assess the *in vitro* activity of rifampicin, clarithromycin and amoxicillin/clavulanate by TKA using alternative methodologies against clinical *Mul* isolates. Bacterial loads were quantified after 1, 3, 7, 10, 14, 21 and 28 days of treatment by different assays: (i) the gold-standard bacteriological assessment (CFU/ml); (ii) optical density (OD_{600}); (iii) BacTiter-Glo cell viability assay (Relative Luminescence Units, RLU) and; (iv) 16S rRNA RT/IS*2404* qPCR assay (number of gene copies).

Overall, a good correlation was observed between the gold standard (CFU counting) and the rest of methodologies. While drugs (at the concentration tested) alone had no effect, amoxicillin/clavulanate in combination with rifampicin (AMV+RIF) and with rifampicin/clarithromycin (AMV+RIF+CLA) were highly bactericidal, with bacterial loads significantly decreasing from day 3. The bacterial reduction between the viable colony counts on the last day (day 28) compared to day 3 was almost of 3-log (>99.9%). On day 28 both combinations showed a mean of $OD_{600}<0.2$, $1.78x10^4$ RLU, and $5.62x10^5$ 16S rRNA copies/cDNA, being significantly (P-value < 0.05) lower values than the rest of conditions.

In summary, all four methodologies provided comparable results showing that amoxicillin/clavulanate is strongly synergistic with rifampicin/clarithromycin against *Mul*; these combinations were more effective *in vitro* than the antibiotics currently used to treat BU. Our study suggests that alternative and faster TKA methodologies can be used in BU research beyond CFU quantification for drug discovery and development programs.

These studies are also supporting an ongoing clinical trial (*NCT05169554*) to determine the bacterial clearance rate in patient lesions.

Acknowledgments

This work is part of BLMs4BU project, which is supported by GlaxoSmithKline (GSK) and funded by Tres Cantos Open Lab Foundation (TCOLF).

Skin NTDs and/or integration – Keywords

Buruli ulcer, time-kill assays, methodologies, amoxicillin/clavulanate, bactericidal, bacterial clearance rate

How to reduce loss to follow up in deep fungal infection of skin in resource-limited settings?

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Introduction : Loss to follow-up is a serious problem in the management of deep fungal infection on skin in low and middle-income countries. Patients who are lost to follow-up are often sicker, and without regular medical attention may either die or return to hospital with serious illnesses. We aim to report the predictive factors of loss to follow-up in Malagasy patients affected by chromoblastomycosis (CBM) and sporotrichosis (SPT).

Methods : From March 2013 to January 2019, a prospective study on CBM and SPT patients was undertaken. The study included patients with CBM and SPT who had received antifungal treatment. The treatment is free for all patients, itraconazole 200 mg was given to patients every day. Loss to follow-up was assessed at the end of the second month of treatment, 6th and 12th month of treatment.

Results : Among 200 CBM and SPT patients included in this study, 50% and then 64% of patients were lost to follow-up within two and six months of initiating treatment, respectively. Only 17 CBM patients (21.2%) achieved their treatment at the end of the 12th month. No correlation was found between gender, age, severity of lesions and risk for loss to follow-up. However, high risk for loss to follow-up was seen in farmers, and in patients living far from health centres. The duration of disease more than one year was also a risk for loss to follow-up in SPT patients.

Discussion : According to our results, the key factors associated with loss to follow-up are not only the cost of treatment but also the cost of transport to the health centres, need to obtain food instead of attending the health centres, and lack of staff follow-up of defaulters.

Conclusion : Interventions that prevent loss to follow-up in resource-limited settings would substantially improve survival and would be cost-effective.

Skin NTDs and/or integration – Keywords

Chromoblastomycosis

Synthesis on knowledge of treatment from cutaneous leishmaniasis affected communities of Tigray, Northern Ethiopia

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Though, molecular biology of leishmaniasis and its pentavalent antimoniols treatment introduced 50 years ago were tremendous. Knowledge on Cutaneous leishmaniasis (CL) cause, transmission and treatment in the Ethiopian health system is low. Among the leishmaniasis diseases, cutaneous leishmaniasis has got less attention compare to visceral leishmaniasis. As a result, communities in CL endemic areas are using different traditional treatment methods. The ethnographic study aimed to assess cutaneous leishmaniasis treatment practices among people in endemic areas in North, Ethiopia. A six month ethnographic study was conducted in cutaneous leishmaniasis endemic districts using biopsychosocial model to incorporate a range of issues that not yet have received focused attention in the leishmaniasis research community. Indeed, an evidence based biopsychosocial approach of CL was critical to opening up avenues of treatment pathway of this debilitating neglected disease. Individuals with CL and local communities assumed, CL deserves less attention and hospitalized treatment due to its low or no recorded fatality as the disease has spontaneously self-healing nature. In addition to this, experiences of people with CL and local communities captured during the ethnographic field engagement exposed that CL is one of the frequently traditionally treated diseases. Some of the commonly used traditional treatments mentioned were (holly water, morning sputum from Sheik before eating food, nail polish, feces of child, burning with hot iron, senbet senabity prayer, extracts of qulqual plant, splashing or daubing with the mix powder of salt, urea and garlic, and a mixture of soot and garlic). Generally, it has been observed that there is high preference to traditional treatment of CL and the search for modern healthcare services become ignored. The following are among the common reasons mentioned why this is so: Lack of knowledge on the availability of the modern treatment for CL, community beliefs on the effectiveness of traditional treatment and the assumption that CL can only be treated traditionally, Over simplifying the diseases, lack of successful treatment journey of people with CL Ineffective treatment services given in private healthcare services propagated by patients that adversely discouraged others to prefer modern treatment and lack of knowledge of professionals to provide general information over the disease nature and where individuals with CL should go to seek care. Several studies emphasized on the negative health effects of using non-professionally prescribed treatments due to the potential problem such treatments may create. According to people with CL; the treatments being used have reportedly been tried by close family, friends or other people and have the reputation of being effective. However, such claim of efficiency is reinforced by lack of evidence to support if the lesions being treated were actually caused by CL or was the lesion healed due to the treatment or spontaneously. People with CL are justifying their decision to use either the traditional or self-treatments due to the fact that they need to deal with the disease concern and want to get rid-off it. To deal with the forgotten disease evidence based practice is highly needed.

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Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis, treatment, traditional treatment, Tigray, Ethiopia

How to include atopic dermatitis and common chronic skin diseases within the WHO strategic framework for the integrated control and management of skin NTDs

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This presentation summarizes the meeting on atopic dermatitis (AD) and common skin disorders in sub-Saharan Africa (SSA) sponsored by the International Society of Atopic Dermatitis (ISAD), the World Health Organization (WHO), the World Allergy Organization (WAO), the International League of Dermatological Societies (ILDS) and the Ministry of Public Health of Madagascar, held in Antananarivo on June 6th, 2022. This meeting was a follow-up of a workshop held in Geneva summarized in the Schmid et al JEADV 2019 paper DOI: 10.1111/jdv.15972. The simultaneous launch of the WHO framework on skin neglected tropical diseases (NTDs) was timely opening the door for the WHO NTD department to work on skin diseases in general.

The objective was to launch with all stakeholders a convergent plan of action in SSA targeting both skin NTDs and common chronic skin diseases in particular atopic dermatitis (AD) in conjunction with the WHO new framework program which aims to reduce morbidity, disability, and the psychosocial impacts of skin NTDs and other skin diseases through an integrated approach.

Decisions made at the meeting (1) improve training and capacity building e.g., update WHO manuals and apps, including guidelines for the management of AD in low resources countries, online course on AD for the WHO platform, translation of AD leaflets in native languages (2) improve drug accessibility especially for emollients and MTX, but also new molecules, through essential medicine list inclusion and pharma lobbying. "Global Accessibility to drugs for AD" will be the topic of a satellite symposium at ISAD Gdansk 2023.

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Effectiveness of intralesional sodium stibogluconate for the treatment of localized cutaneous leishmaniasis at Boru Meda general hospital, Amhara, Ethiopia: Pragmatic trial

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Background

Cutaneous leishmaniasis (CL) is generally caused by Leishmania aethiopica in Ethiopia, and is relatively hard to treat. Sodium stibogluconate (SSG) is the only routinely and widely available antileishmanial treatment, and can be used systemically for severe lesions and locally for smaller lesions. There is limited data on the effectiveness of intralesional (IL) SSG for localized CL in Ethiopia and therefore good data is necessary to improve our understanding of the effectiveness of the treatment.

Methodology/Principal findings

A pragmatic (before and after Quazi experimental) study was done to assess the effectiveness of intralesional SSG among localized CL patients at Boru Meda general hospital, Northeast Ethiopia. Patients who were assigned to intralesional SSG by the treating physician were eligible for this study. Study subjects were recruited between January and August 2021. Infiltration of intralesional SSG was given weekly to a maximum of six doses. However, when a patient's lesions were already cured before getting 6 doses, treatment was not conintued, and patient were only asked to come for lesion assessment. Skin slit smears (SSS) were taken each week until they became negative. Outcomes were assessed at day 90, with patients who had 100% reepithelization (for ulcerative lesions) and/or flattening (for indurated lesions) defined as cured. Multi-level logistic regression was done to assess factors associated with cure. A total of 83 patients were enrolled, and final outcomes were available for 72 (86.75%). From these 72, 43 (59.7%, 95% confidence interval 0.44–0.69) were cured at day 90. Adverse effects were common with 69/72 patients (95.8%) reporting injection site pain.

Factors associated with cure were age (OR 1.07 95% CI: 1.07–1.27), being male (OR 1.79, 95% CI: 1.10–2.25), size of the lesion (OR 0.79, 95% CI: 0.078–0.94) and skin slit smear (SSS) result +1 grading (OR 1.53, 95% CI: 1.24–1.73) and +2 grading (OR 1.51, 95% CI: 1.41–3.89) compared to the SSS grade +6.

Conclusion

Our findings revealed that intralesional sodium stibogluconate resulted in a cure rate of around 60%, with almost all patients experiencing injection site pain. This emphasizes the need for local treatment options which are more patient-friendly and have better cure rates.

Acknowledgments

My appreciation goes to study participants and I would like to thank the data collectors (dermatovenereologists, health officers, and nurses in the dermatology clinic) for their great efforts.

Skin NTDs and/or integration – Key words

Intralesional,Sodium stibogluconate, Effectiveness, Localized cutaneous leishmaniasis, Ethiopia

Community-based wound management including ulcerative skin NTDs in a rural setting of Côte d'Ivoire

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Wounds are a neglected health problem in rural communities of low-income countries, mostly caused by trauma and ulcerative skin diseases including Neglected Tropical Diseases (NTDs) and associated with systemic complications and disability. Rural communities have limited access to high quality health services-based wound care.

We conducted a prospective observational study on wound management at three levels – community (C), health centre (HC), district hospital (DH)—in a rural community of Côte d'Ivoire. Patients with skin wounds actively identified in a house-to-house survey and passively in the health services in a defined area of the Taabo Health and Demographic Surveillance System were asked to participate and followed-up longitudinally. Endpoints were proportion of wounds closed, time to wound closure, wound size over time, frequency of secondary bacterial infection, need for recapturing after follow-up interruption, and duration

of treatment stratified by health service level and wound aetiology.

We enrolled 561 patients with 923 wounds between May 2019 and March 2020. The observation period ended in March 2021. Median age was 10 years (IQR 7–15), 63.0% of patients were male. Almost all (99.5%, 870/874) wounds closed within the observation period, 5.3% (49/923) were lost to follow-up. Wounds primarily treated in C, HC and DH closed within a median time of 10, 16 and 170 days, respectively. Median time to acute wound and chronic wound closure was 13 and 72 days, respectively. Wounds treated in C, HC and DH presented with secondary bacterial infections in 10.3% (36/350), 31.0% (133/429) and 100% (5/5) of cases, respectively. Recapturing was required in 68.3% (630/923) of wounds with participants reporting wound closure as the main reason for not attending follow-up.

We describe a wound management model based on national and WHO recommendations focusing on early identification and treatment in the community with potential for broad implementation in low-income countries.

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Skin NTDs and/or integration – Keywords

Integrated wound management, wound care, patient-centered, skin NTDs, Buruli ulcer, yaws, lymphatic filariasis, common skin diseases, common skin conditions

The effect of two combination therapies on the cytokine profiles of patients with Post-kala-azar dermal leishmaniasis in Sudan

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Post-kala-azar dermal leishmaniasis (PKDL) is a dermatological complication affecting treated patients with visceral leishmaniasis (VL) caused by *Leishmania donovani*. In Sudan, up to 50-60% of those with VL will develop PKDL, with some of them possibly evolving to chronic PKDL or grade 2 and 3 severity, with disfiguring lesions over time if not treated. The current treatment regimen is unsatisfactory since it extends the use of potentially toxic drugs on patients who, on average, do not feel ill.

A phase II clinical trial was implemented to assess two new combinations treatments for PKDL patients in Sudan. Arm1 consisted of a combination of Paromomycin (20 mg/kg/d) IM for 14 days and Miltefosine oral for 42 days, and Arm2 combination of AmBisome® (20 mg/kg total dose) IV over 7 days and Miltefosine oral for 28 days. A total of 110 PKDL patients were randomized in the 2 study arms (55/arm).

In addition to treatment efficacy and safety, a secondary endpoint was to evaluate the host immune response before (D0), at the end (D42), and after the treatments (6M). Whole blood samples were stimulated with soluble *Leishmania* antigen (SLA) for 24 hours (WBA assay) and measured, using Luminex technology, the levels of 15 specific cytokines for Th1, Th2 and Th17 responses in SLA stimulated plasma.

At D0, most of the patients showed a mixed Th1/Th2 response with a dominance of a Th1 profile, characterized by high levels of TNF-α and IFN-γ and low concentrations of IL-5, and IL-10. After PKDL treatment (D42), the proinflammatory cytokines significantly declined while, by contrast, the anti-inflammatory cytokines significantly increased and remained consistent throughout follow-up (6M). Furthermore, there is evidence of Th17-like response at 6M as a result of an increase in IL-17.

At M12, seven patients from Arm2 required rescue treatment (Arm2R). The analysis of the cytokine profile of this sub-group of patients at D0 showed that IFN-γ and TNF-α levels were significantly lower than those found in Arm2. After treatment (D42), the concentration of these cytokines reached similar levels to those of Arm2. However, at 6 months, these patients exhibited a lack of responsiveness to proinflammatory cytokines, which was also evident in Granzyme B levels.

To conclude, following effective PKDL treatment, we observed a memory Th1-type response with high IFN-γ and TNF-α, which evolved to a mixed Th1/Th2 response with decreased proinflammatory cytokines at short term, and slightly recovered at 6M, when Th17-like responses are also patent. However, relapsed patients showed an anergy in their cellular immune response after VL and/or PKDL treatment. Low production of IFN-y and TNF should be studied in larger trial because of their potential as a biomarker of treatment failure.

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Skin NTDs and/or integration – Keywords

PKDL; Sudan, *Leishmania donovani*, cytokines, WBA, treatment

Community-based treatment using cryotherapy and miltefosine for cutaneous leishmaniasis in Ethiopia: The way forward?

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Cutaneous leishmaniasis (CL) is a neglected disease that poses a large public health problem in Ochollo village, southern Ethiopia. In addition to hyraxes, data indicates humans contribute to transmission of Leishmania aethiopica as well. Therefore, early diagnosis and treatment of CL patients is pivotal to reduce the human reservoir and accordingly, CL transmission. Evidence on treatment effectiveness of community-based treatment is limited, while community perspectives on modern CL treatment are understudied. In this study, we aimed to investigate the acceptability and effectiveness of community-based treatment using cryotherapy and miltefosine.

A multi-disciplinary study was carried out in Ochollo. All patients diagnosed with CL and eligible for treatment were recruited in the study, and were assigned either to miltefosine or cryotherapy depending on their lesion characteristics. Cryotherapy was given weekly, and miltefosine daily for 28 days, using allometric dosing for children. Clinical, patient-reported (patient global assessment and dermatological life quality index), and parasitological outcomes were assessed at one, three, and six months after starting treatment. Cure was defined as complete flattening and/or reepithelization of all lesions six months after the start of treatment. To assess acceptability of modern community-based treatment, a mixed-methods study was done using questionnaires and interviews from patients, previous patients, health workers, traditional healers, and community leaders before and three months after treatment.

We included 107 patients, with a median age of six. Around 50% had used traditional treatment, and only three had tried modern treatment. Forty-eight were assigned to cryotherapy, 42 to miltefosine, while 17 patients were not treated – mostly patients with severe lesions who were too young to take miltefosine. Cryotherapy was given in 1-10 sessions, and had a cure rate of 52% after six months, with 20% having substantial improvement. Miltefosine treatment cured 41% of patients, whereas 28% showed substantial improvement. Before treatment, 58% of patients indicated their lesion did not impact their quality of life, which increased to 95% at M6. Similarly, most patients rated their lesion severity as mild (39%) or moderate (28%) before treatment, whereas 62% rated their lesion as cleared at M6. The acceptability survey showed that 98% of patients would accept modern community treatment. Main barriers to seek modern treatment are the need to travel (69%), time lost (74%), and cost, with most patients not willing to pay more than 500 birr (10USD) for treatment. Two thirds of patients were very satisfied with their treatment outcome, and 84% was very satisfied with the treatment they received in the community. Interviews showed that the community perceived the given modern treatment as better than traditional

treatment, because it healed the lesion quicker, gave less side-effects and scar formation, and was easy and convenient to use.

Cure rates were relatively poor, although most patients had at least good improvement. Patient-reported outcomes and interviews showed that patients were very satisfied with treatment outcomes and receiving treatment in the community. Larger implementation studies are needed to optimize decentralization and integration of treatment for CL in Ethiopia.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis

Surgical debulking of podoconiosis nodules and its impact on quality of life in Ethiopia

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Background

In Ethiopia, severe lymphedema and acute dermato-lymphangio-adenitis (ADLA) of the legs as a consequence of podoconiosis affects approximately 1.5 million people. In some this condition may lead to woody-hard fibrotic nodules, which are resistant to conventional treatment. We present a series of patients who underwent surgical nodulectomy in a resource limited setting and their outcome. **Methods:** In two teaching hospitals, we offered surgical nodulectomies under local anaesthesia to patients with persisting significant fibrotic nodules due to podoconiosis. Excisions after nodulectomy were left to heal by secondary intention with compression bandaging. As outcome, we recorded time to re-epithelialization after surgery, change in number of ADLA episodes, change in quality of life measured with the Dermatology Quality of Live Index (DQLI) questionnaire, and recurrence rate one year after surgery.

Results

37 nodulectomy operations were performed on 21 patients. All wounds re-reepithelialised within 21 days (range 17–42). 4 patients developed clinically relevant wound infections. The DLQI values were significantly better six months after surgery than before surgery (P<0.0001). Also, the number of ADLA episodes per three months was significantly lower six months after surgery than before surgery (P<0.0001).

Conclusion

Nodulectomy in podoconiosis patients leads to a significant improvement in the quality of life with no serious complications, and we recommend this to be a standard procedure in resource-poor settings.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Surgical management of elephantiasis, operational research, shoe wearing, debulking

Session 8 : Treatments – Other abstracts

Clinical update: Ivermectin access for scabies improved through PBS change in Australia

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Background

Scabies is a Neglected Tropical Disease which is endemic in Aboriginal communities in northern Australia with some of the highest rates of scabies worldwide. The secondary complications lead to significant morbidity and mortality from sequalae including rheumatic heart disease and post-streptococcal glomerulonephritis. Poor medication access and treatment failure is well known perpetuate a cycle of health inequity in northern Australia. Considering the clinical need of the patient population for managing scabies in northern Australia highlighted the impracticality and tolerability issues experienced with use of topical 5% permethrin cream as the sole first-line treatment option. It is essential to consider public health strategies and therapeutic opportunities to address the high burden of disease which contribute to the health and life expectancy gap that exists between Aboriginal and Torres Strait Islander people and other Australians.

Aim

A multi-stakeholder submission for the Pharmaceutical Benefits Advisory Committee was developed to support a change to the listing of ivermectin on the Pharmaceutical Benefits Scheme in Australia; recommending ivermectin as a first-line treatment option for the management of scabies in Aboriginal and Torres Strait Islander people across Australia.

Outcome

The PBS listing was successfully changed after 9-months of review on 1st April 2022, and subsequently oral ivermectin has been listed as a first-line treatment for the management of scabies in Aboriginal and Torres Strait Islander people in Australia. It is anticipated that the change in national prescribing will have a large impact for a small number of Australians, as well as improve the access of treatment to effectively manage a condition that disproportionately affects First Nations people in Australia.

Conclusion

The successful PBS listing change occurred ahead of the release of the new edition of the new Australian clinical guidelines, which are scheduled to be released in early 2023. The updated guidelines will include ivermectin as a co-first line treatment alongside topical 5% permethrin cream, and support the consideration of regional control strategies for endemic regions in which the burden of scabies is estimated to be greater than 10% as recommended by the World Health Organisation.

Acknowledgments

We would like to acknowledge the support of the Northern Australian Aboriginal Community Controlled Organisation (NACCHO) in development of the original submission to the Pharmaceutic Benefits Advisory Committee.

Dr Victoria Cox is a PhD research student through the Menzies School of Health Research and is funded by a research grant through The Australian Centre for the Control and Elimination of Neglected Tropical Diseases (ACE-NTDs).

Skin NTDs and/or integration – Keywords

Ivermectin, clinical guidelines, medicines access, mass-drug administration

Treatment of cutaneous leishmaniasis recidivans using miltefolsine in Gilgil, Nakuru County, Kenya

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Leishmaniasis, a neglected tropical disease is caused by more than 20 species of the protozoan transmitted to humans by the bite of a female phlebotomite sand fly. Cutaneous Leishmaniasis (CL) is endemic in over 90 countries. In Kenya the disease occurs in rural areas and is geographically distributed in Central Rift Kenya. It occurs in three forms; localised CL, disseminated CL and cutaneous leishmaniasis recidivans (CLR). CLR is a peculiar form of CL mainly caused by *L. tropica.* It is still subject of great confusion in medical literature because of knowledge gaps associated to nosology and pathogenesis. The epidemiology and the incidence of CLR among the cases of CL worldwide is unknown. It differs from 3% to 33% according the few case series reported. Current treatment for CL in Kenya is by intralesional or systemic sodium stibogluconate (SSG) with sub optimal effectiveness.

A dermatologist and the local health team clinically examined patients and a diagnosis of CLR was retained in 7 patients. These patients had already received 28 days of systemic SSG and had either had non-healing lesions or relapse. They had been clinically diagnosed and laboratory confirmed as cutaneous leishmaniasis by demonstration of amastigotes in Giemsa-Stained tissue smears. The patients were give adult dose of miltefolsine 50mg three times a day for 28 days donated on compassionate basis and followed up over a period of 18 months.

There were 5 males and 2 females. 6 were blacks and one of American origin all aged between 36 and 65 years. All their lesions were on the face. A majority of the patients (4) had a single lesions size between from 6 cm and 10cm radius, 2 had two lesions each and one had 5 lesions. Six had their lesions clear within three month of the administration of the miltefolsine with recrudescence in one patient at 13 months after completing the dose. The most common side effects were nausea in 6/7 and vomiting in 4/7.

Leishmaniasis recidivans associated with non-healing lesions and/or recrudescence of papules or nodules from previously healed lesions has minimal response to SSG. Healing is demonstrated with use of miltefosine in this type of CL

Treatment of CLR with monotherapy, which is the main approach for CL treatment in Gilgil is not efficient for this CL form. The management strategy should be changed to using combined therapy. There is also need for controlled clinical trial study to show the real effectiveness of miltefolsine for treatment of cutaneous leishmaniasis.

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Drugs for Neglected Diseases Initiative, and Department of Health Sciences, Nakuru County

Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis recidivans, Miltefolsine, sodium stibogluconate

Self-care treatment for filarial elephantiasis using integrative medicine

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Background

Lymphatic Filariasis (LF) is a neglected tropical disease that causes lymphoedema (Elephantiasis) as its main sequela. The World Health Organisation's (WHO) LF elimination strategy targets disease elimination and alleviates suffering through morbidity management and disability prevention (MMDP). However, there is no effective treatment for Filarial Elephantiasis (FE) by the MMDP programs. Integrative medicine treatment (IM) for lymphoedema uses a combination of Indian traditional medicine, Ayurveda, alongside yoga exercises, compression therapy, antibiotics and antifungals, providing a useful combination where resources are limited, and different practices are in use

Objectives

To assess the value of the IM services in the existing clinical practice of lower limb lymphoedema management and to determine whether the treatment outcomes are aligned with the WHO's global goal of Lymphatic Filariasis MMDP.

Method

Institutional data from electronic medical records of all 1698 FE cohorts who attended the day-care lymphoedema IM facility between 2010-2019 were retrospectively analysed using pre- and post-treatment comparisons. Patients' treatment outcomes were evaluated, including limb volume, bacterial entry points (BEEPs), cellulitis episodes, and health-related quality of life (HQoL). Multiple regression analysis, t-tests, Chi-square tests, and Analysis of variance (ANOVA) were used to assess the association between IM and patients' treatment outcomes. This clinical audit adopted NICE guidelines.

Results

Limb volume showed substantial reduction following an intensive supervised care period (mean=24.5%, sd=13.17), with a further reduction between discharge and first follow-up (mean=1.42%, sd=18.42) and reduction from the first follow-up to second follow up (mean=2.3%, sd=19.53). The Follow-up days range was 34-2595 days. Most patients (1437, 84.63%) had a history of cellulitis at first presentation. No new episodes of cellulitis were observed at the first follow-up and only five (5.3%) new cellulitis in the second follow-up. BEEPs that trigger cellulitis are also reduced during follow-up. HQoL significantly improved when measured at first and second follow-ups.

Conclusion

IM for lower limb elephantiasis/lymphoedema successfully reduces limb volume and episodes of cellulitis, BEEPs leading to improved HQoL. It aligns with the WHO's LF treatment goals. As a low cost predominantly self-care management programme, it has the potential to change models of care and improve the lives of lymphoedema patients.

Acknowledgments

WHO Regional Office for South-East Asia, New Delhi

Skin NTDs and/or integration – Keywords

Lymphatic filariasis, lymphoedema, integrative medicine, Morbidity Management and Disability Prevention, Bill and Melinda Gates Foundation

The role of micronutrient malnutrition in the pathogenesis of Buruli ulcer

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Buruli ulcer (BU) is a neglected tropical disease caused by subcutaneous infection with *Mycobacterium ulcerans*. Nutrition is known to play a role in infectious disease susceptibility, but this has not been explored for BU. We aimed to assess the diets of those in BU-endemic communities and compare diets of cases vs. controls.

A total of 40 BU-confirmed cases and 40 matched controls were enrolled into the study, all of whom had anthropometric assessment. Food frequency and multi-pass 24-hour recall questionnaires were administered to determine patterns of food consumed, dietary diversity and nutrient intake for the overall cohort, cases vs. controls and patients with different disease severity. Circulating levels of selected dietary micronutrients was also assessed by serum bioassays in a separate cohort of 80 BU cases and controls.

Overall, the diets of study participants were inadequate for their daily needs and most of them had an inadequate intake of all macro- and micronutrients except for carbohydrate. The daily meals of over 95% of study participants contained >60% of their total energy intake from carbohydrate, while 9-10% was from protein (at the lower limit of adequacy). We found significantly reduced intake of several micronutrients in cases compared to controls; zinc (Cases: 5.57±1.70 mg/day, Controls: 6.90±2.96 mg/day, p-value=0.011), selenium (BU Cases: 52.14±31.85 mg/day, Controls: 77.32±44.53 mg/day, p-value= 0.005) and vitamin B12 (BU Cases: 0.89±0.92 µg/day, Controls: 2.332±2.68 µg/day, p-value=0.002). A higher proportion of the controls' diets (85%) contained adequate selenium (as assessed by the 'estimated average requirement' or EAR) than in BU cases (60%) with p-value=0.023. Furthermore, Vitamin B12 inadequacy was significantly higher in BU cases (80%) than in controls (55%) with p-value=0.03. These findings were reinforced by the finding of lower levels of these micronutrients in a separate cohort of BU cases and controls.

Our overall findings show that the diets of BU cases may be a contributing factor in susceptibility to the disease, and nutritional interventions may have potential for both prophylaxis and treatment.

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Skin NTDs and/or integration – Keywords

Buruli ulcer

Mucosal leishmaniasis, a disease in search of treatment

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In 3-5% of patients with cutaneous leishmaniasis in Latin America (range 0.5-17%), the disease spreads to the nasal, oral and/or upper respiratory tract mucosa 2-5 years after cutaneous manifestation (age range 1 to 30+).

Given that visualization of the parasite on direct examination or biopsy is possible only 10-40% of the time, molecular examinations are not available in endemic areas, and serological tests are nonspecific, diagnosis is based mainly on the clinical and epidemiological history, with the disadvantage that differential diagnosis must be performed to distinguish the disease from various common illnesses (tuberculosis, leprosy, paracoccidiodomycosis, adenomas, carcinomas), or rarer conditions (lymphomas, other infections). This necessitates additional tests (biopsy, cultures, etc.) that are usually performed at specialized centres, meaning that patients incur higher travel costs and must wait longer for their treatment to start.

The current recommendations of both multinational organizations and the national health services of those countries with the most cases specify pentavalent antimonials in monotherapy as the first therapeutic option. Publications recommending other medicines (miltefosine, amphotericins, pentamidine) are scarce, thus making it hard to conclude that these are valid options. Except for a couple of publications that combine pentavalent antimonials with pentoxifylline in a small group of patients, there is no evidence of other combined therapeutic approaches.

The retrospective analysis of mucosal cases treated in the last 20 years and the preliminary results of an ongoing controlled clinical trial involving 120 patients treated in monotherapy with one of three recognized anti-leishmanial medicines has enabled us to define patterns of presentation, cross-referenced to the therapeutic response to the different medicines used.

Any medicine in monotherapy has a high chance of failure, especially in the presence of lesions of more than 2 years of evolution or lesions affecting areas outside the nasal mucosa or the palate, while the combination of two specific anti-leishmaniasis drugs has a better chance of success. Nevertheless recurrences will be the norm in very chronic or very extensive lesions or lesions that have already failed to respond to previous treatments.

Proper treatment of the skin disease, education and monitoring of patients for early detection of mucosal involvement, plus rapid recourse to combination therapy, can facilitate cure for mucosal leishmaniasis, but these ideal circumstances occur only in some 25-30% of cases, so even where there is good initial response, the possibility of recurrence is high.

Skin NTDs and/or integration – Keywords

Leishmaniasis, mucosal leishmaniasis, pentavalent antimonials, miltefosine, liposomal amphotericin B, pentamidine

Acknowledgments

My appreciation goes to study participants and I would like to thank the data collectors (dermatovenereologists, health officers, and nurses in the dermatology clinic) for their great efforts

Skin NTDs and/or integration – Key words

Intralesional, Sodium stibogluconate, effectiveness, localized cutaneous leishmaniasis, Ethiopia

A retrospective cohort study of monthly rifampicin, ofloxacin and minocycline in the management of leprosy in the United Kingdom

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The World Health Organization (WHO) recommend rifampicin, dapsone and clofazimine multi-drug therapy (MDT) for the treatment of leprosy. Severe adverse effects include dapsone hypersensitivity syndrome, skin pigmentation, anaemia, and hepatitis. At the Hospital of Tropical Diseases (HTD), London, United Kingdom monthly rifampicin, ofloxacin and minocycline (mROM) is used as first line treatment for leprosy. There are few studies on the efficacy and adverse effect profile of mROM.

A retrospective study of patients with leprosy who were prescribed mROM at HTD was conducted. Demographic and clinical data were collected on outcomes including relapses, leprosy reactions, bacterial index (BI) and adverse effects. Individuals were interviewed using a semi-structured questionnaire to understand their experiences of mROM.

29 individuals were identified and 20 interviewed. 26 (89.7%) patients completed monthly ROM. 9 (31%) had switched from WHO MDT to mROM (five of whom (55.6%) were interviewed). BI reduced significantly following mROM treatment ($p = 0.04$). 17 individuals (58.6%) experienced a leprosy reaction. One of the 29 (3.4%) relapsed. The relapse rate was 9.5/1000 person years. 52 reports of potential adverse effects were either mild or moderate. The commonest adverse effect (13/52) reported was orange discolouration of urine. No adverse effect required hospitalisation or stopping mROM. Most individuals reported that skin lesions improved by the time they had completed mROM. Three individuals expressed relief because clofazimine pigmentation improved on switching from WHO MDT to mROM.

Our small study in a non-endemic setting, monthly ROM was safe, effective and acceptable. ROM therapy is associated with improvement in skin lesions, decline in bacterial index and acceptable adverse effects. Larger, prospective, randomised studies are needed to determine whether relapse rates with mROM are equivalent or better than WHO MDT and to provide robust data on the seemingly superior adverse effect profile of mROM.

Acknowledgments

We are grateful to the patients and staff of the Hospital for Tropical Diseases, University College London Hospitals NHS Foundation Trust, London, UK.

Skin NTDs and/or integration – Keywords

Leprosy, treatment, multi-drug therapy, adverse effects, ROM

Investigation of antileishmanial activities of green synthesized silver nanoparticles via *Thymus vulgaris* extract against *Leishmania majo in vitro*

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Severe and fatal complications of leishmaniasis remains a problem, no vaccine is available and the current drug treatment against this protozoan infection is inefficient. The use of novel approaches such as green nanotechnology has been used as a therapeutic modality. This study was aimed to examine the efficacy of green synthesized silver nanoparticles (Ag NPs) via *Thymus vulgaris* (thyme) against *Leishmania major* (*L. major*) *in vitro*.

We have prepared silver nanoparticles (TSNPs) by adding thyme extract to the silver nitrate aqueous solution (0.2 mM), and evaluated their antileishmanial activity. The viability of *L. major* promastigotes was assessed in the presence of various concentrations of TSNPs by direct counting after 24 h. The MTT assay was used to identify the viability of promastigotes. The same procedures were assessed in uninfected macrophage cells. The apoptotic effects of nanoparticles on *L. major* promastigotes were determined with flow cytometry assay using annexin staining. To evaluate anti-amastigotes activity of TSNPs, light microscopic observation was used to determine the number of parasites within the macrophages in each well.

The effect of TSNPs on promastigotes and amastigotes of *L. major* was effective and has a reverse relationship with its concentration. The results demonstrated that TSNPs, inhibited the growth rate of *L. major* amastigotes and, the IC50 value of these nanoparticles was estimated 3.02 ppm after 72h. These nanoparticles also had no significant cytotoxicity in Raw 264.7 macrophages. The results of flow cytometry showed that the toxic effects of TSNPs on promastigotes after 24 hours were statistically significant ($p<0.05$) and showed 69.51% of apoptosis.

As a whole, our study confirms that TSNPs have a beneficial effect on promastigote and amastigote forms of *L. major* in vitro and could be considered as a candidate for the treatment of this infection.

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Skin NTDs and/or integration – Keywords

Leishmania major, silver, nanoparticles, in vitro

Session 9 : Operational research - Presentations

Friday, 31 March 2023 **Chair: Ymkje Stienstra**		
Time	**Subject**	**Presenters**
09:00 – 09:10	**Arrival of Director-General** **Remarks**	
09:10 – 09:25	Presentation of conclusions and recommendations	Roderick Hay
09:25 – 09:45	**Keynote presentation:** Operational research for skin NTDs - what are the critical needs?	Gail Davey
09:45 – 10:00	Experience with holistic management of skin neglected tropical diseases through church networks in Songololo Territory	Delphin Phanzu
10:00 – 10:15	Barriers associated with accessing lymphatic filariasis Morbidity Management and Disability Prevention (MMDP) Services in Jigawa State, Nigeria	Juliana Amanyi-Enegela
10:15 – 10:30	An integrated person-centred approach to the identification, referral, diagnosis, and management of skin NTDs: findings from a multi-disciplinary evaluation	Laura Dean
10:30 – 10:45	Two and a half years of PEP4LEP skin camps: An implementation trial on community based integrated skin screening and leprosy prevention in Ethiopia, Mozambique and Tanzania	Anne Schoenmakers
10:45 – 11:00	Sustainability of self-help programmes in the context of leprosy and the work of leprosy missions	Sopna Choudhury
11:00 – 11:15	Community understandings of the aetiology of leprosy, Buruli ulcer and yaws diseases in the Atwima Mponua District of the Ashanti Region of Ghana	Daniel Okyere
11:15 – 11:30	Contribution to NTD pharmacoeconomics: Costs of mycetoma drug development	Eduard Zijlstra
11:30– 11:45	Understanding the economic burden on households of neglected tropical diseases of the skin: Qualitative findings from Ghana and Ethiopia	Jacob Novignon
11:45 – 12:00	**Discussions**	**All**

Experience of holistic management of skin-related neglected tropical diseases through church networks in the Songololo area

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Introduction

Neglected tropical diseases (NTDs) are a group of preventable and curable diseases affecting the poorest and most vulnerable populations in remote areas of Africa. Most countries in the African region are co-endemic for at least 5 NTDs.

In 2018 the Democratic Republic of the Congo (DRC) reported 3334 cases of leprosy, 17 cases of yaws and 99 cases of Buruli ulcer. For reasons of efficiency, the World Health Organization (WHO) advocates integrating measures to control these skin NTDs. The overall goal of the study was to equip the community of faith to provide physical, spiritual, and emotional care to individuals and families affected by skin NTDs, specifically by (i) empowering local faith networks to mobilize the faith community to identify cases of skin NTDs and refer patients to the health system; (ii) implementing best practices of self-care in the community; (iii) providing ongoing spiritual and emotional support.

Method

Practical research conducted between July 2020 and June 2021 in two health districts (Kimpese and Nsona-Mpangu) in the Songololo area of central Kongo province. In each health district, 6 health areas were selected, making a total of 12. The study took place in three phases: (i) mapping and identification of churches and stakeholders suitable for training; (ii) three-day basic training programme; (iii) implementation of the activities per se.

Results

Training was dispensed to 506 people during the study period: 480 from the church network (72 pastors and 408 lay leaders) in techniques to detect suspected skin NTDs cases, referral of cases to health structures, and provision of psycho-spiritual support. In addition, 26 health workers received training in self-care methods.

A total of 441 suspected skin NTD cases were detected through the church network in the two health districts, broken down as follows: 243 suspected cases of Buruli ulcer, including 25 confirmed cases (10%); 148 suspected cases of yaws including 2 confirmed cases (1%), and 17 suspected cases of leprosy including 6 confirmed cases (35%).

Of all the suspected cases (441) referred to health facilities, 385 (87%) actually attended, and 81 (8%) benefited from spiritual and emotional support, including 17 baptisms. A total of 32 patients benefited from self-care training and were provided with the required materials and consumables.

Conclusion

Our study demonstrated the potential for local faith-based networks to mobilize their community (pastors, lay leaders and community members) to manage people with skin NTDs, including case identification and referral to the health-care system; to implement best practices for self-care in the community; and to provide ongoing spiritual and emotional support which is helpful in reducing the isolation of those affected.

Acknowledgements

We thank all those who participated in this study for their cooperation: the pastors and lay leaders of the church networks in the Kimpese and Nsona-Mpangu health areas, the health area nurses and the administrative staff in the health districts for their assistance. This study was supported by Cornerstone Trust and American Leprosy Missions.

Skin NTDs and/or integration – Keywords

Skin-related neglected tropical diseases, leprosy, yaws, Buruli ulcer, holistic management, self-care, Songololo, Kongo central, Democratic Republic of the Congo

Barriers associated with accessing lymphatic filariasis Morbidity Management and Disability Prevention (MMDP) services in Jigawa State, Nigeria

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Lymphoedema and hydrocoele are chronic clinical manifestations of lymphatic filariasis (LF) and the main approach for managing and treating these conditions is through the provision of basic essential care through morbidity management and disability prevention (MMDP) services in endemic areas. Persons with LF morbidities are expected to access the services at the community level and get referred to secondary health care if the need arises. However, there is little information on utilisation and challenges patients encounter when accessing MMDP services in Nigeria. This study sought to assess the status of the utilization of LF MMDP services and factors affecting access to MMDP services in Jigawa State, North-western Nigeria.

This exploratory study utilized mixed methods that included a descriptive cross-sectional survey of 155 patients, 6 in-depth interviews, 6 key informant interviews and 8 focus group discussions. Data collected included the availability of and access to primary health facilities that offer MMDP services, their functionality, and barriers associated with access to MMDP services, coordination and partnerships amongst the different community actors, and recommendations on improved service delivery and utilization. Descriptive analysis was done for quantitative data and thematic analysis for the qualitative data.

Results of the facility mapping exercise show the existence of a primary health facilities in the research location; however, there is a need for training of health facility staff on identifying LF morbidity cases, providing the essential care services, and determining which cases should be referred to the secondary health facility for further assessment and services delivery.

On the barriers to accessing MMDP services, financial cost of transportation to either utilise referrals at secondary health facilities or access other MMDP services such as replenishing treatment supplies was a major constraint. Other barriers to accessing MMDP services include low levels of awareness regarding available MMDP services, fear of safety of hydrocoele surgeries and fear of social stigmatisation.

Opportunities exist for improving the level of awareness to increase access and utilisation of MMDP services using innovative community structures and building capacity of health providers and community members regardless of gender.

Scaling up of delivery of locally appropriate communication messages and strategies to increase uptake of MMDP services is paramount in any LF elimination programme. This may entail moving beyond the traditional community outreach of using town criers and require the development of innovative approaches that are designed to capture all segments of the society. Patients who have adhered to treatment protocol and attest to improvement in health status serve as community champions for MMDP. They could become powerful tools in advocacy and allay fears surrounding hydrocoele surgeries.

Acknowledgments

We would like to express our gratitude to HANDS and the Jigawa State ministry of health, Nigeria for facilitating and providing the enabling environment for the research.

Skin NTDs and/or integration – Key words

Lymphatic filariasis, Morbidity Management and Disability Prevention (MMDP), Access & Barriers

An integrated person-centred approach to the identification, referral, diagnosis, and management of skin NTDs: findings from a multi-disciplinary evaluation

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For many persons with skin NTDs, lack of access to effective service provision results in significant physical and psycho-social consequences, complex treatment journeys, and catastrophic socio-economic impacts. Integrated health system approaches to managing skin NTDs have been proposed as a key solution to these challenges, to address equity and effectiveness issues. Liberia is one of the first countries in the world to develop a national integrated approach to managing skin NTDs. However, evidence on optimal approaches, the quality of services delivered, the mainstreaming of mental health and human resource management issues, and how to implement services at scale to ensure equitable delivery, is limited.

Using a person-centred approach, we have co-developed and adapted health systems interventions for the management of skin NTDs in Liberia to generate learning for other settings in sub-Saharan Africa. We have worked with Ministry of Health officials, health workers, and affected persons to identify preferential strategies to detect, refer, treat and support people living with skin NTDs. These approaches are detailed within a comprehensive intervention manual that is designed to support national health systems to roll out an integrated approach to the management of skin NTDs. The manual is made up of three core modules: 1) Case detection and integrated management (including provision of mental health support and stigma reduction); 2) Training (with a specific focus on adult learning principles); and 3) Human resource management. We are currently piloting the use of this manual and its associated interventions within three counties in Liberia.

To date, we have trained 3,218 health cadres (mid- and community level health workers, traditional and faith healers, and peer advocates) in the identification, referral, diagnosis, and management of skin NTDs. All training has included specific focus on stigma reduction, mental health, disability inclusion and gender sensitivity. Following two-weeks of intervention roll-out we had identified 37 new skin NTD cases and a further 30 previously known cases had engaged in peer-support activities. Engagement of community advisory boards at county and national level continues to be essential in supporting intervention monitoring and adaptation and collaboration across ministerial departments has been critical to our success.

Within this presentation, we will share learnings from our multi-disciplinary evaluation of the development, delivery and evaluation of the integrated intervention.

Acknowledgments

This work was supported by the National Institute for Health Research (NIHR), Research for Innovation for Global Health Transformation REDRESS Programme (NIHR2001129).

Skin NTDs and/or integration – Key words

Buruli ulcer, leprosy, yaws, onchocerciasis, lymphedema, hydrocele, integration, mental health, human resource management, equity and inclusion

Two and a half years of PEP4LEP skin camps: An implementation trial on community based integrated skin screening and leprosy prevention in Ethiopia, Mozambique and Tanzania

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The PEP4LEP study is a cluster-randomized implementation trial aiming to contribute to interrupting leprosy transmission by identifying the most effective and feasible method of screening people at risk of developing leprosy and administering chemoprophylaxis in Ethiopia, Mozambique and Tanzania. In the 2022 World Health Organization strategic framework for skin-related neglected tropical diseases (skin NTDs), an integrated skin screening approach is promoted to increase impact. This is implemented in the PEP4LEP project: dermatologists and trained health workers are not only screening for leprosy, but also for other skin NTDs such as lymphatic filariasis, for skin diseases linked to HIV/AIDS such as Kaposi's sarcoma, and for more common skin conditions such as eczema. The mobile health (mHealth) application 'NLR's SkinApp' can support health workers during the screening process.

One PEP4LEP intervention arm is community-based skin health events ("skin camps"), screening 100 community contacts per leprosy index-patient, and provide them with chemoprophylaxis when eligible. These skin camps will bring both leprosy chemoprophylaxis and specialised dermatological care closer to underserved communities. In total, 270 index-patients and 27,000 community contacts are intended to be included in this intervention. Enrolled ccommunity contacts with skin conditions receive topical skin medication free of charge, medical advice, or referrals for more specialised care.

The first PEP4LEP skin camp was organized in Tanzania in July 2020, followed by Ethiopia in May 2021, and Mozambique in April 2022. Below the preliminary results for the year ended December 31, 2022.

In Ethiopia, 43 index patients were included until December 2022. During 43 skin camps, 4,051 contacts received integrated skin screening. Among these contacts, 33 (0.8%) new leprosy patients were detected, as were 1,735 (42.8%) community contacts with other skin diseases. Leprosy chemoprophylaxis was administered to 3,551 (87.7%) eligible contacts.

In Mozambique, by the end of 2022, 56 index patients had been included from 26 skin camps. A total of 4,142 contacts received integrated skin screening and 3,628 (87.6%) received leprosy chemoprophylaxis. Of the Mozambiquan contacts screened, 72 (1.7%) new leprosy patients were detected and 1,837 (44.4%) contacts with other skin were diagnosed. A particularly high number of contacts with scabies was detected in Mozambique.

In Tanzania, 68 index patients were included in 68 skin camps. Of the 7,180 screened contacts, 6,413 (89.3) contacts were eligible for preventive medication and no-one refused. In Tanzania, 61 (0.8%) new leprosy patients were found and 3,989 (55.6%) patients with other skin conditions.

Besides leprosy and scabies, other skin diseases diagnosed during the skin camps include among others: acne, albinism, angular cheilitis, atopic/contact dermatitis, folliculitis, fungal diseases, furanculosis, ichthyosis, impetigo, keloid scars, lichen simplex/planus, melasma, naevi, pellagra, pityriasis alba/versicolour, podoconiosis, pruritic papular eruption, psoriasis, seborrheic dermatitis, urticaria, vitiligo and xerosis cutis.

A clear advantage of the PEP4LEP skin camps is that disease status disclosure of the leprosy index-patient is not needed. In addition, health workers are motivated to participate, and high numbers of community members are visiting the camps for screening and dermatological treatment. Challenges include the transfer of trained health staff, the COVID-19 pandemic's impact on skin camps ("gathering ban"), the inaccessibility of communities caused by poor road infrastructure and heavy rains/floodings (which increased because of climate change), and medication shortages, e.g. for scabies and leprosy. More results are expected also on cost-effectiveness and acceptability.

Acknowledgments

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Skin NTDs and/or integration – Key words

Skin NTDs, integrated skin screening, skin camps, mHealth, skin diseases, dermatology, East Africa (Ethiopia, Mozambique, Tanzania), research

Buruli ulcer, cutaneous leishmaniasis, post-kala azar dermal leishmaniasis, leprosy, lymphatic filariasis, podoconiosis, mycetoma, onchocerciasis, scabies, yaws, fungal diseases and other skin diseases.

Integration across multiple diseases and multiple countries

Sustainability of community-based self-help programmes in the context of leprosy and the work of leprosy missions

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Introduction

To break the vicious cycle of poverty and poor health outcomes associated with leprosy, self-help groups (SHG) have been implemented, based in communities and involving the formation of groups of people who can provide mutual support and form saving syndicates.

Objectives

Our objective is to determine the extent to which SHG programme activities have continued in the time beyond the funding period and record evidence of sustained benefits, at four study sites across three leprosy endemic countries. Findings will be presented from a scoping review on sustainability as well as discussions on preliminary findings from our study looking at sustainability of SHGs from four sites across countries (India, Nepal and Nigeria)

Methods

We will retrieve and analyse any project documents. This will be followed by semi-structured interviews with people involved in delivery of the self-help intervention, potential beneficiaries and people in the wider environment who would have been familiar with the programme. Interviews aim to identify barriers and facilitators to success and sustainability. Data will be analysed thematically and compared across groups and countries.

Impact

Comparative analysis of data from across the four geographical areas will result in a comprehensive investigation of the concept of sustainability SHG programmes for people with leprosy, disability, other conditions causing ulcers or marginalised, once funding has ceased.

Our findings will have implications for a wider population as people affected by leprosy are in the minority in the self-help groups in all of our participating countries.

Limitations

There is a risk of bias and conflict of interest as interviews will be conducted by individuals from the implementation organizations. We also expect recall bias as participants will be asked to recall events from their past. We expect that our triangulation of methods and data sources will somewhat mitigate the bias.

Conclusions

While there is literature on the existence of SHGs and their effectiveness during the funded periods, little is known about the sustainability of these interventions. Our study will help answer this knowledge gap.

Acknowledgments

National Institute for Health Research (NIHR: 200132) using UK Aid from the UK Government to support global health research

Skin NTDs and/or integration – Keywords

Leprosy, disability, sustainability, self-care, self-help groups, evaluation

Community understandings of the aetiology and care seeking for Leprosy, Buruli ulcer and yaws diseases in the Atwima Mponua District of the Ashanti Region of Ghana

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Skin NTDs including Buruli ulcer, yaws, and leprosy are major causes of morbidity in sub-Sahara Africa. Although treatable, they are associated with morbidity, disability and stigma when diagnosed and treated late. Studies have shown that lack of understanding about the causes of the diseases may affect timely decision and action to seek treatment, which can further aggravate the problem and lead to stigma and discrimination of individuals and close relations. There is inadequate information on the illness experiences of people living with skin diseases in the Atwima Mponua District which is noted for its co-endemicity in skin diseases. It is in this regard that, the study aimed to explore how affected people understand the causes of skin NTDs and their associated illness experiences.

The study adopted a qualitative approach using purposive and snowball as sampling techniques of data collection. After a written consent was sort, a total of 7 Focus group discussions were conducted with adult community members (n=4), healthcare workers (n=2), and patients (n=1), 42 in-depth interviews with Buruli ulcer patients (n=7), healthcare workers (n=33), a schoolteacher and a traditional healer. Also, observations were conducted at the homes of affected people and their caretakers and traditional healer's therapeutic setting. Using MAXQDA v2020, a 3-level thematic coding framework developed from the objectives of the study was used to code and analyse responses.

Results suggested that affected people and community members we interacted with, had appreciable knowledge of the condition in terms of signs and symptoms. Local (Twi) names such as '*kwata*' and '*dei*' were mentioned for leprosy and yaws respectively, however, no local name for BU was mentioned. Those who were aware of the condition only called it Buruli or BU. Reported causes were mainly linked to environmental, human, and spiritual factors. Crucially, we observed that the understood causes informed which care pathways were chosen. People tend to seek care from spiritual/faith healers if they perceive the cause of a skin condition to be spiritually associated, while those without this view either may seek herbal or biomedical care.

The results of this study reaffirm that of previous studies that illness experiences of people living with skin conditions may influence their care pathways if they do not see positive improvements from their current place of care. This may lead to late seeking of proper care with the resultant effect of deformities.

Strategies that improve education and awareness on the causes and modes of transmission of skin NTDs in the district may translate into reduction of stigma and increased care seeking by way of early reporting and diagnosis through the formal health system which will reduce or eliminate disability as has been shown in similar settings.

Acknowledgments

We wish to thank those who participated in this study. The Skin Health Africa Research Programme is funded by the Research and Innovation for Global Health Transformation (RIGHT) Programme [Grant Reference Number NIHR200125] of the National Institute for Health and Care Research (NIHR) https://www.nihr.ac.uk/. The funder had no role in study design, data collection, and analysis.

Skin NTDs and/or integration – Key words

Leprosy, Buruli ulcer, yaws, stigma

Pharmaco-economics in neglected tropical diseases: the case of mycetoma

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There is a fatal imbalance in research and development (R&D) to meet needs in Neglected Tropical Diseases (NTDs); while 1393 drugs were developed between 1975-1999, only 1.3% were for NTDs that form 12% of the global disease burden. Ten years later, 4% of 850 new drugs and vaccines were for NTDs, and most were repurposed drugs; only 1% of 336 new chemical entities (NCEs) were for NTDs. The Drugs for Neglected Diseases initiative (DNDi) was launched in 2003, exploring a new, alternative, non-for-profit for developing drugs for neglected populations. The R&D costs are outlined in the DNDi model paper: https://dndi.org/press-releases/2019/not-for-profit-research-development-can-address-market-failure-for-neglected-patients/

We have examined the R&D costs of a recently completed Randomized Clinical trial (RCT) on the use of fosravuconazole in eumycetoma.

Mycetoma is an implantation disease that can be caused by bacteria (actinomycetoma) or fungi (eumycetoma). For the latter, only itraconazole is available in low-and-middle income countries (LMICs) and is often given for 12 months after which the remaining lesion is removed surgically. Not uncommonly, patients would have to contribute financially to purchase the drug at prohibitive cost. There are no RCTs; cure rates from case reports or case series show cure rates of <40%.

We have conducted a double-blind, randomized Phase IIb RCT between 2017-2021 with 2 study arms of fosravuconazole (200 mg and 300 mg weekly) and a comparator arm with itraconazole (400 mg daily). The drugs were given for 12 months with surgery at 6 months. Fosravuconazole was repurposed from the DND*i* Chagas' disease portfolio; it is registered in Japan for the indication onychomycosis. It is an azole drug that showed superior efficacy for *Madurella mycetomatis*, the most common fungus causing eumycetoma in Sudan. This highly complex study, the first ever RCT in eumycetoma, was conducted in partnership by DNDi and Eisai Ltd. Japan, and coordinated by the Mycetoma Research Center, Khartoum.

Entry criteria were strict: age ≥ 15 years, lesions ≥ 2 and <16 cm, no previous treatment. Patient recruitment (target n=138) was difficult as patients live in hard-to-reach areas; this was compounded by political instability and the COVID-19 pandemic.

This study was carried out with 5 FTEs (DND*i*), and 22 FTEs (MRC) per year with additional support from partners in the Netherlands and Sudan.

Total global expenditure of the study was 8 million Euro over 8 years vs initial estimates of 2 million over 4 years. The per patient cost was 47k€ / patient for Total Direct R&D (excl. CMC). This is within acceptable range for DNDi, especially within the context of a highly complex trial with > 100 pts and low disease prevalence. Regarding funding, 48% of direct R&D costs came from via earmarked funding (GHIT, Canton de Genève & BMGF) and 52% was funded by Core/Portfolio funds.

In conclusion, the expenditure for repurposing of drug in this RCT was within the range expected from similar studies despite the complexity of the study.

Acknowledgments

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Skin NTDs and/or integration – Key words

Mycetoma, RCT, Sudan, repurposing of drug, expenditure

Understanding the economic burden on households of neglected tropical diseases of the skin: Qualitative findings from Ghana and Ethiopia

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Introduction

Neglected tropical diseases of the skin ("skin NTDs") including leprosy, yaws, cutaneous leishmaniasis and Buruli ulcer, pose a substantial health and economic burden in many African countries. These diseases are associated with substantial physical disability, psychological distress, social exclusion, and financial hardship. There is sparce information on the experienced economic burden of these diseases in contrasting settings. This study aimed to improve understanding of the economic burden of skin NTDs on patients and their households in case-study districts in Ghana and Ethiopia, including the coping strategies adopted by patients and households with these diseases.

Methods

The study was conducted in the Atwima Mponua district in the Ashanti region of Ghana (for Buruli ulcer, yaws, and leprosy) and Kallu district of South Wollo zone in Ethiopia (for cutaneous leishmaniasis and leprosy). The study is part of multidisciplinary formative research to inform the development and evaluation of integrated strategies to improve health and wellbeing in those affected by skin NTDs appropriate to the local contexts. In both countries, qualitative data were collected on economic burden on affected individuals and their households, stigma experiences, and disease discourses. Data collection included in-depth interviews (n=98) with affected individuals, caregivers, and health workers; focus group discussions (n=27) with community members; and key informant interviews (n=21) with opinion leaders, traditional healers and policy actors were conducted. Data were coded using MAXQDA 2020 software with thematic framework analysis.

Results

Despite substantial differences in contexts and in the specific skin NTDs experienced, similar themes emerged across the two countries. We found that individuals with skin NTDs suffer substantial economic burden due to financial and opportunity costs associated with care seeking. There was also evidence that these costs delay care seeking and when care is eventually sought, adherence to treatment is limited. The major cost drivers across both countries include transportation to the health facility and wound dressing supplies. However, in Ethiopia, other major cost drivers include accommodation, food, laboratory tests, and imaging (ECG). These costs also influenced treatment choices with some patients preferring traditional healers. In addition to their affordability, the choice of traditional healers was also attributed to accessibility of care and flexibility of payment. Both patients and caregivers reported a reduction in economic and school-related activities. Specifically, there was evidence of opportunity cost including

days lost to work, reduced working hours, lateness to school, absenteeism and withdrawal from school entirely because of their conditions. In both countries, several coping strategies including dis-saving, asset sale, consumption reduction, contracting out farmland, borrowing, family and community support and health insurance were used by patients and family members to mitigate the financial costs of illness and production losses.

Conclusion

In both countries, this formative research indicated that interventions to bring care for skin NTDs closer to communities – thereby reducing both financial costs of travel and opportunity costs of care – would have the most potential to mitigate the substantial economic impacts of experiencing and seeking care for skin NTDs and would be a key element in any efforts to improve health and wellbeing.

Acknowledgments

We wish to thank the individuals and communities for their participation in the work of the Skin Health Africa Research Programme. The Skin Health Africa Research Programme is funded by the Research and Innovation for Global Health Transformation (RIGHT) Programme [Grant Reference Number NIHR200125] of the National Institute for Health and Care Research (NIHR) https://www.nihr.ac.uk/

The funder had no role in study design, data collection and analysis.

Skin NTDs and/or integration – Key words

Buruli ulcer, cutaneous leishmaniasis, leprosy, yaws, and integration

Session 9 : Operational research – Posters

Community understanding and beliefs of cutaneous leishmaniasis in Amhara region, Ethiopia

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Cutaneous leishmaniasis (CL) is a neglected tropical disease (NTD) of the skin, caused by *Leishmania* protozoa and transmitted to human via the bite of infected female sandfly. CL is skin NTD of public health concern in Ethiopia, where thousands of new cases are annually reported and a quarter of the population lives in high-risk areas. In the third NTDs master plan, the Federal Ministry of Health proposed health promotion and vector control strategies to control CL by 2030. However, evidence is limited on the sociocultural underpinnings of CL in Ethiopia to design context-specific and culture sensitive community-based interventions. We aimed to explore community understanding and beliefs about CL to inform these interventions.

As part of the larger Skin Health Africa Research Project (SHARP), an exploratory qualitative study was carried out from March to May 2021 in Kallu district, Amhara region, in Ethiopia. As We did community engagement to reach CL affected villages as well as trace CL affected individuals in the district. Study participants were recruited purposively with due account of heterogeneity by age, sex and educational status. We conducted 20 focus group discussion (FGD) sessions with all eligible community members, and 18 in-depth interviews (IDI) with CL-affected individuals who had active disease. Separate topic guides were developed to collect the FGD and IDI data. The data were audio recorded, transcribed and translated verbatim for analysis. Data was managed using MAXQDA plus 2020. A codebook was developed based on the research questions, refined after initial data coding and thematic analysis conducted.

People in Kallu district used the vernacular names "*kunchir*" or "*konchir*" to refer to CL. The main manifestation of CL described was lesion formation observed on the face, primarily the nose, cheek, eye, and lip. While scar formation and disfigurement were disease outcomes, the monthly moon cycle and sexual intercourse were mentioned as exacerbating factors for lesions. The perceived cause of CL was contact with bat body fluids: urine and menstrual blood. Vulnerability was attributed to being young and living in highland areas. Furthermore, respondents believed that CL is non-contagious.

The community had a strong belief that bat body fluid causes CL possibly contributing toward misconceptions about the cause, vulnerability, transmission, and understanding of the disease. This calls for a tailored community-based intervention centered on dispelling misconceptions to achieve CL control in Kallu district.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Bat, belief, community, cutaneous leishmaniasis, qualitative study, Ethiopia

Perceptions and health seeking practices for scabies in central Ghana

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Introduction

The WHO has advocated for country-driven and country-owned strategies as part of the integrated control of skin Neglected Tropical Diseases. Knowledge of context specific issues is important for design and implementation of scabies control interventions by endemic countries. Understanding the underlying belief systems and providing insights into the cause is key to encouraging earlier presentation and improving the quality of life of those affected with scabies. We aimed to assess the perceptions, attitudes and practices towards scabies in central Ghana.

Methods

Data was collected via semi-structured questionnaires for people who had active scabies or scabies in the past year and people who never had scabies in the past. The questionnaire covered several domains: knowledge about the causes and risk factors; perceptions towards stigmatisation and consequences of scabies in daily life; and treatment practices.

Results

Out of 128 participants, 67 were in the scabies group. The mean age (±SD) of participants was 32.3 ± 15.6 years and 30.1 ± 11.0 years for participants in the scabies and non-scabies groups respectively. There were 48.4% (62/128) females. Thirty percent of the participants had tertiary education, 14.1% had no education and 22.7% were farmers.

Overall scabies group participants less often indicated a factor to predispose to scabies than community controls; only ‘family/friends contacts’ was more often mentioned in the scabies group. Scabies causation was attributed to poor hygiene, traditional beliefs, heredity and drinking water. Overall, 31.9% (41 of 128) [11.9% in the scabies group and 20% in the non-scabies group] and 38.4% (49 of 128) [10.5% in the scabies group and 27.9% in the non-scabies group] indicated witchcraft and curses respectively had a role in the aetiology of scabies. Individuals with scabies delay care seeking (median time from symptom onset to visiting the health centre was 21 [14 – 30] days) and this delay is enhanced by their beliefs, a perception of limited disease severity and cost of treatment. Compared to participants from the dermatology clinic in the scabies group, participants from the community in the scabies group tended to have a longer delay (median [IQR] 30 [14 – 48.8] vs 14 [9.5 – 30] days, p = 0.002). Participants indicated that scabies led to health consequences, stigma, and loss of productivity.

The finding that some people seemed unaware of free scabies treatment under the national health insurance scheme in Ghana highlights the need for educational programmes to promote the availability of free and effective treatment for persons with health insurance.

Discussion/ conclusion

There is the need to enhance health education to promote early care seeking, enhance knowledge of communities on impact and dispel negative perceptions about scabies in Ghana. Control programmes should consider the diverse beliefs and attitudes when developing community education materials or undertaking mass drug administrations.

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Skin NTDs and/or integration – Keywords

Scabies, skin NTD

“It left me burned”: Lived experiences of persons with cutaneous leishmaniasis in Kallu, Ethiopia

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Cutaneous leishmaniasis (CL) poses a significant public health problem in Ethiopia. CL results in permanent scars, disability and stigma. There is an estimated incidence of 20 000 to 50 000 cases. Despite this considerable burden, data on the lived experiences of persons with cutaneous leishmaniasis in Ethiopia are lacking, in particular with respect to how individuals with CL experience their illness, its treatment, and the consequences of living with CL.

The aim of this study was to explore these lived experiences through interviews with people with CL in Kallu district, Ethiopia which is endemic for CL. 18 persons in Kallu with both active and healed CL were purposely selected for in-depth interviews. Health extension workers identified eligible participants. Interview recordings were transcribed verbatim and translated from Amharic to English for data coding. Individual sections were initially organized into a coding frame based on the interview guide using MAXQDA plus 2020. Content analysis was performed to understand lived experiences of persons with CL.

Illness experiences of persons with CL included pain, pruritus, bleeding and ulceration of the skin lesions.

Home remedies and traditional healers were the most frequently used treatment options which reflected perceptions of effectiveness, advice from affected individuals, convenience cost. Persons with CL experienced burning sensations and pain associated with treatment using home remedies and those provided by traditional healers.

The major consequences of living with CL are a perceived negative impact on body image, impaired psychological wellbeing and stigma. Individuals also reported abstaining from sexual intercourse as this was believed to worsen CL.

Individuals with CL experienced feelings of fear, sadness and worry because of the perceived disfigurement caused by CL. Fear of potential spread of the lesion and death due to CL contributed to the psychological impact. Individuals affected by CL reported a sense of reduced self-worth due to the perceived impact on appearance. Anticipated social stigma lead to individuals excluding themselves from social participation.

Illness and treatments used by individuals for CL in Kallu are both associated with physical and emotional discomfort and significant disruption to social life which extends from onset of symptoms through treatment and even after treatment.

There is a need for intervention policies and programs to promote early case detection and treatment alongside specific strategies to reduce the physical, psychological and social burden of CL. Community members appear crucial in promoting choice of care pathway and engagement with this key group could be an important strategy in guiding individuals to allopathic services. Barriers to allopathic treatment seeking, such as cost and availability, will need to be addressed.

Acknowledgments

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The funder had no role in study design, data collection and analysis.

Skin NTDs and/or integration – Keywords

Buruli ulcer, cutaneous leishmaniasis, leprosy, yaws, integration, lived experience, skin NTDs, stigma, traditional treatments

Organizing and managing a programme for self-care in leprosy

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People affected by leprosy are at increased risk of ulcers from peripheral nerve damage which can result in visible impairments, stigmatization, and economic marginalization. Literature suggests that empowering patients to self-manage their condition will help improve clinical, social, and economic outcomes in marginalized people. Self-care however does not exist independently of the broader social and political environment.

We provide an organisational framework that offers direction to health services and Non-Governmental Organisations (NGOs) who wish to promote effective self-care. We describe the systems level or organisational principles that are necessary, albeit not sufficient, conditions for the promotion of effective and acceptable self-care.

We conceptualise a three 'levels' model, or guidelines, for self-care. The first (macro) level is that of the policy and funding environment—the 'organizing authority', such as a NGO operating within a government leprosy programme. The organizing authority must set the stage by mobilising resources in terms of people, facilities, equipment and information systems. The second (meso) level involves mobility of resources to translate upstream policy into downstream action. This bridging task typically falls to 'facilitators'; people who link the organizing authority to the community. The third (micro) level involves peer leaders and individuals who are affected by leprosy who must be enabled to learn and practise self-care as part of their daily lives. These self-care guidelines were explicitly informed by modern psychological theory; co-produced with people who have experienced leprosy and those responsible for implementing guidelines; and cover not just the self-care procedures themselves, but also the organisational changes that must be put in place to support self-care in the community.

We will then describe the development and our plans for evaluation of self-care/self-help programmes across three participating countries—Nigeria, Nepal and India. These self-care interventions are supported by a set of guidelines that we have developed as part of the 'Transforming the Treatment and Prevention of Leprosy and Buruli ulcers in Low and Middle-Income Countries (LMICs)' under the Research and Innovation for Global Health Transformation (RIGHT) programme.

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Skin NTDs and/or integration – Keywords

Leprosy, disability, self-care, self-help groups, evaluation

The feasibility of using telehealth for training health care workers (HCWs) and persons with disability on integrated rehabilitation and prevention of impairments and disabilities of leprosy, lymphatic filariasis, diabetes, pressure ulcers, and other chronic wounds (TeleRPOID Project)

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The Philippines has the highest number of new leprosy cases detected in the Western Pacific Region, ranging from 1000 to 2000+ each year for the past decade. For Lymphatic filariasis (LF), 43 out of 46 filariasis-endemic provinces have eliminated LF. However, the grade 2 disabilities of these Neglected Tropical Diseases are likely to be hidden or undetected in patients who are not being monitored during and after treatment. The COVID-19 pandemic has created even greater challenges in health service access among persons affected by disabilities. Teletraining is just beginning to be adopted due to the COVID pandemic therefore a feasibility study is necessary.

This study aimed to determine the feasibility of using telehealth and distance learning in training healthcare workers and patients on the integrated rehabilitation and prevention of impairments and disabilities of leprosy, lymphatic filariasis, mycetoma, diabetes, pressure ulcers, and other chronic wounds

Selected rural health units, patients with disabilities, and their caregivers in a region, endemic for both leprosy and lymphatic filariasis were invited to the study and consent secured. Municipal health officers and leprosy coordinators were involved in conceptualizing, planning, implementation, and evaluation of the teletraining program in order to ensure its acceptability and utilization. Asynchronous and synchronous methods were used. The main reference was the "Ten Steps" guide. Training videos were developed and electronic references selected and uploaded in a Google Drive, accessed by all participants. A flash drive with these materials was also sent to each study site. One-day didactics and skills trainings were conducted through live-interactive sessions using online platforms (Zoom or Google Meet). Topics focused on nerve function assessment (for leprosy and diabetes), problems of mobility, lymphedema, wound care, and self-care. Participants were required to practice and demonstrate their skills on one patient in the community. Mentoring was done through Messenger chats. Written and video assessments of the participants' knowledge and performance were done.

The study was implemented within 4 months of 2022. Two municipalities of Sultan Kudarat province, Mindanao Island group with one rural health unit (RHU) each had participated. All participants (N=16; 8 RHU personnel and 8 village health workers) attended the synchronous skills training, 12 (75%) submitted return demo videos, and 10 (62.5%) had practicum patients. All participants rated the training as successfully attaining objectives and activities. All were generally satisfied with the teletraining because of improved knowledge and skills gained. They were willing to continue it. Efficiency, speed, quality of training, and trainers had high ratings. Teletraining was considered effective in improving the wound care of their patients. Patients were also satisfied with the home care. However, the unreliable

internet service in the study sites created difficulties during synchronous sessions and negatively affected appropriateness of teletraining. Finding patients for practicum was challenging. Some supplies were not available in local drugstores and had to be shipped from Manila, raising costs. Over-all rating of the teletraining was good. Teletraining on integrated disability prevention and care is feasible if stable internet connectivity in distant health units exists. Larger studies are recommended.

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Skin NTDs and/or integration – Keywords

leprosy, lymphatic filariasis, lymphedema, mycetoma, impairments, disabilities, wounds, telehealth, distance learning

Identifying the optimal model for integrated case detection, referral and confirmation of skin NTDs: A case study in Bong County, Liberia

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Introduction

People affected by Skin Neglected Tropical Diseases (NTDs), specifically leprosy, Buruli ulcer, yaws, and lymphatic filariasis, are likely to delay accessing health services, often leading to catastrophic physical, psycho-social and economic consequences. Global health actors have recognized that the Sustainable Development Goal for Universal Health Coverage is only achievable through integration within and outside of vertical disease control programs, integrated case detection is a critical component of this approach. This study evaluated existing approaches to case detection and referral in Liberia, utilizing the findings to develop and test an optimal model for integrated community-based case detection and referral and evaluate the efficacy of the implementation of the optimal model in improving early diagnosis of NTDs.

Methods

The study used mixed-methods, including key informant interviews, focus group discussions, participant observation, quantitative analysis and reflexive sessions to evaluate the current approaches and develop, test, and evaluate the implementation of an optimal model of case detection and referral developed based on the findings in the formative phase of the study.

Results

Based on the learnings from the formative stage an optimal model was developed that addressed five key areas that need to be in considered for an optimal model: 1) Integrated training, 2) Supportive supervision, 3) Referral process 4) Logistical support and 5) Gender equity. Within each of these areas specific activities took place. Due to the short duration of implementation the quantitative results from the testing of the optimal model are of limited utility; the annual number of cases detected increased in the twelve months of implementation in 2020 compared to 2019 (pre-intervention) but will require observation over a longer period of time to be of statistical significance. However, qualitative data revealed important factors that impact the effectiveness of integrated case detection, data emphasized the gendered dynamics in communities that shape the case identification process, such as men and women preferring to see health workers of the same gender. Furthermore, the qualitative data showed an increase in knowledge of the transmission, signs and symptoms, and management options amongst CHW which enabled them to dispel misconceptions and stigma associated with NTDs.

Discussion

Integrated case finding and referral for skin NTDs is feasible and can be very effective. However, in order to have the optimal impact it is critical to go beyond the simple co-implementation of case finding for different diseases, but instead to consider the five critical areas identified in this study: 1) Integrated training, 2) Supportive supervision, 3) Referral process 4) Logistical support and 5) Gender equity. Through the consideration of these 5 areas in the planning, budgeting and implementation of case finding, the impact will increase and cases that may have not been found will be more likely to be identified and the knowledge from integrated training more likely to be maintained within the community and health workforce. Optimal models for case detection, referral, and confirmation of suspected NTD cases rely on integrated approaches to training, supervision, referral, and remuneration embedded within existing health systems infrastructure. Together, these approaches improve access to health services, thus reducing morbidity associated with NTDs.

Conclusion

Global health stakeholders have advocated for integration to improve the success of public health interventions. NTDs interventions are becoming more integrated to maximize limited resources, improve coverage and access to healthcare services. However, documentation on the effectiveness of integrated approaches to identify and refer NTD cases in the community is very limited. The results provide evidence of the benefits of an integrated approach to case detection and referral, as well as the challenges that must be addressed programmatically to achieve the goal of improving access to health services for persons affected by NTDs.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Buruli ulcer, leprosy, yaws, lymphatic filariasis, integration, case-detection, referral, skin NTDs, NTDs, UHC

Economic evaluations of interventions for neglected tropical skin diseases: A systematic review

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Background: Neglected tropical diseases of the skin (“skin NTDs”) can lead to substantial morbidity, disability, stigma, psychological distress, and disfigurement, and can incur substantial costs. Given the scarcity of resources to address this health and economic burden, policy choices should be informed by an understanding of the efficiency and affordability of alternative approaches – including vertical and integrated strategies. Previous reviews of economic evaluations have not assessed skin NTDs holistically as a group, making it difficult to explore evidence on the economics of integration or to identify commonalities and differences across skin NTDs from an economic perspective. Further, none systematically identified and synthesized available evidence on intervention costs and costs of illness, which are important in describing the burden and assessing the affordability of interventions. We conducted a systematic review of skin NTD economic evaluations to inform current policy debates and guide future skin NTD economic evaluations.

Methods: Literature searches to identify peer-reviewed, published studies were conducted in 13 electronic databases (plus review of reviews) using a pre-defined strategy to identify full economic evaluations (cost-effectiveness, cost-utility, cost-benefit, or cost-consequences analyses) and cost analyses (intervention costing, cost-of-illness/economic burden) published between Jan 2000 and April 2022 (inclusive) for 11 skin NTDs: Buruli ulcer (BU), cutaneous leishmaniasis (CL), post-kala-azar dermal leishmaniasis (PKDL), leprosy, yaws, lymphatic filariasis (LF), onchocerciasis, mycetoma, scabies, chromoblastomycosis and sporotrichosis. 4 reviewers working in pairs independently screened records based on pre-defined eligibility criteria. Included records were categorised by disease, country, intervention and economic evaluation types. Detailed data were extracted from studies of full economic evaluations to describe methods and results and to assess methodological quality based on standard checklists and guidelines. Findings are reported in accordance with PRISMA guidelines. Data were analysed using descriptive statistics complemented by narrative synthesis.

Results: 3723 records were identified, of which 3491 were excluded following deduplication (591), title and screening(2900), and 105 were excluded following full-text review. The 127 included economic evaluations comprised 34 (27%) full economic evaluations, 60 (47%) intervention cost (only) studies, and 33 (26%) cost-of-illness or economic burden studies. LF was most studied (n=47), followed by CL (n=29), onchocerciasis (n=27), leprosy (n=18), BU (n=9), scabies (n=9), PKDL (n=1), and yaws (n=1); 11 (9%) evaluated ≥2 diseases and 3 evaluated ≥4 diseases. Most evaluations studied countries in Africa (n=50, 38%) or Asia (n=45, 34%). Of the 34 full economic evaluations, many were of low methodological quality.

Discussion: These analyses support efforts to compare the affordability and efficiency of investing in different skin NTD interventions both with each other and with other health priorities. Cost studies predominate and cost-effectiveness and cost-utility analyses remain relatively scarce. We found skin NTD economic evaluations to be of inconsistent quality and usually focused on individual diseases, which limits their usefulness for priority-setting. Nonetheless, important commonalities and differences emerged across skin NTDs. Future economic evaluations should draw on existing evidence where possible, while ensuring adherence to methodological standards, to ensure results can be used. Economic evaluation of integrated strategies remains an important gap.

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Skin NTDs and/or integration – Keywords

Buruli ulcer, cutaneous leishmaniasis, post-kala-azar dermal leishmaniasis, leprosy, yaws, lymphatic filariasis, onchocerciasis, mycetoma, scabies, chromoblastomycosis and sporotrichosis, integration

Prevalence of Skin Neglected Tropical Diseases and skin infections among slum population in urban communities of Mumbai: Preliminary observations

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Background

Skin Neglected Tropical Diseases (Skin NTDs) can lead to reduced quality of life in the affected individuals because of change in appearance, functional impairment, discrimination and stigmatization. Urban communities living in slums are at more risk of skin NTDs, which includes leprosy, due to several factors such as low socio-economic status, high density of population, malnutrition, poor hygiene and climatic conditions like humidity in Mumbai. In addition, several other skin diseases such as superficial dermatomycosis, parasitic and bacterial skin infections and tropical ulcers that are not formally recognized by WHO as NTDs also contribute to the skin disease burden in urban communities.

Integration of these skin NTDs into the public health agenda has been a priority in global health. However current data on the prevalence, distribution, and disease burden of the skin NTDs in urban settings from a community perspective is lacking and needs to be studied. The objective of this study was to evaluate the prevalence of skin NTDs among the slum population in one of the biggest slums in Dharavi, Mumbai.

Methods

This was a cross sectional investigation that was undertaken in December 2022. About 5,000 families from seven locations of Dharavi slum in Mumbai were purposively selected as study population who were not screened for detection of leprosy and other skin NTDs in the past 3 years.

A total of 14,990 (71.2%) out of 21,064 individuals enumerated were screened for detection of skin NTDs using pictorial pocket card and atlas by 12 trained external monitors during a 10-day special drive. The external monitors included trained paramedical staff and trained community health volunteers of leprosy and were given additional task-oriented training to identify leprosy and skin NTDs and skin diseases such as superficial dermatomycosis, parasitic infestations such as scabies, vitiligo and daily reporting using the mobile app prior to the drive. During the screening activity, 3 people with leprosy cured and having physical disabilities and 12 people with other skin infections, mostly scabies and superficial dermatomycosis was detected by active search. The prevalence of skin NTDs was 0.1% in slum population of Mumbai. Daily reporting was done using the mobile app.

Observations

This study shows that the prevalence of skin NTDs is lower among the slum population in urban communities of Mumbai. Scabies and superficial fungal infections were the most prevalent skin infections and may warrant MDA with Ivermectin. Such community-based studies in a larger population are necessary to ascertain the magnitude of skin NTDs and superficial dermatomycosis and other skin diseases in order to plan and implement community-based approach and strategies.

Systematic mapping of people with skin NTDs can also support development of new knowledge around integrated approaches to screen and manage skin NTDs in urban settings thereby accelerating the targets to achieve elimination of NTDs by 2030.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Skin NTDs, integration, prevalence, urban communities, leprosy, scabies

Scabies in Nampula, interventions are needed: An Impact of the PEP4LEP skin camp activities

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Introduction

The PEP4LEP project compares the feasibility and cost-effectiveness of two different leprosy preventive interventions using single dose rifampicin as post-exposure prophylaxis (SDR-PEP)). A community-based intervention (the so-called skin camps) and a health facility-based intervention. The goal is to advise the Ministry of Health about the most feasible intervention. During the skin camps, community contacts of a leprosy patient are invited for skin examination and if they are eligible, to take SDR-PEP. Considering the presence of stigma and to gain a big impact, not only household contact, but also community members (the 100 community contacts or 20 households living near a leprosy index patient) are invited for skin examination and treatment. Preliminary results show that many new cases of scabies are found among the community members. Therefore, our objective is to share the results of the new cases of scabies found during the skin camps in various communities in the district of Mogovolas and what the NTD program at the provincial level is doing to solve this problem.

Methods

The project staff set up a 1-2 day skin camp in a village and invite community members to participate. Health workers will be trained on leprosy detection and follow up, and recognition of other skin diseases. Volunteers are trained to invite the contacts of leprosy patient to attend the skin camp in their community, without sharing the disease status of this index patient. During the skin camp, all community members will be screened and receive treatment. A dermatologist will be present (a very rare professional to have at community level) to confirm leprosy diagnosis and to diagnose, treat and/or refer contacts with other skin diseases.

Results

The skin camps were a great success as the number of participants attending the skin camps exceeded the targeted 100 contacts per skin camp. Most of them were not invited (skin camps are designed for approximately the 100 participants whom are most at risk on developing leprosy). Preliminary results show that 310 new scabies cases were diagnosed in 4 skin camps. The results will be shared and discussed with the NTD program (results will follow).

Discussion

Considering the maximum number of participants, priority was given to those who received invitation cards. The number of people attending the skin camp was higher than the health workers, resulting in long days and no breaks for health workers. The availability of medicines for other skin diseases was a challenge, particularly for scabies, as it was not found within the health system, neither in the private pharmacies.

Conclusions

PEP4LEP skin camps contribute to finding new scabies cases in communities. Health authorities should be alarmed (and provide medicines) to overcome this situation.

Acknowledgments

We would like to acknowledge all patients, community members, health workers and PEP4LEP consortium members who participated in the PEP4LEP project. This project was funded by the EDCTP2 program supported by the European Union (grant number RIA2017NIM-1839-PEP4LEP). The project also received funding from the Leprosy Research Initiative (LRI; www.leprosyresearch.org; grant number 707.19.58). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the abstract.

Skin NTDs and/or integration – Keywords

Skin camps, early diagnosis, leprosy, scabies, integrated approach

Session 9 : Operational research – Other abstracts

Barriers to cutaneous leishmaniasis prevention and management in northern Ethiopia: An ethnography study

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One of the neglected tropical skin disease that can be found in Tigray, northern Ethiopia, is cutaneous leishmaniasis (CL). They are frequently linked to endemic areas with poor access to medical treatment. This study's goal is to investigate potential factors that influence CL management and prevention in Tigray's Primary healthcare facilities.

A six-month site-specific qualitative study employing rapid ethnographic methods was conducted to meet this objective, and theme content analysis was used to create a coding framework. With CL patients, caregivers, healthcare professionals, traditional healers, and community leaders, semi-structured interviews, focused group discussions, and participatory observations (n = 33, 3, and numerous, respectively) were done.

Barriers at the individual, community, and system levels of the health system are three things that were discovered to have an effect on CL's community's access to healthcare. Individual barriers included knowledge, financial limitations, and delays for diagnosis and treatment. At the communal level, impediments like poverty, stigma, and disease perception exist. At the level of the health system, barriers include lack of access, poor health professionals' knowledge and abilities, a lack of medicines and supplies, poor data management, constrained finances, a lack of program support for cutaneous leishmaniasis, and a lack of CL care. This study identified a number of challenges, including inadequate surveillance in endemic areas, a lack of access to CL care, and information gaps. Diagnoses and treatments are also limited by the existing national standards for CL prevention and control. Cultural barriers that influence the attitudes and deeds of community and health workers were also discovered.

Although there are several factors that affect CL management, the most significant one is that disadvantaged people cannot easily receive CL diagnosis and treatment, and both the general public and healthcare professionals lack adequate knowledge of the disease.

Acknowledgments

I would like to express my deepest appreciation to study participants, Mekelle University and ECLIPSE project (Funded by National Institute for Health Research_NIHR and UK aid)

Skin NTDs and/or integration – Keywords

Cutaneous leishmaniasis, primary health care, neglected skin disease, Tigray

The roles of Toll-Like Receptors (TLRs) cytokines and opioid receptors in prevention and treatment of cutaneous leishmaniasis

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Introduction

Toll-Like Receptors (TLRs) and cytokines play key roles in infection control**.** They also enhance phagocytosis and killing of parasites. Morphine can modify host immunity and defense against infectious diseases. The opioid receptors share functional mechanisms and intracellular signals.

Methods

In this study, we assessed Therapeutic and preventive effects of morphine against *Leishmania major* and then we evaluated the expression of TLRs**,** pro and anti-inflamatory cytokines and opioid receptors (Kappa κ, Delta δ and Mu μ) in both healthy macrophages and those infected with *Leishmania major* in vitro and in BALB/c mice. The treatment carried out with morphine and glucantime. The expression of TLRs**,** cytokines and opioid receptors evaluated by real time PCR.

Results

Morphine showed preventive effect and no lesions were observed in the group that was taken morphine before being challenged with promastigotes. TLR2 expression decreased in drug-treated healthy macrophages, whereas TLR4 expression increased. TLR7 expression decreased in healthy macrophages. TLR9 expression was the highest in the groups treated with morphine in infected macrophages. Our findings revealed that healthy macrophages produce higher TNFα and lower IL6; the infected macrophages show a reverse pattern by producing higher IL6 and lower TNFα. We found that treatment with morphine strengthen defensive reactions against leishmaniasis. In mouse macrophages, the highest level of TLR9 expression was induced by morphine.

Discussion

The results showed that morphine at all concentrations and glucantime increased the expression of receptors, which was significant in all of these groups compared with control group ($P < 0.05$). In healthy parasitic-infected macrophages and in peritoneal macrophages isolated from healthy and parasitic mice under treatment with morphine, expression was increased in all opioid receptors, the highest expression of mu (μ) receptors was observed in peritoneal macrophages isolated from infected mice treated with morphine and fold change equal to 32.29.

Conclusion

TLR7&9 has critical role for recognition and control of microbial infection. No lesions were developed in mice treated with morphine before challenge which suggests a protective role for morphine in leishmaniasis. The positive role of morphine in decreasing IL-10 expression and increasing the expression of inflammatory cytokines such as TNF-α and therefore its preventing role in Leishmania disease.

Acknowledgments

This research funded by Tarbiat Modares University.

Skin NTDs and/or integration – Keywords

Morphine, Glucantime, *Leishmania major*, preventive effect, therapeutic effect, TLRs, cytokines, opioid receptors.

Applying community health systems lenses to identify determinants of access to surgery among mobile & migrant populations with hydrocele in Zambia

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Participatory Research and Innovations Management, Lusaka, Zambia.

Introduction

Hydrocele which is caused by long term lymphatic filariasis infection can be treated through the provision of surgery. Access to surgeries remains low particularly for hard to reach populations. This study applied community health system (CHS) lenses to identify determinants to the adoption, implementation and integration of hydrocele surgeries among migrants &mobile populations in Luangwa District, Zambia. The CHS has four main lenses; the *programmatic lens* views CHS as a continuum between primary health care systems and the CHS itself within a bound geographical space with a set of actors, populations and programmes based on existing policies and plans. The *Relational lens* is interested in the actors, their formal or informal relationships and the flow of power within communities. The *collective action* lens examines the mechanisms and processes that enable the different actors to mobilize, collaborate and act collectively on health. The *critical lens* maps power relations by assessing ideas, interests and institutions and their interplay in the delivery of health services

Methods

A concurrent mixed methods design consisting of cross-sectional survey with hydrocele patients (n=438) and in-depth interviews with different community actors (n=38) was conducted in October 2021. Data analysis was based on the relational and programmatic lenses of Community Health Systems.

Results

Under the *Programmatic lens,* insufficient resources resulted in most health facilities being incapable of providing the minimum package of care for lymphatic filariasis. The absence of cross border collaborative structures limits the continuity of care for patients moving across the three countries. patients who had small hydroceles to delay accessing care until their condition has progressed significantly, and the pain became unbearable. Language barriers especially for fishermen, farmers and migrants from Mozambique who spoke Portuguese affected the extent to which they could communicate with health providers and community health workers. Direct and indirect costs associated with utilizing the surgery were a key impediment to 46% of the survey participants of whom 72.3% were not able to cover the costs at all. In the *relational lens*, Community leaders used their respected positions to champion for the interventions and spoke publicly in different fora about the disease and the value of the surgery thereby challenging the secrecy surrounding discussions of hydrocele. Nevertheless, the level of engagement of traditional leaders and religious leaders was quite low and their engagement presents a potential avenue to improve access. Patients were rarely included in planning, implementation or evaluation of hydrocele services. The absence of patient groups in the district presents an opportunity to enhance patient engagement. For fishing populations, fishing associations who were currently not being engaged in service delivery, represented another opportunity for harnessing the *power within*. Some patients utilized their *power within to* act as champions for the surgery.

Conclusions

Community health systems provide a potential avenue through which access amongst mobile and migrant populations can be enhanced through strategies such engagement of patient groups, knowledge sharing across borders and use of community monitoring initiatives.

Acknowledgments

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Skin NTDs and/or integration – Keywords

Lymphatic filariasis

Barriers and facilitators to improve care for individuals and communities affected by skin NTDs

Authors: Multiple authors drawn from the NIHR-funded PROSPER Network

Affiliations:

Multiple authors drawn from the NIHR-funded PROSPER Network with a total funding portfolio of more than £20 million between 2019 - 2024 .
Speakers will be drawn from:
SHARP - https://www.lshtm.ac.uk/research/centres-projects-groups/sharp
ECLIPSE - https://www.eclipse-community.com/
5S - https://www.bsms.ac.uk/research/global-health-and-infection/nihr-5s-foundation/nihr-5s-foundation.aspx
REDRESS - https://www.redressliberia.org/
UoB RIGHT - https://www.birmingham.ac.uk/research/applied-health/research/nihr-right-leprosy/index.aspx

Barriers to quality of care for individuals with skin-NTDs exist at every level of the care pathway. Addressing these barriers requires working with stakeholders including affected individuals, communities, informal health providers, health workers and district and national NTD programmes.

A multi-disciplinary approach has been used by the consortia of the PROSPER network funded by the United Kingdom (UK) NIHR Research and Innovation for Global Health Transformation. The PROSPER network is an association of five collaborative research consortia in Brazil, Ethiopia, India, Ghana, Liberia, Nepal, Nigeria, Sri Lanka and the UK The work spans Buruli ulcer, cutaneous leishmaniasis, leprosy, lymphatic filariasis, onchocerciasis mycetoma, podoconiosis, scabies and yaws.

The large scope and trans-disciplinary nature of the PROSPER network has allowed us to examine and contrast strategies for engaging with key stakeholders, together with key findings to better understand and address context-specific barriers to care. In this joint presentation we will present cross-cutting findings from the PROSPER network focused on strategies for engaging key stakeholders in order to understand and address barriers to care. Community engagement and the involvement of affected individuals and their family members is central to the approaches adopted by the five consortia. Case studies from each consortium of the network will be used to show the value of applying multi-disciplinary approaches including anthropology, social science, health economics, biomedical and health systems – at multiple levels to tackle these issues.

Consistent themes across our work include issues related to conceptual understandings of disease, internal and experienced stigma, mental wellbeing, the financial burden of skin NTDs for both affected individuals and the health system, and an important lack of health system readiness to deliver accessible, sustainable, effective, integrated services for skin NTDs.

Our findings provide important insight around context-specific challenges and opportunities to improve care for individuals and communities affected by skin NTDs, including how a ‘one size fits all’ approach may prove ineffective. Our findings emphasize how health systems should actively forge partnerships within affected communities for effective programme delivery. Involving internal and external stakeholders in the design, implementation and evaluation of skin-NTD care services, for example, can be key to ensuring strategies address local social, economic, and environmental barriers and meets community needs.

Acknowledgments

NIHR

Skin NTDs and/or integration – Keywords

Buruli ulcer, cutaneous leishmaniasis, leprosy, lymphatic filariasis (lymphoedema and hydrocele), onchocerciasis, podoconiosis, mycetoma, scabies, yaws

Abstracts from WHO Regional Offices

Status of skin NTDs in the African Region

Status of skin NTDs is a subset of neglected tropical diseases with skin manifestations that impair, disable and disfigure and may lead to stigmatization, discrimination and socioeconomic problems. More than half of the 20 NTDs that present with skin manifestations making skin NTDs significant public health problems requiring combination or integration of activities wherever possible in order to optimize use of resources (financial or staff), strengthening surveillance, stigma reduction and public awareness for their prevention. Most of the skin NTDs are co-endemic in Africa with variable level of endemicity and level of control, elimination and eradication interventions in the member states.

Main diseases

Skin NTDs endemic in the African region include **Buruli ulcer, cutaneous leishmaniasis, mycetoma, chromoblastomycosis and other deep mycoses, leprosy, lymphatic filariasis, onchocerciasis, post-kala-azar dermal leishmaniasis, scabies and other ectoparasitoses including tungiasis and yaws.**

Activities

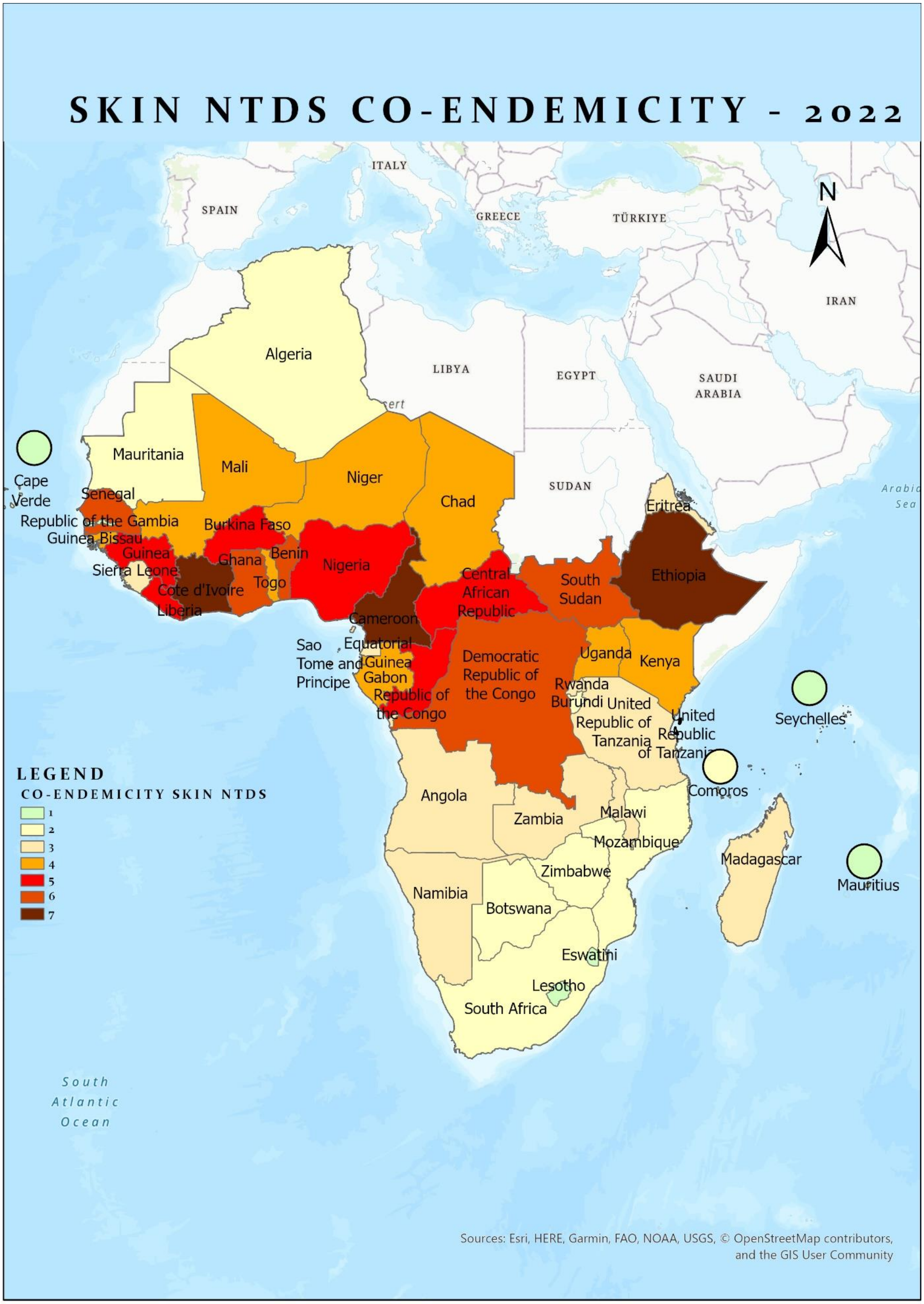
Ongoing activities for the control, elimination and eradication of skin NTDs include integrated skin NTD Framework to be addressed in the National NTD integrated masterplan, strengthen integrated skin NTD implementation, active case detection and case management, supporting the monitoring and evaluation of projects and programmes at national level, capacity building of health care providers, strengthen partnership and coordination.

Challenges

The true burden of skin NTDs is not well known in the African region affecting implementation. Lack of resources (funding, trained human resource), lack of proper tool for case detection and treatment, inadequate information on disease burden and distribution, absent or weak level of integration

Way forward

Implementation of the strategic framework for integrated skin NTDs through people-centred approach, improved country ownership, disease mapping, strengthen the surveillance system, improve access to services, advocacy for funding and donation of drugs and diagnostics, strengthen health system, research and development, use of available technologies including AI and comprehensive and continuum of care including mental health care.



Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

Status of skin NTDs in the Americas

Leprosy

Until 2019, the leprosy situation on the Americas showed a trend towards a slow but steady decrease throughout the years. Between 2005 and 2019 there was a decrease of 28% in the number of new cases detected, from 41 780 to 29 936. A slight increase occurred in the years 2017, 2018 and 2019. In 2019, All the countries reported a prevalence rate of less than one case per 10 000 populations, except for Brazil.

The COVID-19 pandemic struck early in 2020 and greatly impacted the countries all over the Americas region. This had important consequences on all public health programs, including the national leprosy control programs, as most, if not all, of the programs partially or totally suspended their activities in order to protect the communities, the health care professionals and the health care workers. Community-based activities were halted at least temporarily, and patients stopped seeking medical care because of fear of COVID-19. Financial and human resources from the national public heath surveillance programs, including the leprosy control programs, were, understandably, reallocated to support the response to the COVID-19 pandemic.

Therefore, all the leprosy indicators throughout the region were impacted. Table 1shows the behavior of the most important leprosy indicators in the period 2017 to 2021. Please note the sharp decline in all of them, including the total number of new cases detected, from 30 153 in 2019 to 19 195 in 2020, a 36.3 % reduction, and in the number of cases registered for treatment at the end of the year, from 35 557 to 25 786, a 27.5% reduction. There was only a slight increase in the number of new cases detected in 2021, to 19 826 (631 more cases), while the number of cases registered for treatment dropped to 25 053 (733 less cases).

Table 1. Main Leprosy Indicators in the Americas Region in the five-year period 2017 to 2021.

	Year				
Indicator	**2017**	**2018**	**2019**	**2020**	**2021**
New cases detected	29 101	20 957	29 936	19 195	19 826
Cases registered for treatment at end of the year	31 527	34 538	35 231	25 786	25 053
New cases in children under 15 year	NA	1 781	1 612	904	817
New cases with G2D	2 149	2 324	2 544	1 609	1 862
New cases in children with G2D	NA	41	51	37	31

The adverse impact of the pandemic on the leprosy programs could have serious consequences for the patients, including delayed diagnosis, delayed treatment, delayed diagnosis and management of leprosy reactions, increased possibility of developing permanent disability and disfigurement, and all the adverse psychological, social and economic consequences.

Cutaneous and mucosal leishmaniasis

In 2021, 37 786 cases were reported in the Region, the lowest number in the period 2001-2021. This is due to a gradual trend towards a reduction in case numbers starting in 2005. In 2021, although the number of cases decreased in some countries, other countries showed significant increases when compared to 2020. These countries experienced the following increases: Argentina (85%), Mexico (60.5%), Panama (37.1%), and El Salvador (28.2%). The regional incidence in 2021 was 16.54 cases per 100 000 population, the lowest rate recorded in recent years. The countries with the highest incidence rates per 100 000 population were Suriname (200.3), Panama (42.8), Bolivia (35.8), Peru (35.4), and Guatemala (33.9). Those with the lowest rates were Guyana (0.8), Paraguay (2.6), Mexico (6.2), Argentina (6.9), and Venezuela (8.8). Figure 1 shows the incidence pf both cutaneous leishmaniasis in the Americas, 2021, based on the data reported by national leishmaniasis control programs and surveillance services.

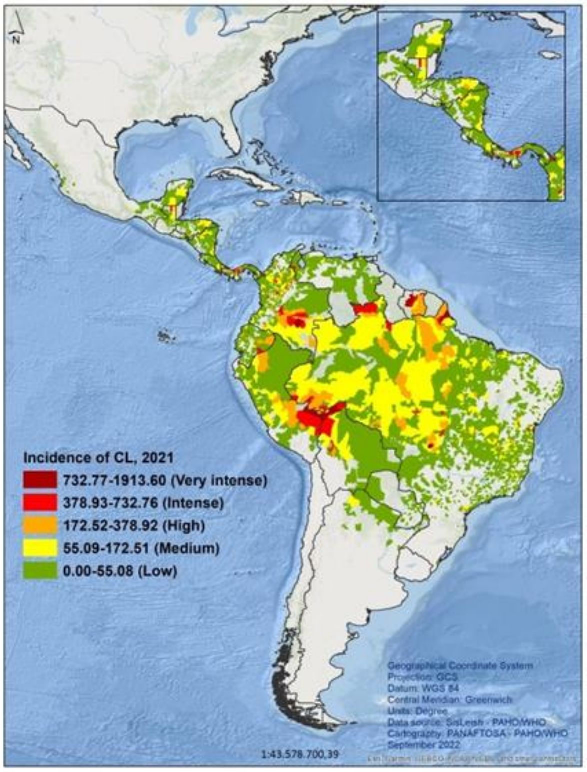


Figure 1. Incidence of cutaneous leishmaniasis per 100 000 population, second subnational administrative level, Region of the Americas,

Source: *Pan American Health Organization. Leishmaniases. Epidemiological Report on the Region of the Americas Washington, DC: PAHO; December 2022 [accessed 20 March 2023].*

Onchocerciasis

Onchocerciasis transmission occurred in the Americas Region in 12 foci in 6 countries, Brazil, Colombia, Ecuador, Guatemala, Mexico and Venezuela. The Onchocerciasis Elimination Program for the Americas (OEPA) started in 1992 with the goal of eliminating morbidity and transmission. The strategy was to provide bi-annual treatments to all the eligible population with ivermectin with a coverage of ≥ 85% of the treatment at least twice a year. WHO verified the elimination of onchocerciasis transmission in 4 countries: Colombia (2013), Ecuador (2014), Mexico (2015) and Guatemala (2016). Venezuela's Ministry of Health announced the elimination of transmission in 2 of its 3 transmission foci.

In 2021, the 538 517 inhabitants of formerly endemic areas represented a 94% reduction in the original regional population at risk for onchocerciasis. The remaining 6% (35 518 individuals) live in the Yanomami focus area (YFA), a Brazil–Venezuela cross-border transmission zone named for the nomadic indigenous people. The YFA consists of the contiguous Brazilian Amazonas focus and the Venezuelan South focus, comprising 654 communities scattered over approximately 230 000 km2 of Amazon savannah and rainforest. Despite significant progress, because of both geographical and cultural barriers, the YFA poses a great challenge for the achievement of the regional elimination in the Americas.

Source: *World Health Organization. (2022). Progress in eliminating onchocerciasis in the WHO Region of the Americas: Advances in reaching the last endemic communities of the South Focus in the Bolivarian Republic of Venezuela Weekly*

Epidemiological Record, 97 (39), 481 - 484. World Health Organization. https://apps.who.int/iris/handle/10665/363331

Lymphatic filariasis

The Region of the Americas is on track to reach the LF elimination goal. Of the seven countries considered endemic for LF transmission, three were removed from the WHO list in the year 2011 (Costa Rica, Suriname, Trinidad & Tobago). The four remaining countries (Brazil, Dominican Republic, Guyana, Haiti) achieved important progress during the last years, as follows:

Brazil is the first country in the Americas to stop MDA nationally and to establish post-MDA surveillance. The last TAS will be conducted in Jaboatão dos Guararapes, Recife in 2023. The country is planning to finish the dossier in 2023 to submit it to the Regional Program Review Group (RPRG).

Dominican Republic stopped MDA in all LF endemic foci. La Ciénaga and Southwest passed TAS3 and the Eastern focus passed TAS1.

Guyana introduced renovated approaches and tools, including microplanning, communication strategies, supervision tools, among others, and achieved effective coverages in MDA2017 and 2018. In 2019 the country scaled up the treatment for 100% of the geographical region and introduced in the Ivermectin in the MDA changing from DA (DEC and Albendazole) to IDA (Ivermectin, DEC and Albendazole). In 2023, the country performed the IDA impact survey to define the interruption of the massive administration of medication. This alternative medication regimen using IDA offers new opportunities to Guyana in order to achieve LF elimination by the year 2026.

Haiti passed TAS in more than 80% of endemic communes. Only 22 communes remain endemic, most of them in urban areas, highlighting the importance of achieving effective coverage to progress towards the LF elimination goal. The experience of MDA-2018 and 2019 using microplanning, reinforcing social communication and supervision, improved the outcome of the campaign and opens up new opportunities to move forwards the LF elimination goal.

Morbidity management still the main challenge in the Region of the Americas. While all 4 countries have submitted some information on MMDP, the burden of the disease is underestimated and the reported availability of MMDP care in IUs with known patients in the Region is 3% (4 of 117).

Given the progress in the Latin American and Caribbean (LAC), the population requiring MDA in the LAC region has decreased by 12.9 million (67% reduction). To go forward during this last track of the elimination path, new approaches were developed in the Americas to improve the outcomes of MDAs, such as microplanning tools, combined strategies to improve communication and social mobilization, drug coverage monitoring and rapid assessment of MDA coverages, among others.

Tungiasis

In 2021, PAHO/WHO organized a formal consultation meeting on tungiasis, the result of this meeting was published and is available online[9].

The article on the epidemiological situation of tungiasis in the Americas was published in the second half of 2022[10]. In October 2022, a meeting was held to document the actions to control and prevent tungiasis in Brazil and Colombia, the report of this meeting will be published soon. In the same year, an internal interprogrammatic group was formed at PAHO to support actions to control the disease in the Americas, with the participation of the NID, entomology in health and PANAFTOSA team.

In 2023, we purchased 1000 vials of NYDA that were donated to Brazil and Colombia, with a focus on treating cases in indigenous populations. A NYDA surplus is available and that will be distributed as needed in other countries. Operative guidelines are being developed for tungiasis control in the Americas. After the draft is ready, we will consult with experts to verify the documents. A treatment guideline for the disease based on the GRADE methodology is being developed and is expected to be published in the second half of 2024.

Yaws

A systematic review on yaws in the Americas was published in 2019[11].

In early March 2023, a regional meeting was held with 13 countries in order to present the current recommendations on strategies to interrupt yaws transmission and identify the main actions to be completed to progress towards confirming the interruption of transmission in the Region of the Americas.

Scabies

In May 2022, the first regional meeting on scabies was held with the aim of presenting the current knowledge and gaps at the global and regional levels and exploring opportunities for collaboration between the countries of the Region of the Americas, IACS, and PAHO/WHO.

Training to carry out the integrated rapid mapping of Skin NTDs is planned.

Other skin NTDs

The regional burden and risk factors for mycetoma, chromoblastomycosis and sporotrichosis are partially known in the America region, but further mapping needs to be done the distribution and burden of disease and identify their risk factors. Based on this information, a regional strategy for their prevention and control could be developed.

Podoconiosis has not been detected in the Americas region and only sporadic cases of Buruli ulcer are reported.

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[9] https://www.who.int/publications/i/item/9789240054400

[10] https://www.paho.org/en/documents/current-status-knowledge-epidemiology-tungiasis-americas

[11] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6405159/

Status of skin NTDs in the Eastern Mediterranean Region

In EMR the prevalent skin NTDs are cutaneous leishmaniasis, mycetoma, chromoblastomycosis and other deep mycoses, leprosy, lymphatic filariasis, onchocerciasis, post-kala-azar dermal leishmaniasis, and scabies.

EMR has the highest global burden of cutaneous leishmaniasis, accounting for more than 75% of the global burden annually. Out of 22 countries 18 countries are endemic for this disease[1]. Five countries in the region, i.e. Afghanistan, Iraq, Iran, Pakistan and Syria reported 93% of the cases in 2021. The highest number of cases in 2021 was reported from Syria accounting to 78,2312[2]. Since 2009, countries have varying trends in case reporting and none of the countries demonstrated progressively declining trend. Most of the endemic countries do not have adequate capacity at healthcare delivery system for effective case management. Apart from Iraq, CL high burden countries in the region use both treatment options, chemotherapy and physical treatment.

All countries have eliminated leprosy as a public health problem except Somalia. Five countries, i.e. Egypt, Pakistan, Somalia, Sudan, and Yemen report more than 90% of leprosy cases annually[1]. All the countries in the region have adopted 3-drug regimen recommended by WHO in 2018. Egypt, Pakistan and Yemen conduct contact screening of the index case. However, none of the countries provide single dose rifampicin prophylaxis due to unavailability of the medicine at country level.

Lymphatic filariasis is endemic in Egypt, Sudan and Yemen. Egypt and Yemen have eliminated the disease as a public health problem. Sudan is the only country in EMR conducting mass drug administration to eliminate the disease.

Onchocerciasis is endemic in Sudan and Yemen. Sudan has four endemic foci, currently two foci need intervention for 176,353 with mass drug administration. In Yemen it is estimated that 763,881 people require preventive chemotherapy[2]. Yemen has started conducting partial mass drug administration since 1992. In the recent years health staff managing oncho-dermatitis observed a significant reduction of the cases[6].

In spite of having a high burden of visceral leishmaniasis in Sudan, Somalia and Yemen, data on post-kala-azar dermal leishmaniasis is minimal. Only Sudan reports PKDL cases and it is not comprehensive[4]. Sudan reported that skin lesions heal spontaneously in nearly 85% of patients, and persist in 15% of patients requiring medical treatment with antimonials[5].

Mycetoma data has been reported to EMRO by Iran, Libya, Qatar, Sudan, Saudi Arabia and UAE[3]. The data reporting has not been consistent. Among the countries which reported data on mycetoma Sudan had been reporting the highest number of cases since 2015. Saudi Arabia reported cases only in 2015, other countries had reported zero case. Eventhough Yemen, Somalia, Pakistan and Djibouti do not report cases the disease is endemic there[5] .

Scabies is prevalent in many countries in EMR[5]. Recognizing the burden of disease and the risk of long-term sequelae control strategies must be integrated with existing activities in order to facilitate rapid, cost-effective uptake of the strategy.

Many countries in EMR are taking initiatives to integrate skin-NTD case management into all levels of healthcare delivery system. Pakistan has integrated cutaneous leishmaniasis and leprosy case management. Sudan having a large burden of skin-NTDs, provides integrated case management for most of the skin-NTDs. Yemen also has integrated skin-NTD management for leprosy, lymphatic filariasis and onchocerciasis.

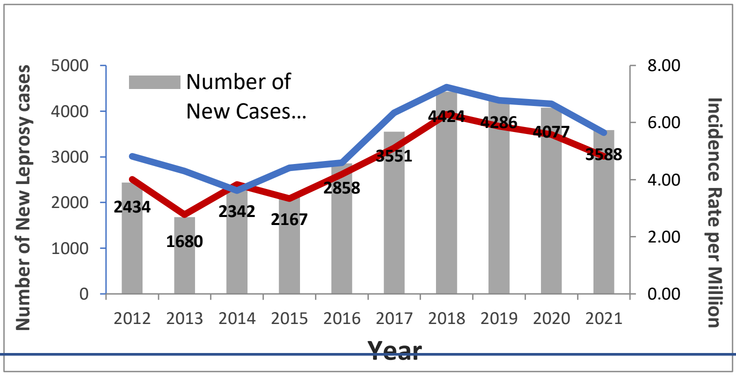
Many challenges hinder the prevention, control and elimination of skin-NTDs, specially for skin-NTDs that are amenable to individual case management. Lack of capacity in the health workforce to provide effective care, global scarcity of medicines, vertical approach of disease control programmes and inadequate donor support are some of the challenges perceive in EMR.

EMR Leprosy profile

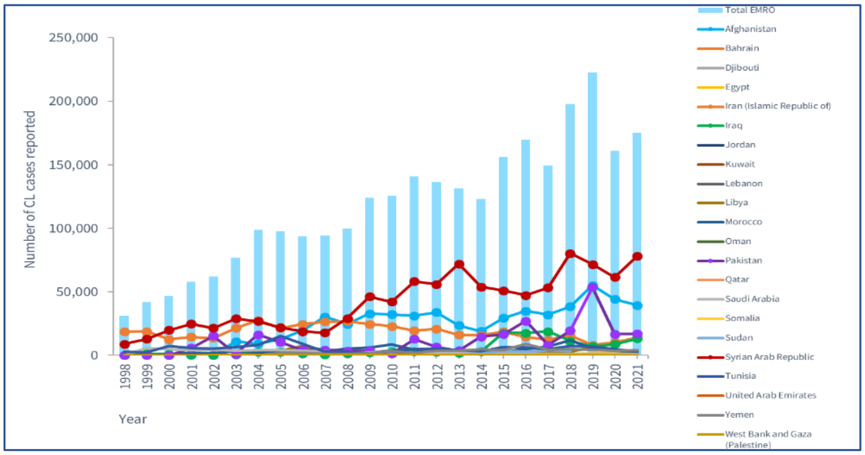
5.6% New Children Cases

39.7% New Female Cases

5.9% New G2D Cases



EMR cutaneous leishmaniasis trends



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Status of skin NTDs in the South-East Asia Region

Skin-related neglected tropical diseases, or “skin NTDs”, are historically neglected because active case detection, individual case management, significant resources and intensive effort are required to control, eliminate, and eradicate them. At least ten of the diseases included in WHO’s list of NTDs present with changes on the skin before other changes occur in the internal organs or physical disabilities develop. There are co-endemicity of skin NTDs in South-East Asia Region with varied degree of integration and different stages for mapping, interventions, post-intervention and post-elimination.

Key skin NTDs

South-East Asia Region is the place where the largest burden of both leprosy and lymphatic filariasis can be seen with significant co-endemicity. Moreover, cutaneous leishmaniasis and post-kala-azar Dermal Leishmaniasis are endemic in the Region, but still need to explore their true burden. In addition, scabies, mycetoma, chromoblastomycosis, and other deep mycosis are yet to be mapped for their endemicity.

Yaws is currently endemic in Indonesia and Timor-Leste is in the last mile of eliminating it. India declared yaws free since 2016 and now in the post-elimination stage.

Activities

In South-east Asia Region, the number of countries having eliminated at least one NTD is 6 out of 11 member states including lymphatic filariasis and yaws.

National Kala-azar Elimination Programme (NKEP), Bangladesh, in collaboration with other NTD national programmes and with support from WHO, developed capacity of front-line health workers on integrated skin NTD approach at Modhupur and Mirzapur upazilas of Tangail district where both leprosy and Kala-azar are endemic. After the training, the upazilas piloted integrated skin NTD approach at hospital OPD and community to understand the challenges of implementation of the integrated skin NTD approach.

Regional toolkit on skin NTDs is being developed to strengthen health system capacity on case detection, diagnosis, and response, composed of a booklet and a simple flipbook on skin NTDs and common dermatoses in the Region to guide primary health care workers.

The Region is facilitating integrated community-based surveys including skin NTDs wherever possible. Recent years, Timor-Leste has shown the best practice of integrated approach by screening skin diseases of scabies and yaws among first- and second-year primary school students during Transmission Assessment Surveys of LF.

The Region organized the regional workshop on lymphatic filariasis management and disability prevention in close collaboration with Government T.D. Medical College, Alappuzha, Kerala, India during 2019 and observed good progress in the member states. Thus, similar workshop is being planned within this year, 2023.

Challenges

As mentioned earlier, some skin NTDs like scabies and mycetoma were neglected even among NTDs. It is an important issue to understand true burden of them. Varying degree of the integration of skin NTDs themselves and mainstreaming of them into national health care system is another big challenge. Advocacy for strong political commitment to put skin NTDs in the prioritized list is still needed. Deficient of funding and skilled human workforce is old culprit for many public health interventions as well as for skin NTDs.

Way forward

Co-endemicity would be mapped for better targeting of integrated skin NTDs intervention.

True burden of selected skin NTDs would be explored through burden estimation exercises or piggybacking on existing platform such as TAS.

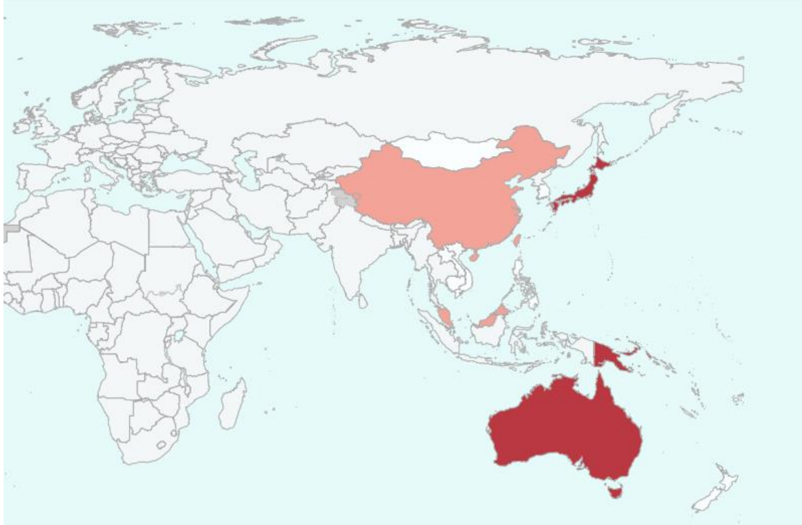
The health work workers of the Region will be trained through regional tool kit on skin NTDs.

Advocacy for strong political commitment will be done through High-level Regional NTD meeting.

Status of skin NTDs in the Western Pacific Region

WHO's Western Pacific Region is endemic to seven skin NTDs including Buruli Ulcer, Cutaneous Leishmaniasis, Leprosy, Lymphatic Filariasis, Scabies, and Yaws.

Only three countries are currently endemic for Buruli Ulcer (BU) – Australia, Japan, and Papua New Guinea. Three countries, including China, Kiribati, and Malaysia were previously endemic for Buruli Ulcer and where the current status is not fully known. Majority of the cases are reported from Australia (308 cases reported in 2019) followed by PNG (11 cases), and Japan (3 cases) in the same year. Although Cambodia was historically non-endemic, two suspected BU case was detected in there in March 2023. Other than Japan and Australia, most of the countries in the region is the lack of capacity to confirm diagnosis of BU.

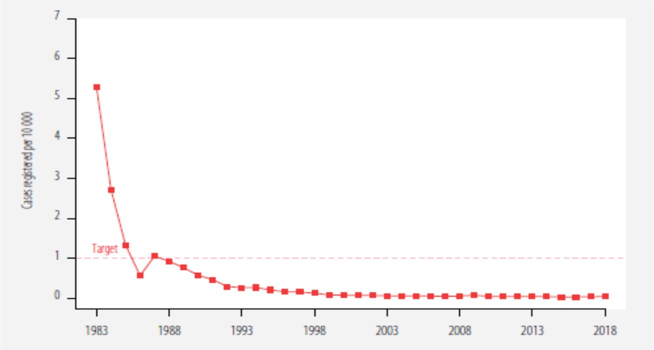


Map of Buruli Ulcer Endemicity as of 2021 in the Western Pacific Region: Source – WHO GHO

The region is not endemic for Leishmaniasis although China is considered endemic with very low endemicity. No data has been reported in the last two years. Only 5 cases of cutaneous Leishmaniasis were reported in 2015.

As shown in the figure below, prevalence of Leprosy has drastically dropped over the past four decades and countries in the region are making significant progress toward zero leprosy, challenges do persist in some countries especially the Pacific Island Countries.

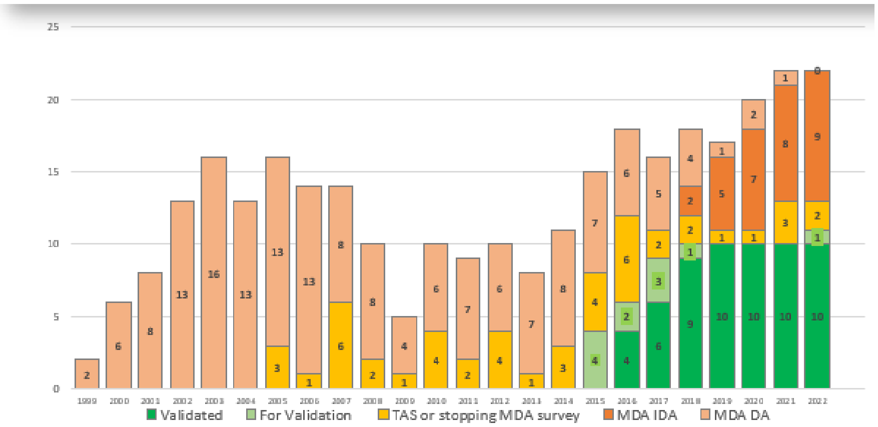
Fig. 2. **Prevalence rate of leprosy in the Western Pacific Region, 1983–2018**



Prevalence rate of Leprosy in the Western Pacific Region, 1983-2018: Epidemiological Review of Leprosy in WPR

In 2018, 4193 cases of leprosy were reported from the region which constitutes 2% of the total number of cases reported globally during the same year. Case detection rates per 100,000 population continues to be the highest in the pacific Island Countries.

In the Western Pacific Region, 22 of 37 countries and areas were endemic for lymphatic filariasis as of 2016. Since then, 10 of the 22 countries and areas have eliminated the disease as a public health problem, receiving WHO validation for elimination by 2019. Cambodia, Cook Islands, Niue and Vanuatu eliminated the disease by 2016, followed by Kiribati, the Marshall Islands, Palau, Tonga Viet Nam and Wallis and Futuna in subsequent years. More recently, the Lao People's Democratic Republic was validated in February 2023 for elimination of LF as a public health problem. Two other countries are conducting a Transmission Assessment Survey, and nine countries are implementing MDA.



Status of LF elimination in the Western Pacific Region

Four countries in the region are endemic for Yaws – Papua New Guinea, Solomon Islands, Vanuatu, and Philippines. Reporting 92,856 suspected Yaws cases in 2021, PNG carries the highest Yaws burden in the world followed by Solom Islands which reported 13,599 suspected cases the same year.

Most of the pacific Island countries including PNG, Solomon Islands, and Vanuatu, Kiribati are endemic for scabies. Hower, accurate estimates of disease burden are not available due to insufficient data and mapping.

Whereas significant progress is made in the region, major challenges persist. There is a greater potential for integration in some countries where co-endemicity is common, for instance, PNG and Solomon Islands. However, systemic challenges pertaining to weaker health systems, lack of resources, and inadequate mainstreaming with PHC hamper integration. Other challenges facing control and elimination of various endemic skin NTDs in the region include lack of required funding and commitment, lower PHC capacity for diagnosis and treatment of skin NTDs, stigma and discrimination against those suffering from skin NTDs requiring greater focus on mobilizing communities to empower individuals, weaker supply chain management capacities, poor surveillance and disease mapping, and inadequate cross-sectoral collaboration.