World Health Organization India

sameeksha

ANTIMICROBIAL RESISTANCE (AMR) | Volume 33 | 27 February 2025

AMR *Sameeksha**

Highlights

- Knowledge, attitude and practices survey of medical students on antibiotic use and AMR
- Genomic insights into AMR of *V. cholerae* in Odisha
- Quality improvement interventions on antibiotic prescription practices
- Incremental costs of treating AMR among hospitalized patients
- Innovative molecular diagnostic tool for early detection of NDM-resistant infections
- Global research agenda for AMR in human health

1) Awareness and understanding

Antibiotic use and antimicrobial resistance: knowledge, attitude and practices survey of medical students to evaluate undergraduate training curriculum

- KAP survey of MBBS students indicate majority of students are aware of what AMR is and the need to disseminate public awareness of AMR but report poor practices, such as self-medication and skipping doses.
- Calls for revisions of competency-based medical education to improve practices for rational antibiotic use.

Access Microbiology | Research article | 8 January 2025 | Online link

Physician's perception and practices on antimicrobial resistance in a tertiary care hospital in Bangladesh

- Cross-sectional study finds physicians in private sector and those who have practiced medicine for longer are more likely to report higher AMR perception and practice scores.
- Recommends AMR education for practicing physicians, monitoring prescribing and investing in antimicrobial stewardship.

BMJ Open | Original research | 22 December 2024 | Online link

2) Laboratories and surveillance

Genomic insights into the dynamic antibiotic resistance landscape of *Vibrio cholerae* during the cholera outbreak 2022 in Odisha, India

- Study of genetic and molecular mechanisms underlying AMR of *V. cholerae* in Odisha where there has been a rise in resistance to *V. cholerae* O1 strains.
- Calls for a shift away from using antibiotics for treating cholera towards other measures, including oral cholera vaccines, rehydration therapy, probiotic interventions and WASH.

Scientific Reports | Article | 9 January 2025 | Online link

Genotypic characterisation of carbapenem-resistant *Enterobacteriaceae* in a tertiary care hospital in South India

- Cross sectional survey detects 38% of samples to be *Enterobacteriaceae*, of which nearly 9% were resistant to carbapenems; the most common cause of resistance was metallo-β-lactamases.
- Highlights the importance of laboratories in monitoring carbapenem resistance for antimicrobial stewardship.

Cureus | Original article | 3 December 2024 | Online link

Seasonal trends and antibiotic resistance profiles of bacterial pathogens in Indian clinical isolates

- Cross-sectional study of patient samples using heatmaps and time series graphs indicates potential seasonal variation in bacterial infections, which vary according to pathogen and region.
- Underscores the need for robust monitoring systems and targeted antimicrobial stewardship programs.

Cureus | Original article | 10 January 2025 | Online link

Mentorship advances antimicrobial use surveillance systems in low- and middle-income countries

- Presents a mentorship program as an effective training tool to improve antimicrobial use surveillance based on experiences of mentorship in several countries including Nepal and Pakistan.
- Summarizes learning activities, outcomes and challenges associated with mentorship.

JAC – Antimicrobial Resistance | Journal article | 26 December 2024 | Online link

3) Infection prevention and control

Sameeksha – Infection Prevention and Control | volume 16

- Implementing a healthcare-associated bloodstream infection surveillance network in India
- Multimedia tool for improving IPC practices in cardiac surgical ICUs
- Global surgery is stronger when infection prevention and control is incorporated
- Environmental impact and sustainability of IPC
- Global action plan and monitoring framework on IPC, 2024-2030
- World Hand Hygiene Day 2025 resources

WCO India | Newsletter | 17 February 2025 | Online link

4) Optimise use of antimicrobials

Efficacy of quality improvement interventions on antibiotic prescription practices for ventilator-associated pneumonia at a tertiary care centre: a prospective pre–post interventional study

- Evaluates intervention with education, multidisciplinary collaboration and electronic prompts.
- Study finds intervention leads to improvements in survivability; reductions in ICU stays and better antimicrobial prescribing practices.

BMJ Open Quality | Original research | 20 December 2024 | Online link

The impact of antimicrobial stewardship interventions on appropriate use of surgical antimicrobial prophylaxis in low- and middle-income countries: a systematic review

- Assesses antimicrobial stewardship programs on surgical antimicrobial prophylaxis compliance as well as clinical and economic impacts.
- Finds high use of "Watch" group of antibiotics, predominantly second and third generation cephalosporins.

Systematic Reviews | Research | 19 December 2024 | Online link

Water, sanitation, handwashing, and nutritional interventions can reduce child antibiotic use: evidence from Bangladesh and Kenya

- Cluster randomized control trial assesses impact of WASH and nutrition on caregiver reported antibiotic use.
- Groups participating in Bangladesh report lower antibiotic use with all three interventions.

Nature Communications | Article | 9 January 2025 | Online link

Ensuring safe and effective pharmacotherapy: the role of "community pharmacology" in attaining "health for all" from the Indian perspective

- Argues community pharmacology will facilitate antimicrobial stewardship within the broader health sector.
- Identifies key challenges to achieving rational pharmacotherapy.

Journal of Family Medicine and Primary Care | Commentary | December 2024 | Online link

Recommended antibiotic treatment agreement between infectious diseases specialists and ChatGPT®

- Uses simulated clinical situations to assess level of agreement of appropriate antibiotic prescriptions between infectious disease specialists and artificial intelligence (AI).
- Finds moderate agreement, indicating that AI is not yet a substitute for clinical decision-making.

BMC Infectious Diseases | Research | 7 January 2025 | Online link

Assessment of the Bangladeshi antibiotic market: implications of the WHO AWaRe classification and dosage form availability on antimicrobial resistance

- Finds 56 combinations of antibiotics available in the market, with only six combinations approved by WHO.
- Concludes the Bangladeshi market is currently dominated by "Watch" group of antibiotics.

Journal of Infection and Public Health | Original article | 15 November 2024 | Online link

5) Research, innovations and finance

Global research agenda for antimicrobial resistance in human health

- Adopts a rigorous methodology to identify top research priorities for AMR that is rooted in the Global Action Plan on AMR and is in line with the Sustainable Development Goals.
- Presents 33 research priorities for bacterial and fungal infections and 7 priorities for multidrug-resistant tuberculosis, including prevention diagnosis, treatment and cross-cutting issues.

WHO | Publication | 6 February 2025 | Online link

Incremental cost of treating antimicrobial-resistant infections among hospitalised patients in India: a cohort study

- Finds high incremental costs among patients, driven by medication costs, and heavy debt burdens on households.
- Incremental costs vary across types of hospitals, pathogens, length of stay in hospitals and final diagnoses.

BMJ Open | Original research | 22 December 2024 | Online link

Genus-specific agreement, error rates, and correlation between broth microdilution test and Vitek 2 compact system with regard to colistin susceptibility testing in clinical isolates of *Enterobacterales*, *Pseudomonas aeruginosa*, and *Acinetobacter* species

- Compares broth microdilution and Vitek for colistin sensitivity and finds error rates for Vitek vary across genus and species.
- Concludes Vitek is inferior to broth microdilution for detecting colistin susceptibility.

Journal of the Academy of Clinical Microbiologists | Original research | 17 January 2025 | Online link

PathCrisp: an innovative molecular diagnostic tool for early detection of NDM-resistant infections

- Develops and tests a rapid molecular detection system, a combination of CRISPR/Cas12a and loop-mediated isothermal amplification.
- Detects New Delhi metallo-β -lactamase gene in carbapenem-resistant *Enterobacteriaceae* samples with 100% agreement with conventional PCR test.

Scientific Reports | Article | 2 January 2025 | Online link

In vitro efficacy of levonadifloxacin against methicillin-resistant *Staphylococcus aureus* (MRSA) including hVISA isolates collected across India

- Assesses levonadifloxacin against 456 MRSA hospital isolates using disc diffusion method.
- Finds 100% susceptibility to levonadifloxacin indicating potential clinical applications.

Indian Journal of Medical Microbiology | Original research article | 8 January 2025 | Online link

Biochar filtration of drug-resistant bacteria and active pharmaceutical ingredients to combat antimicrobial resistance

- Uses pyrolysis to convert waste lignocellulosic biochars, removing up to 88% of clarithromycin from wastewater.
- Highlights the potential for environmental AMR mitigation.

Scientific Reports | Article | 8 January 2025 | Online link

Impact of urbanization on antimicrobial resistance in soil microbial communities

- Using molecular and culturomics approaches, finds high levels of AMR genes in soils of urban parks in northern Italy.
- Highlights the need to monitor AMR in urban environments in spread of AMR.

Scientific Reports | Article | 3 January 2025 | Online link

6) Collaborations

Situational analysis of human and agricultural health practice: One Health and antibiotic use in an indigenous village in rural Punjab, India

- Cross-sectional survey of all households in a village yields comprehensive human, animal and agricultural profiles of AMR use.
- Identifies specific agricultural and livestock practices that are contributing to AMR.

One Health | Research article | 21 December 2024 | Online link

Advances in addressing antimicrobial resistance

- Describes recent advances in AMR from animals with a focus on surveillance, stewardship and strengthening animal health systems.
- Calls for animal health systems improvements especially where food production is expected to increase.

WOAH | Scientific & technical review | 2024 | Online link

Human and veterinary medicine collaboration: synergistic approach to address antimicrobial resistance through the lens of planetary health

- Adopts planetary health framework to explore AMR within human and veterinary medicine, while considering broader social and environmental systems.
- Highlights interconnectedness of ecological sustainability, climate action and environmental stewardship.

Antibiotics | Review | 30 December 2024 | Online link

Quotable quote

Improving animal health systems to improve animal health and resilience is a core component of antimicrobial stewardship efforts.

– WOAH, advances in addressing AMR 2024

Sameeksha is a Hindi word, meaning review. This is a compilation of open access publications and resources on One Health containment of AMR (along with a brief summary) – grouped according to the strategic priorities of India's National Action Plan on Antimicrobial Resistance. Kindly note, inclusion of publications and resources in this review/compilation does not imply an endorsement by WHO.