NATIONAL DIETARY GUIDELINES FOR BANGLADESH

স্বাস্থ্য ও পরিবার কল্যাণ মন্ত্রণালয়

National Nutrition Services
Ensuring Nutrition Services to All

World Health Organization
Bangladesh

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Food and Agriculture Organization of the United Nations

NATIONAL DIETARY GUIDELINES FOR BANGLADESH

Published by:

National Nutrition Services (NNS)

Printed at: Dhaka Bangladesh, August 2025

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PREFACE

Bangladesh has made remarkable progress in reducing the prevalence of child undernutrition by one-third in the last three decades. However, child stunting, wasting, low birth weight and micronutrient deficiencies especially of vitamin A, iron (Fe), folic acid, calcium (Ca), zinc (Zn) and iodine remain major nutritional problems. Alongside, nutrition related non communicable diseases (NCD)s are also a common cause of high morbidity and mortality rates in Bangladesh.

A healthy diet is a prerequisite for protection against many chronic non-communicable diseases and conditions, notably, overweight, obesity, heart disease, diabetes, liver disease and certain forms of cancer. Strategic guidance is needed to provide science-based information on how food and nutrient intake goals can be used by policymakers, practitioners and the public so that healthier choices can be made about food and people can be encouraged to engage in sufficient physical activity to improve nutritional well-being. A range of options is required to help people achieve and maintain healthy dietary and activity patterns in a simple and rewarding manner. New scientific information is essential to permit adjustment not only by policymakers but also at the level of policy processes to initiate change.

The reason we need a diet consisting of the range of essential food groups is to provide all the essential nutrients required for the growth, development and maintenance of the body. A food-based approach focuses on this principle. It proposes improving dietary diversity and quality so that people can obtain a variety of safe and nutritious foods to meet the requirements for energy, macro and micronutrients across the age groups for a healthy and productive life.

The Dietary Guidelines for Bangladesh 2022 offered here consist of three sections, namely **1) General Dietary Guidelines 2) Age Specific Dietary Guidelines and 3) Disease Specific Dietary Guidelines.** These are based on the principles of a food-based approach to nutrition that can help improve the nutritional and health status of the population on a sustainable basis. These support an eating plan of a diversity of foods that are nutrient-rich foods such as fruits and vegetables, whole grains, lentils, nuts and oilseeds, dairy, egg, poultry, lean meats and fish. The guidelines outline advice and messages for the general population, for different age and physiological groups that have increased nutrient needs in certain therapeutic conditions and to prevent chronic diseases.

The present guidelines have been updated from the previous dietary guidelines (2015) (2020), which were developed as an output of the Bangladesh Desirable Dietary Pattern (DDP) based on the dietary and nutrient adequacy analysis using the food consumption data from the 2010 Household Income Expenditure Survey (HIES) (BBS, 2010) and a review of guidelines from selected Asian countries. The guidelines follow up on the guidelines that were first published in 2000 by the Bangladesh National Nutrition Council (BNNC), Ministry of Health and Family Welfare (MoHFW).

The current guidelines further reviewed the HIES 2016 report (BBS, 2016) and carried out a comparative analysis of the food consumption pattern between 2010 and 2016. The changes in food consumption notably related to increasing diversity in the diet, with specific reference to decline in rice consumption and increase in a range of non-cereal foods consumed and the weighted averages have been taken into consideration.

The messages in the 2015 and 2020 guidelines have been updated and the latest evidence-based information has been used for all age groups and diet-related chronic diseases. These guidelines also provide information on the goals of diet and nutrition therapy to promote and support healthful eating patterns, emphasizing a variety of nutrient-dense foods in appropriate portion sizes.

The dietary guidelines, developed through the joint effort of the Ministry of Health and Family Welfare (MoHFW), Ministry of Food (MoFood), Bangladesh Institute of Research and Rehabilitation in Diabetes Endocrine and Metabolic Disorders (BIRDEM), National Nutrition Service (NNS) - Institute of Public Health Nutrition (IPHN), with technical support from the World Health Organization (WHO) and the Food and Agriculture Organization of the United Nations (FAO) in partnership with other stakeholders, will serve as a policy tool. The guidelines will support policymakers' expression of healthy diet aspirations in terms of nutrition, foods and dietary practices and will contribute to the improvement of nutrition awareness and behaviour change in the population. It is also intended that the guidelines serve as a tool to guide health, agriculture and food policies, to stimulate demand for healthy foods that can influence sensible food choices, healthy diets and lifestyle. We sincerely hope that the updated *National Dietary Guidelines for Bangladesh* will be useful to the readers and practitioners hoping that they will consult this book and benefit from it.

ACKNOWLEDGEMENT

The **National Dietary Guidelines for Bangladesh** are the result of an inclusive and collaborative effort involving extensive consultations across the country. These guidelines have been developed in alignment with the global recommendations of the World Health Organization (WHO) and the Food and Agriculture Organization (FAO) of the United Nations.

We extend our sincere gratitude to all individuals, institutions, and agencies—particularly nutritionists, medical professionals, multi-sectoral stakeholders, development partners, UN agencies, and civil society organizations—for their invaluable contributions throughout the development process.

We gratefully acknowledge the **Ministry of Health and Family Welfare (MoHFW) and the Directorate General of Health Services (DGHS)** for their continuous support and strategic guidance. **National Nutrition Services (NNS)** pays special thanks to the, **Institute of Public Health Nutrition (IPHN)**, and the **Bangladesh National Nutrition Council (BNNC)** for their leadership and coordination during the formulation of these guidelines.

Our heartfelt appreciation goes to the **Ministry of Food**, in particular the **Director General** and **Research Director** of the **Food Planning and Monitoring Unit (FPMU)**, for their steadfast support and oversight for this joint work.

We would like to extend special thanks to **Dr. Quamrun Nahar**, Chief Research Officer and Coordinator, **Clinical Nutrition & Dietetics Training Program** at the **Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM)**, for her leading role in the development of these guidelines, in close consultation with technical experts.

We also express deep gratitude to the **Nutrition Unit of WHO** for their dedicated initiative, patience, and generous technical and financial support, which played a pivotal role in bringing these guidelines to fruition. We are equally thankful to the **USAID-EU-funded FAO Meeting the Undernutrition Challenge (MUCH) team** for their technical input and commitment to quality assurance.

We gratefully acknowledge the contributions of numerous technical experts—including government officials, health professionals, dietitians, nutritionists, and scientists—who were involved in drafting and reviewing the document (Annex 10).

Finally, our sincere thanks to the **World Health Organization (WHO)** and the **Food and Agriculture Organization (FAO)** for their unwavering support, expert guidance, and invaluable contributions toward the development of these food-based dietary guidelines.

ABBREVIATIONS AND ACRONYMS

ADA	American Diabetes Association
ALA	Alpha-linolenic acid
BDHS	Bangladesh Demographic and Health Survey
BES	Bangladesh Endocrine Society
BFHI	Baby Friendly Hospital Initiative
BIRDEM	Bangladesh Institute of Research and Rehabilitation in Diabetes Endocrine and Metabolic Disorders
BMI	Body Mass Index
BNNC	Bangladesh National Nutrition Council
BSTI	Bangladesh Standards and Testing Institute
Ca	Calcium
CF	Complementary Feeding
CIP	Country Investment Plan
CKD	Chronic Kidney Disease
Cu	Copper
DCA	Daily Calorie Allowance
DDP	Desirable Dietary Pattern
DFE	Dietary Folate Equivalent
DGHS	Directorate General of Health Services
DHA	Docosahexaenoic Acid
DM	Diabetes Mellitus
EPA	Eicosapentaenoic Acid
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FBDG	Food-Based Dietary Guidelines
Fe	Iron
FPMU	Food Planning and Monitoring Unit
G	Gram/Grams
GFR	Glomerular Filtration Rate
GI	Glycemic Index
GL	Glycemic Load
HFSS	High Fat Sugar Salt
HIES	Household Income Expenditure Survey
HIV	Human Immunodeficiency Virus

HTST	High Temperature Short Time
IBW	Ideal Body Weight
ICMR	Indian Council of Medical Research
ICN	International Conference on Nutrition
IDF	International Diabetes Federation
IPHN	Institute of Public Health Nutrition
IYCF	Infant and Young Child Feeding
K	Potassium
LDL	Low Density Lipoprotein
MDD	Minimum Dietary Diversity
Mg	Magnesium
MICS	Multiple Indicator Cluster Surveys
Mn	Manganese
MoF	Ministry of Food
MoHFW	Ministry of Health and Family Welfare
MUCH	Meeting the Undernutrition Challenge
MUFA	Monounsaturated Fatty Acid
NCD	Non-communicable Diseases
NIN	National Institute of Nutrition (India)
NNP	National Nutrition Policy
NNS	National Nutrition Service
NPAN 2	Second National Plan of Action for Nutrition
NPNL	Non-Pregnant Non-Lactating Women
ORS	Oral Rehydration Solution
P	Phosphorus
PHO	Partially Hydrogenated Oil
PUFA	Polyunsaturated Fatty Acids
RE	Retinol Equivalents
RI	Recommended Intake
RNI	Recommended Nutrient Intake
SDG	Sustainable Development Goals
SFA	Saturated Fatty Acid
TB	Tuberculosis
TFA	Transfatty acid
UNICEF	United Nations Children's Fund
USAID	United Nations Agency for International Development
WHO	World Health Organization
WHR	Waist Hip Ratio
Zn	Zinc
µg	microgram

MESSAGE

Director General
Directorate General of Health Services

Bangladesh has made notable strides in addressing malnutrition. The Government has adopted several national strategies aligned with Sustainable Development Goal 2 (SDG 2), ensuring that health, agriculture, and broader development planning remain adaptive and responsive to socioeconomic changes, population growth, and the need for multisectoral collaboration.

Despite these efforts, Bangladesh remains off track in meeting all targets for maternal, infant, and young child nutrition (MIYCN). Progress toward achieving the diet-related non-communicable disease (NCD) targets has also been limited. These shortfalls continue to undermine broader development achievements. Although the country has attained self-sufficiency in cereal production—despite growing population pressure—dietary intake still lacks diversity. Yet, dietary diversity is critical to addressing the emerging double burden of malnutrition, which arises from the coexistence of undernutrition and overweight or diet-related NCDs, driven by poor dietary intake and unhealthy environments.

In response to this complex challenge, the Ministry of Health and Family Welfare and the Ministry of Food have jointly developed the National Dietary Guidelines for Bangladesh, 2025. These guidelines serve as a foundational tool for promoting healthy eating patterns, translating nutrient needs into practical food choices, and ensuring overall dietary quality for health. When effectively implemented, they will support dietitians, nutritionists, and consumers alike in making informed decisions about food and nutrition.

I believe the ***National Dietary Guidelines for Bangladesh*** will empower the population to adopt healthier diets throughout the life course. They hold the potential to prevent all forms of malnutrition and a wide range of NCDs. Most importantly, they can influence behavior change—leading to more diversified, balanced, and sustainable dietary patterns that support long-term health and well-being.

Prof. Dr. Md. Abu Jafor

MESSAGE

Director General
Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM)

It is with great pleasure that I acknowledge the publication of the National Dietary Guidelines for Bangladesh 2025 a comprehensive, food-based framework that integrates both age-specific and disease-specific recommendations alongside general dietary advice. Developed using the latest national data, these guidelines reflect current food consumption patterns and nutrient adequacy, offering clear, evidence-based guidance on what to eat, what to limit, what to avoid, and which lifestyle changes can help improve health outcomes.

These updated guidelines are particularly timely and relevant, addressing the nutritional needs of all age groups while providing critical support in the prevention and management of non-communicable diseases such as diabetes, obesity, and cardiovascular conditions. The inclusion of practical tools, such as the Food Pyramid and the Physical Activity Pyramid, makes the guidance both accessible and actionable.

I sincerely thank the Institute of Public Health Nutrition for spearheading this important initiative and express my deep appreciation to the technical committee for their expert input. I also gratefully acknowledge the World Health Organization (WHO) for their financial and technical support, and extend my thanks to all individuals and institutions involved in this collaborative effort.

This guide is the result of joint efforts by the Government of Bangladesh's Ministry of Health and Family Welfare and Ministry of Food, with support from WHO, FAO, and BIRDEM. It is designed to serve individuals, healthcare professionals especially nutritionists and dietitians and policymakers across both public and private healthcare sectors.

I believe these guidelines will deepen our understanding of dietary patterns that reduce the risk of disease and contribute to lasting well being.

Prof Mirza Mahbubul Hasan

FOREWORD

Line Director
National Nutrition Services (NNS)
Ministry of Health and Family Welfare
Government of the People's Republic of Bangladesh

It is my pleasure to present the National Dietary Guidelines for Bangladesh. Proper dietary guidelines have a significant effect on the optimum growth of the human body. Also, following proper dietary guidelines can enhance the activity of a person and increase their lifespan. The betterment of a country depends on the healthy lifestyle of its people. In the context of Bangladesh, where malnutrition is one of the most recognized problems, the healthy dietary guidelines are a much needed antidote.

To prevent malnutrition in all its forms, as well as a range of diet related noncommunicable diseases and conditions it is important to consume a healthy diet throughout the course of life. Due to rapid urnbanization, changing lifestyles and increased production of processed foods, there has been a shift in the dietary patterns of Bangladeshi population. Today, most people consume more processed foods high in free sugars, salt/sodium, fats and they are not eating enough fruit, vegetables and dietary fibre such as whole grains.

These dietary guidelines for Bangladesh will help create a diversified, balanced and healthy diet depending on the age and disease specific needs. There is the focus on creating awareness among the general population about the importance of dietary guidance, and this publication will also assist dietitians, nutritionists and health professional to develop an integrated approach to optimising food and nutritional care for their patients. By providing the recommendations, and the evidence that underpins them, in a single volume, the Guidelines will help policymakers address the major health challenge of improving Bangladeshi's healthy eating patterns.

I would like to convey my gratitude to all the nutritionists, dietitians, medical specialists and multi sectorial stakeholders for their relentless efforts made in developing these guidelines. I also acknowledge the immense support from WHO and FAO provided to the National Nutrition Services (NNS) in developing these guidelines, and making us feel the pride and privileged of taking on the responsibility and continuing this important public service.

Finally, I sincerely hope that these guidelines will help raise awareness among people, help individuals to choose food with good nutritional value, and provide crucial science-based information to dietitians and nutritionists for use in helping beneficiaries make healthy choices for themselves. The National Dietary Guidelines for Bangladesh, is a very important milestone in achieving the SDG indicators and, in the process, reduce malnutrition significantly.

Prof. Dr. Anjuman Ara Sultana

MESSAGE

IDM Message 2025
World Health Organization (WHO) Representative to Bangladesh

Bangladesh has made significant progress in nutrition and food security, demonstrating steady improvement since 2010. In the 2023 Human Development Index (HDI), Bangladesh ranks 130th place out of 193 countries, reflecting advancements in the health sector and efforts to reduce the gender gap, these achievements have positioned the country within the medium human development category.

Despite notable health improvements in recent decades, undernutrition, micronutrient deficiencies, and diet-related non-communicable diseases (NCDs) continue to pose significant challenges in Bangladesh. Prolonged malnutrition and the consumption of unhealthy diets lead to stunting, wasting, underweight, overweight, disease, reduced productivity, and economic losses, underscoring the urgent need for effective dietary guidelines. According to 'The State of Food Security and Nutrition' in Bangladesh, the minimum dietary diversity among women declined from 46% in 2015 to 43% in 2023, falling significantly short of the national target of 75% by 2025, as outlined in 2nd National Plan of Action on Nutrition. This downward trend is concerning, particularly because dietary diversity is a critical indicator of nutrient adequacy and overall food security, especially for women of reproductive age.

Dietary patterns in Bangladesh are largely dominated by a high cereal consumption, which accounts for approximately 58% of the total dietary energy intake. However, this reliance is gradually declining, as rice consumption decreases and the intake of vegetables, fruits, and animal source foods increases. While overall protein requirements are generally met, the quality of protein remains low, as it is primarily derived from cereals rather than more nutrient-dense sources. Therefore, a comprehensive multi-sectoral approach is essential, which should be supported by nutrition-sensitive factors such as improved education, increased household income, better access to healthier foods, and strong policy drivers grounded in health and nutrition strategies, all within a broader enabling environment.

The National Dietary Guidelines for Bangladesh will serve as the foundation for public food, diet, and nutrition education programme aimed at promoting healthy eating habits and lifestyles and preventing chronic diseases. These guidelines have been jointly developed by Ministry of Health and Family Welfare and Ministry of Food, with technical support from the World Health Organization (WHO), and the Food and Agricultural Organization (FAO) and are grounded in global evidence, science-based, positive messaging. The guidelines will be a valuable resource for dietitians, nutritionists, and health professionals, enabling them to apply dietary recommendations for both preventive and curative purposes. Furthermore, the guidelines will be an important tool for the Government in shaping upcoming national nutrition policies, plans and educational programmes to address all forms of malnutrition among the population.

Dr Ahmed Jamsheed Mohamed

MESSAGE

Country Representative, Bangladesh
Food and Agriculture Organization of the United Nations (FAO)

FAO, in collaboration with the World Health Organization, has been providing technical support to member countries towards the development and implementation of national dietary guidelines ever since the first International Conference on Nutrition which was held in Rome, Italy, in 1992.

Food-based dietary guidelines (also known as dietary guidelines) are intended to establish a basis for policies and programmes that foster healthy eating habits and lifestyles. They give advice on the foods, food groups, and dietary patterns that provide the required nutrients which promote overall health and prevent chronic diseases. To this end, FAO assists Member Countries to develop, revise, and implement food-based dietary guidelines and food guides. FAO also carries out periodic reviews on progress made in the development and use of dietary guidelines, tracking progress and outcomes.

Like many countries in Asia, Bangladesh faces multiple burdens of malnutrition. The causes of malnutrition are complex and multi-layered, but safe and diversified diets are among the most effective ways to prevent and control malnutrition.

The *National Dietary Guidelines for Bangladesh* have been developed in consultation with an interdisciplinary team of experts from across agriculture, health, education, nutrition, and food science. They provide context-specific advice on healthy diets and lifestyles, rooted in sound evidence. They take account of the country's public health and nutrition priorities as well as food safety and trade standards and paying respect to traditional food cultures.

FAO congratulates the Ministry of Food and Ministry of Health and Family Welfare for developing this vital tool to combat all forms of malnutrition and prevent diet-related non-communicable diseases (NCDs).

The Bangladesh Third Country Investment Plan on Nutrition-Sensitive Food Systems (2021-2025) and the Second National Plan of Action for Nutrition (2016-2025), to which FAO provided technical support, emphasise the use of food-based dietary guidelines. I urge stakeholders to integrate the *National Dietary Guidelines for Bangladesh* into national policies and programmes so that we can positively influence people's diets and the wider food system.

Shi Jiaoqun

Jiaoqun Shi

INTRODUCTION

At the heart of good nutrition are dietary guidelines

Although Bangladesh has made considerable progress in achieving food security and dietary diversity of households, women and children continue to pose a major challenge. These factors impact the nutritional status across an individual's lifespan, especially the first 1000 days of life.

Households are slowly changing their diets and are consuming a broader range of foods, with greater consumption of vegetables, fruits and animal source foods. However, diets remain heavily centred on cereals, including rice providing around 58 percent of dietary energy intake. Consumption of an unbalanced diet is known to be one of the biggest risk factors contributing to malnutrition and chronic diseases. Although more research is needed on the mechanisms that link diet to health and nutritional well-being, the available evidence provides a basis to justify taking preventive and remedial actions.

Dietary guidelines promote the consumption of safe and nutritious diets and healthy lifestyles from conception to old age. This has been highlighted at national and international levels and there is a consensus that all countries should adopt dietary guidelines suitable to their context.

The guidelines presented in this document build upon the foundational work of previous efforts. They take into account the first dietary guidelines published by the Bangladesh National Nutrition Council (BNNC) in 2000, as well as the updated guidelines jointly developed by the Ministry of Food and the Ministry of Health and Family Welfare (MoHFW) in 2015 and 2020. In addition, the formulation of these guidelines has been informed by a careful review of dietary guidelines from other Asian countries, ensuring that they are both contextually relevant and aligned with regional best practices. The focus of these dietary guidelines is on healthy eating habits, rather than on individual nutrients. In this document, qualitative and quantitative messages have been incorporated while promoting the food-based approaches. Emphasis is on recommendations that can sensitize consumers to eating a variety of safe and nutritious foods in line with traditional food patterns and habits that are protective and beneficial to health. The goals set for the intake of certain food items such as pulses, meat, fish, milk, vegetables and fruits are intended to orient appropriate policy decisions. This is expected to inform nutrient intake targets in consonance with recommended nutrient intakes (RNI).

Suitable messages for each of the food groups have been highlighted. A variety of foods that are locally available, and within the reach of everyone, can be selected to formulate safe and nutritionally adequate diets. Portion and serving sizes, as well as food exchange lists, are provided to guide consumers when planning healthy meals. The food-based dietary guideline also emphasize adequacy of intake of foods from all the food groups for maintenance of optimal health.

It is important to scale up the implementation of National Dietary Guidelines through the national policies, plans and programmes. Eating patterns must be adapted to ensure healthy eating habits. Moreover, large-scale campaigns to change behaviour should be implemented to encourage people to follow these dietary guidelines. Such efforts should be integrated into the existing national nutrition, agriculture and health programmes.

NUTRITION SITUATION IN BANGLADESH

The national momentum to addressing malnutrition has increased significantly over the past few years. Despite efforts, much remains to be done if Bangladesh is to ensure food and nutrition security for its people and unlock its productive potential. A little less than one-fourth (24 percent)[1] of children remain stunted, near about one-third (29 percent)[2] eat a minimum acceptable diet and about 56 percent of women have inadequate diets. Around 50 percent of women of reproductive age suffer from varying forms of micronutrient malnutrition.

In particular, 50 percent of pregnant women and 28.9[3] percent of non pregnant-non lactating women are reportedly anaemic, which has implications for low birth weight of children. Concurrently, the prevalence of overweight and obesity is steadily rising. As per the Bangladesh Demographic and Health Survey, 2018 the prevalence of overweight and obesity among married adolescents (15 to 19 years) increased from 3 percent in 2007 to 11.6 percent. Similar status has been noticed at Bangladesh Demographic and health Survey 2022, 38 percent of ever married women age 20-49 and 20 percent of men age 20 and older are overweight or obese.

This situation of the triple burden of malnutrition is strongly correlated with non-communicable diseases such as diabetes, cardiovascular diseases and certain cancers. The estimated prevalence of diabetes mellitus in Bangladesh is 9.2 percent (International Diabetes Federation IDF, 2019)[4], hypertension is 18 percent (Directorate General of Health Services (DGHS, no date)[5] and cardiovascular disease is 17 percent (DGHS, no date)[6].

The state of nutrition in the Bangladeshi population is summarized in Table 1

[1] Bangladesh DHS 2022 - Key Indicators Report (English). n.d. https://dhsprogram.com/publications/publication-PR148-Preliminary-Reports-Key-Indicators-Reports.cfm

[2] Ibid[1]

[3] National Micronutrient Survey 2019-2020

[4] International Diabetes Federation, 2019.

[5] Multi sectoral Action Plan for Prevention and Control of Non communicable Diseases 2018- 2025, Bangladesh. Accessed from https://dghs.gov.bd/images/docs/Publicaations/NCDC_multisectoral_action_plan_2018_2025.pdf

[6] Ibid[5]

Table 1: Nutritional status

Indicators		Percentage	Source
Low Birth Weight		22.6	National Low Birth-weight Survey, Bangladesh, 2015
Prevalence of undernutrition among children 0 to 5 years of age	Prevalence of stunting (height-for-age < -2SD from the median of the WHO Child Growth Standards) among children under 5 years of age	24	Bangladesh Demographic and Health Survey (BDHS) 2022
	Prevalence of wasting (weight-for-height < -2SD from the median of the WHO Child Growth Standards) among children under 5 years of age	11	Bangladesh Demographic and Health Survey (BDHS) 2022
	Prevalence of underweight (weight-for-age < -2SD from the median of the WHO Child Growth Standards) among children under 5 years of age	22	Bangladesh Demographic and Health Survey (BDHS) 2022
Child mortality/1 000 live births	Neonatal mortality	20	Bangladesh Demographic and Health Survey (BDHS) 2022
	Infant mortality	25	Bangladesh Demographic and Health Survey (BDHS) 2022
	Under-5 mortality	31	Bangladesh Demographic and Health Survey (BDHS) 2022
Anaemia	Children 6-59 months	21.1	National Micronutrients Status Survey 2019/2020
	Non-pregnant non-lactating (NPNL) women	28.9	National Micronutrients Status Survey 2019/2020
Zinc deficiency	Children 6-59 months	31	National Micronutrients Status Survey 2019/2020
	Non-pregnant non-lactating women	43.4	National Micronutrients Status Survey 2019/2020
Iodine deficiency (Urinary Iodine Concentration)	Children 6-59 months	19.7	National Micronutrients Status Survey 2019/2020
	Non-pregnant non-lactating women	29.6	National Micronutrients Status Survey 2019/2020
Diabetes	Adult (Age - adjusted comparative prevalence of diabetes)	14.2	International Diabetes Federation (IDF), 2021
Overweight or Obesity	Children under the age of five (overweight)	2	Bangladesh Demographic and Health Survey (BDHS) 2022
	Evermarried Women aged 20-49 years overweight or obese	38	Bangladesh Demographic and Health Survey (BDHS) 2022
	Men aged 20 years and older overweight or obese	20	Bangladesh Demographic and Health Survey (BDHS) 2022
Obesity	Children under the age of five	0.8	MICS 2019
	Adults aged 18+	3	WHO-NCD Country Profiles 2018
	Adolescents aged 10-19	2	WHO-NCD Country Profiles 2018
Underweight (Chronic Energy Deficiency) BMI<18.5 kg/m^2	Evermarried Women aged 20-49 years	9	Bangladesh Demographic and Health Survey (BDHS) 2022
	Men aged 18 years and older	16	Bangladesh Demographic and Health Survey (BDHS) 2022

NUTRITION-SENSITIVE POLICIES AND STRATEGIES PROMOTING FOOD-BASED DIETARY GUIDELINES

The National Nutrition Policy (NNP, 2015) and the Second National Plan of Action for Nutrition (NPAN2, 2016-2025) are two major policy instruments that aim to significantly improve the nutritional status of the people of Bangladesh. The plans set priorities encompassing both nutrition-specific and nutrition-sensitive interventions and acknowledge the importance of increasing consumers' awareness and capacities to make informed choices for healthy diets. To this end, the food-based dietary guidelines are among the most important guidance tools on food, agriculture and health planning.

Dietary guidelines, to enhance nutrition knowledge and correct food-related behaviour, are also one of the activities being conducted under the operational plans of the NNS, 2011-2016 and 2017-2022.

The National Food Policy 2006, the National Food Policy Plan of Action 2008–2015 and National Food and Nutrition Security Policy Plan of Action (2021-2030) endorsed by the Government of Bangladesh emphasized among its objectives, safe and adequate nutrition for all individuals especially women and children as well as a long-term national plan to ensure balanced food to build a healthy nation.

The Bangladesh third Country Investment Plan on Nutrition-Sensitive Food Systems 2021-2025 (CIP3) is integral to the multisectoral approach needed to tackle hunger and malnutrition and achieve the Sustainable Development Goals (SDGs).

One of its strategic objectives is to ensure the knowledge needed to make wise food choices for a healthy diet. The CIP3 Area of Investment or Pillar III:

"To enhence the consumption and utilization of healthy and diversified diets for achieving nutrition improvements" prioritizes the promotion and implementation of Food-Based Dietary Guidelines through its sub-programme III.4. "Enhanced nutrition knowledge, promotion of good practices, and consumption of safe and nutritious diets for the prevention and control of malnutrition and Non-Communicable Diseases (NCDs)."

Goals and objectives of the dietary guidelines

To provide a plan on what to eat and drink as a healthy diet for all individuals to promote proper growth and development, help preventing diet-related chronic diseases and adequately meet nutritional needs.

Objectives of the dietary guidelines

To support different nutrition actors, general population, different age and physiological groups to improve their nutritional and health status in certain therapeutic conditions and to prevent chronic diseases.

The specific objectives of the dietary guidelines are to:

- Promote healthy eating habits and better diets according to life cycle and age for the general population;
- Enhance understanding level of the professional audience, including policymakers, clinical dietitians and nutritionists, community nutrition actors and researchers about healthy food intake;
- Provide diet-related knowledge for the prevention and dietary management of non-communicable diseases.

Population nutrient intake targets

The population nutrient intake proposed by global bodies for regional and national consideration in establishing dietary recommendations for the prevention of diet-related chronic disorders are given in Table 2, which also provides the proportions of various energy sources in the diet. While the population nutrient intake goals focus on the energy supplying macronutrients, this must not be taken to imply a lack of concern for other nutrients. (WHO and FAO, 2003)[7]. Recent evidence also outlines food groups and ranges of food intake, which combined in a diet, would optimize human health (EAT-Lancet, 2019a) (see Table 3)[8].

Table 2: Ranges of population nutrient intake targets[9]

Dietary factor	Ranges
Total fat	15--30% of total energy
Saturated fatty acids (SFA)	<10% of total energy
Polyunsaturated fatty acids (PUFA)	6--10% of total energy
n-6 Polyunsaturated fatty acids (PUFA)	5--8% of total energy
n-3 Polyunsaturated fatty acids (PUFA)	1--2% of total energy
Trans fatty acids (TFA)	<1% of total energy
Total carbohydrate	55--75% of total energy
Free sugars	<10% of total energy
Protein	10--15% of total energy
Cholesterol	<300 mg per day
Salt/Sodium chloride (Sodium)	<5 g per day (<2 g per day)
Fruits and vegetables	≥400 g per day

Refer to Annex 8 for requirements for macro and micronutrients in different age groups of males and females.

[7] Diet, nutrition and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation 2002. https://www.who.int/publications/i/item/924120916X.

[8] Willett W, Rockström J, Loken B, Springmann M, Lang T, Vermeulen S, Garnett T, Tilman D, DeClerck F, Wood A, et al. Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. Lancet. 2019;393(10170):447-492. doi:10.1016/S0140-6736(18)31788-4.

[9] Ibid [7]

Desirable diet for Bangladesh

The Table 3 outlines a desirable dietary intake for Bangladesh based on the proposed desirable dietary pattern (DDP 2013). A comparative analysis by national experts and an assessment of the food production and consumption by trends households and individuals have provided the basis for the composting the DDP, 2013 for an average Bangladeshi adult consuming 2430 kcal per day (refer to Annex 7: Menu plan for a diet consisting of 2430 kcal).

Comparing the habitual food consumption in Bangladesh and the desirable diet proposed, the emphasis has been on diversification of diets towards a combination of cereals, pulses, increased consumption of vegetables and fruits, proportionately balancing the intake of animal source foods notably dairy, fish, poultry meat and fish and limiting the intake of fats and sugars in line with global dietary recommendations (WHO, 2020a)[10]. (refer to Annex 2: Proportion of foods contributing to a healthy food plate).

The EAT-Lancet Commission, 2019 highlights the critical role that diets play in linking human health and environmental sustainability and the need to integrate these to achieve the Sustainable Development Goals (EAT-Lancet, 2019b)[11]. In this regard, there is the scope for harmonizing the desirable dietary pattern for Bangladesh with the recommendations proposed by the EAT-Lancet Commission 2019(b). With an optimal calorie intake, a diversity of plant-based foods, low amounts of animal source foods, some nuts and seeds, unsaturated rather than saturated fats and a limited amount of refined grains, highly processed foods and added sugars are emphasized.

[10] Healthy diet, World Health Organization, 2020. Accessed from: https://www.who.int/news-room/fact-sheets/detail/healthy-diet

[11] The EAT-Lancet Commission on Food, Planet, Health, 2019. Accessed from: https://eatforum.org/eat-lancet-commission /

Table 3: A comparison of desirable dietary pattern

		Yusuf et al, 1996 (2310 kcal)		National Experts, 2007 (2350 kcal)		National Dietary Guidelines* 2015 (2430 kcal)		EAT Lancet Commission, 2019 (2500 kcal)		
		Desirable intake (g)	*Percentage of total energy*	*Desirable intake (g)*	*Percentage of total energy*	*Desirable intake (g)*	*Percentage of total energy*	*Food*	*Desirable intake (g)*	*Percentage of total energy*
Cereals		372	55	375	55	400	56	Whole-grain cereals	232	32
- Rice		312	46.6	350	51	350	49			
- Wheat and other cereals		60	8.4	25	4	50	7			
Pulses and legumes		66	10	60	8.8	50	6.5	Pulses and legumes	75 (0-100)	11
Animal foods		126	5	180	7	260	10.5	Animal foods	334	12
- Fish		50	-	55	2.1	60	3	- Fish	28 (0-100)	2
- Poultry and meat		22	-	35	1.4	40	2	- Beef, lamb and pork	14 (0–28)	1
								- Chicken and other poultry	29 (0–58)	2
- Egg		7	-	15	0.6	30	2	- Eggs	13 (0–25)	1
- Milk and milk products		47	-	75	2.9	130	3.5	- Dairy foods	250 (0–500)	6
Fruits		57	2.5	100	4.2	100	3	Fruits	200 (100-300)	5
Vegetables	- Leafy	132	2.5	200	3.6	100	2	Vegetables	300 (200-600)	3
	- Non-leafy	-	-	-	-	200	2			
Potato		130	5	60	2.5	100	4	Tubers or starchy vegetables (potatoes and cassava)	50 (0-100)	2
Cooking oil		38	15	40	15.3	30	11	Added fats - Unsaturated	40 (20–80)	14
								Added fats - Saturated	11.8 (0-11.8	4
Sugar/Gur/Molasses		28	5	18	3.2	20	3	Added sugars	31 (0–31)	5
Nuts		-	-	-	-	-	-	Nuts	50 (0-75)	12
Spices		10	-	20	0.4	20	2	-	-	-

SECTION: 01

GENERAL DIETARY GUIDELINES FOR BANGLADESH

GENERAL DIETARY GUIDELINES FOR BANGLADESH

Dietary guidelines are sets of advisory statements providing principles and criteria of good dietary practices to promote nutritional wellbeing. These guidelines are intended to be used by individuals. The following advisory statements indicate the type of foods that need to be consumed, the extent to which they have to be consumed along with the use of spices, condiments and water intake (refer to Annex 1 for food pyramid). It also suggests the use of healthy preparation, cooking and processing methods to retain nutrients and promote better health.

1. Eat a well-balanced diet with a variety of foods at each meal;
2. Limit intake of foods high in fat and minimize fats and oils in food preparation;
3. Limit intake of salt and condiments and use only iodized salt;
4. Reduce consumption of sugars, sweets and sweetened drinks;
5. Drink 1.5 to 3.5 litres of pure safe drinking water daily (6 to 14 glasses);
6. Consume safe and clean foods and beverages;
7. Maintain desirable body weight through the intake of a balanced diet and regular physical activity;
8. Follow appropriate preparation and processing techniques and adopt healthy cooking methods;
9. Eat additional food and take extra care during pregnancy and lactation;
10. Practise exclusive breastfeeding for the first six months and introduce appropriate complementary foods from six months onwards.

Guideline 1: Eat a well-balanced diet with a variety of foods at each meal

Eat adequate amounts of whole-grain cereals, cereal products, starchy roots, tubers and plantains daily

Popular cereals in Bangladesh are rice and wheat. Rice is the principal source of energy and a good source of B vitamins. Rice products such as rice flakes (chira), puffed rice (muri) and rice flour are popular foods. The next rich source of energy is wheat. Wheat is rich in essential minerals like Calcium (Ca), Magnesium (Mg), Potassium (K), Manganese (Mn), Zinc (Zn), Copper (Cu) and B complex vitamins. Parboiled, unpolished, unrefined brown rice and whole-wheat flour contain a higher amount of nutrients and dietary fibres that are beneficial to health. Whole grain cereals help to reduce the risk of gallstones, heart disease, colon cancer and many other illnesses. Whole wheat and unrefined rice also have a low Glycemic Index (GI) that is good for health.

Apart from rice and wheat, other whole-grain cereals and millets that could be incorporated as a part of daily Bangladeshi diet include the following: barley (Jaab, whole), maize (Bhutta), foxtail millet (Kaon), proso millet (Cheena, whole dana), pearl millet (Bajra) and sorghum (Jowar).

Roots and tubers are commonly eaten in Bangladesh and can also serve as cereal substitutes. These include potato, sweet potato,[12] colocasia root and plantains. These are good sources of energy and minerals such as Potassium (K).

[12] Orange fleshed sweet potato variety, commonly known as Komola Sundari is not only a good source of energy but is also a rich source of beta carotene

Key messages

- Eat rice or wheat or a combination of cereals around 270 to 420 g (maximum, depending upon the physical activity or occupation undertaken), which is equivalent to 9 to 14 servings daily (1 serving = 30 g). In the case of starchy roots, tubers and plantains, one serving is equal to 75 to 100 g (refer to Annex 4 for Standard weights and measures of food and Annex 5 for food exchange list);

- Eat rice or roti with legumes/pulses or fish/poultry/egg every day to enhance nutritional quality;

- Do not discard water from cooked rice as you are likely to lose water-soluble vitamins;

- Try to consume unpolished/brown rice, whole-wheat brown atta and available millets as they contain nutrients such as protein, fat, dietary fibre, minerals (iron) B complex and vitamin E.

Consume required amounts of fish, meat, poultry, egg, pulses/legumes and some nuts and seeds daily

Fish, meat, poultry, egg and legumes and pulses are good sources of protein which are needed for growth and maintain body functions. Protein is also needed to improve immune response and supply energy. Fish from the sea have a high concentration of omega-3 fatty acids, vitamin D and vitamin B2 that are beneficial to health. Small bony fish, which can be eaten whole, are a good source of calcium for strong bones and teeth. Meat and poultry are rich sources of good quality proteins and vitamins such as niacin and riboflavin and minerals like Calcium (Ca), Zinc (Zn) and Copper (Cu), which have protective and regulatory functions in the body. Eating lean meat is more beneficial, as not only does it provide a source of protein, it also reduces fat accumulation in blood vessels. Eating fish regularly, instead of red meat, helps reduce blood cholesterol.

Egg is a major and an affordable source of high-quality protein. In addition to protein, other nutrients like lutein, choline, iron and vitamin D in eggs are good for boosting immunity. Meat/poultry/eggs are also good sources of heme iron (bioavailable).

Pulses and legumes are a good source of protein. They also contain a wide range of nutrients, including carbohydrate, dietary fibre, vitamins and minerals, as well as phytochemicals such as antioxidants and phytoestrogens that are beneficial to health. Chickpeas and lentils contain saponins that help lower blood cholesterol. Pulses include lentils *(masur dal)*, dried peas (motor), chickpea/Bengal gram *(cholar dal)*, black gram *(mashkalai dal)*, mung beans *(green gram)*, red gram *(arhar)*, soybean (gari kalai) and other legume crops. Pulses are gluten-free and can be used in diets for celiac disease and gluten enteropathy.

Nuts and seeds are good sources of protein, healthy fats, fibres, vitamins and minerals. Nuts and seeds regulate body weight, food intake and help burn energy. Nuts and seeds contain unsaturated fats and antioxidants that provide protective effects against heart disease. This group comprises mostly tree nuts but also includes groundnut (peanut). Common tropical tree nuts include cashew, almond, pistachio and walnut. Commonly available seeds include sesame, sunflower, pumpkin, jackfruit and flax seeds. When nuts and seeds are provided in small quantities, as appropriate, to children as part of complementary foods or in their daily diet, they provide a rich source of unsaturated fatty acids, vegetable protein, fibre, minerals, tocopherols, phytosterols and phenolic compounds.

Key messages

- Eat 1 to 4 medium size pieces (1 pc = 40 g) of fish, meat, poultry and 1 to 2 cups of cooked pulses and legumes daily;
- Combine cereals with pulses/legumes in the ratio of 3:1;
- Both children and adults can safely consume one egg a day;
- Eat small amounts of unsalted, roasted varieties of nuts and seeds four to five times a week.

Consume adequate amounts of milk and milk products

Milk is an excellent source of bioavailable calcium and phosphorus, which are essential for building strong bones and teeth. Milk also contains good quality protein, lactose and vitamins, especially vitamin B12, which promotes growth and proper functioning of body tissues. Consumption of milk is essential for young children and adolescents for building maximum peak bone mass and linear growth. Milk consumption also helps to prevent osteoporosis in later life. It is essential in pregnancy and lactation for healthy bones and teeth. In Bangladesh, milk from cows, goats and buffalo is popular. Milk products commonly consumed in Bangladesh include sweets, skim milk powder, curd (doi), ghee and cheese (poneer).

Key messages

- Drink at least one cup of milk (130 to 150 ml) or milk products such as plain curd *(doi)* 100 g or cheese *(poneer)* 30g once a day as a good source of calcium for healthy bones and teeth;
- Eat curd or drink soymilk if there is lactose intolerance. Curd contains lactic acid bacteria that are beneficial to the body and can help digest lactose in milk;
- Fat-free or skim milk is recommended for health, especially for older adults.

Eat plenty of fruits and vegetables everyday

Vegetables and fruits are good sources of vitamins, minerals and other useful substances such as dietary fibre. Leafy vegetables, yellow-orange vegetables and fruits are especially good sources of fibre, folate, and a wide range of carotenoids and vitamin C. Leafy vegetables also provide small quantities of protein and can, therefore, be combined in appropriate amounts with cereals and pulses and other foods in preparations.

The fibre in vegetables and fruits helps to remove waste as well as eliminating excess cholesterol and some carcinogenic compounds. Regular consumption of these foods helps to prevent vitamin A deficiency and anaemia. Research has shown that beta-carotene and vitamin C in vegetables and fruits can prevent fat from depositing in blood vessels and also reduce the risk of some types of cancer, and inhibit the growth of certain types of cancer cells. Bangladesh is fortunate in having a wide range of leafy vegetables and local seasonal fruits. Vegetables and fruits should be eaten regularly as part of the diet, and especially of children and adolescents to keep them strong and healthy. It is suggested that individuals eat a variety of vegetables during every meal, regularly eat fruits, especially after meals or as a snack. These should be consumed according to seasonal availability.

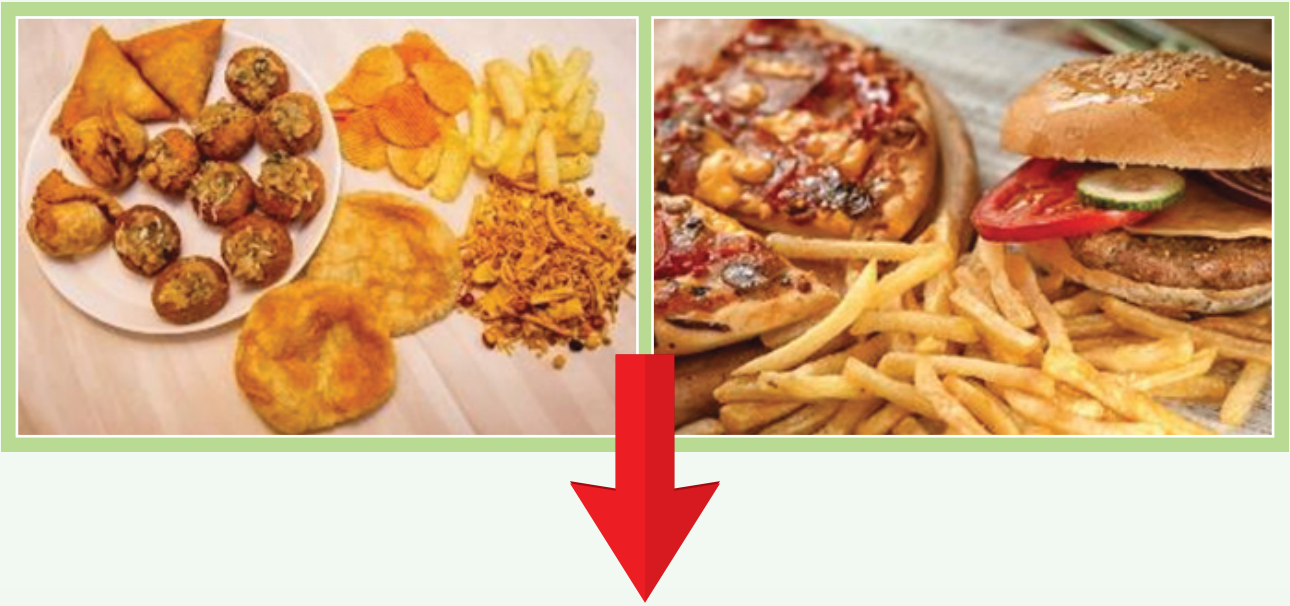
Key messages

- Consume at least 400 g of fruit and vegetables per day[13], excluding potatoes, sweet potatoes and similar other starchy roots[14];
  - Eat at least 100 g leafy and 200 g non-leafy vegetables daily;
  - Eat two (02) seasonal fruits (50 g each), one from citrus, another from vitamin A rich sources;
  - Consume 25 g of naturally occurring dietary fibre per day;
- Eat citrus fruit after a meal to enhance iron absorption;
- Eat salad every day, which is a live food;
- Aim to consume locally sourced fruits and vegetables or homegrown product. Local food is fresher, healthier and tastes better given the shorter time between harvest and the table and it is less likely that the nutrient value has decreased.

[13] WHO updates guidelines on fats and carbohydrates 2023. https://www.who.int/news/item/17-07-2023-who-updates-guidelines-on-fats-and-carbohydrates

[14] Ibid[9]

Guideline 2: Limit intake of foods high in fat, and minimize fats and oils in food preparation



The foods displayed in the picture above are high in fat content. It is important to limit their daily intake.

Fats and oils are essential nutrients for health, supplying energy and essential fatty acids. Fats and oils from both plant and animal sources are concentrated sources of energy. Fats that are used in cooking and as such at the table 4 (vegetable oils, hydrogenated oils, butter and ghee) are termed as “visible fats“. Fats present as an integral part of various foods are referred to as “invisible fat“. Fats and oils provide 9 kcal per gram. In Bangladesh, soybean oil, mustard oil, rice bran oil are the most commonly used oils in food preparation. Ghee and butter are also used occasionally. Fat in foods provide essential fatty acids and help in the absorption of fat-soluble vitamins such as A, D, E, and K. Some fats are a source of antioxidants that are known to reduce the risk of some cancers and chronic heart disease. Fats also contribute to texture, flavour and taste and therefore increase the palatability of the food. Cholesterol in fat is an essential component that is needed in small amounts for the development of the brain. Cholesterol is present only in foods of animal origin such as whole cream milk, butter, ghee, egg, meat and organ meats, shrimp and prawn. Cholesterol is not available in plant foods.

Based on their chemical nature, fatty acids are broadly grouped as saturated fat (SFA), monounsaturated fat (MUFA) and polyunsaturated fat (PUFA). Table 4 shows the list of fatty acids present in fats and oils. Olive oil, contains both omega-3 and omega-6 fatty acids. Omega-3 fatty acids are important in preventing cardiovascular disease and are particularly found in oily fish such as salmon and flaxseed oil. Fish oil is a source of omega-3 fatty acids that confer nutritional and health benefits.

Saturated fat comes from meat and animal skin, hydrogenated oils, ghee, butter and coconut oil. High intake of saturated fat increases atherogenic risk and their intake should be limited, especially in adults.

Fast foods, bakery products, highly processed fat-rich foods contain trans-fat that can raise your low density lipoprotein (LDL) cholesterol just like saturated fats. They can also increase cellular inflammation and lower the high density lipoprotein cholesterol that protects against heart disease.

Table 4: Major types of fatty acids in fats and oils[15]

Saturated	*Monounsaturated*	*Polyunsaturated*		
		Linoleic (n-6)		αLinolenic (n-3)
Coconut Palm kernel Ghee/Butter Hydrogenated Margarine	Red palm oil Palmolein Groundnut Rice bran Sesame Olive	Low	Red palm oil Palmolein	Mustard Soybean
		Moderate	Groundnut, Rice bran, Sesame	
		High	Safflower, Sunflower, Cotton seed, Corn, Soybean Canola Olive	

Key messages

- Vegetable oils like mustard oil and olive oil are preferred to hydrogenated oils and saturated fats and are recommended for use in moderation. Natural saturated fats like butter and ghee can be used in restricted amounts or avoided, as necessary;
- Use only the required amount of cooking oil. It is recommended that no more than 30 g (2 tablespoons maximum) is used of visible fat per person per day;
- Limit the intake of deep-fried foods and oily snacks;
- Limit intake of foods high in trans-fat, high-fat bakery products (biscuits, cake, pastries, pies), fast foods, (hot dog, burger), rich foods (biryani, kachhi), junk food (burger, pizza, french fries) and processed meats such as grilled chicken as they contain trans fats that increase the risk of coronary heart disease.

Recommendations on the type of fat to be used for optimal health

- Replace saturated fatty acids in the diet with polyunsaturated fatty acids[16];
- Total fat (visible + invisible) should provide between 15-30 percent of the daily energy intake;
- Adults with a sedentary lifestyle can consume about 25 g visible fat, while individuals involved in hard physical work require about 30 to 40 g of visible fat;
- Saturated fat should provide less than 10 percent of the daily energy intake;
- Polyunsaturated such as omega-3 and omega-6 fats should contribute to 6 to 10 percent of the daily energy intake;
- Intake of trans fat should be less than 1 percent of the daily energy intake;
- Monounsaturated fats can provide the remainder of the energy from fat;
- Cholesterol intake should be less than 300 mg/day;
- N-6 PUFA to N-3 PUFA ratio should be 5:1 in the diet.

[15] Adapted from Dietary Guidelines for Indians - A Manual, National Institute of Nutrition (NIN), 2011

[16] Ibid[13]

Guideline 3: Limit intake of salt and condiments and use only iodized salt

The foods displayed in the picture above have a high content of salt and sodium. It is important to limit their daily intake.

Salt or sodium chloride is an essential ingredient of food and enhances its taste. It is also used as a preservative. Added salt (sodium 40 percent, chloride 60 percent) is the major source of sodium in our diet. One teaspoon (5g) of salt provides less than 2g of Sodium[17,18] Salt is also present in the diet as sodium bicarbonate (baking soda) and as monosodium glutamate in processed foods, in additives such as sodium phosphate, sodium carbonate and sodium benzoate. Too little salt in the diet can lead to muscle cramps, dizziness, or electrolyte disturbance. Likewise, high salt intake is a major risk factor for hypertension or elevated blood pressure. It is estimated that in Bangladesh people consume about 9g salt (near about two

[17] Sodium reduction. 2023. https://www.who.int/news-room/fact-sheets/detail/salt-reduction

[18] The Global Health Observatory http://bit.ly/3zLGsGY

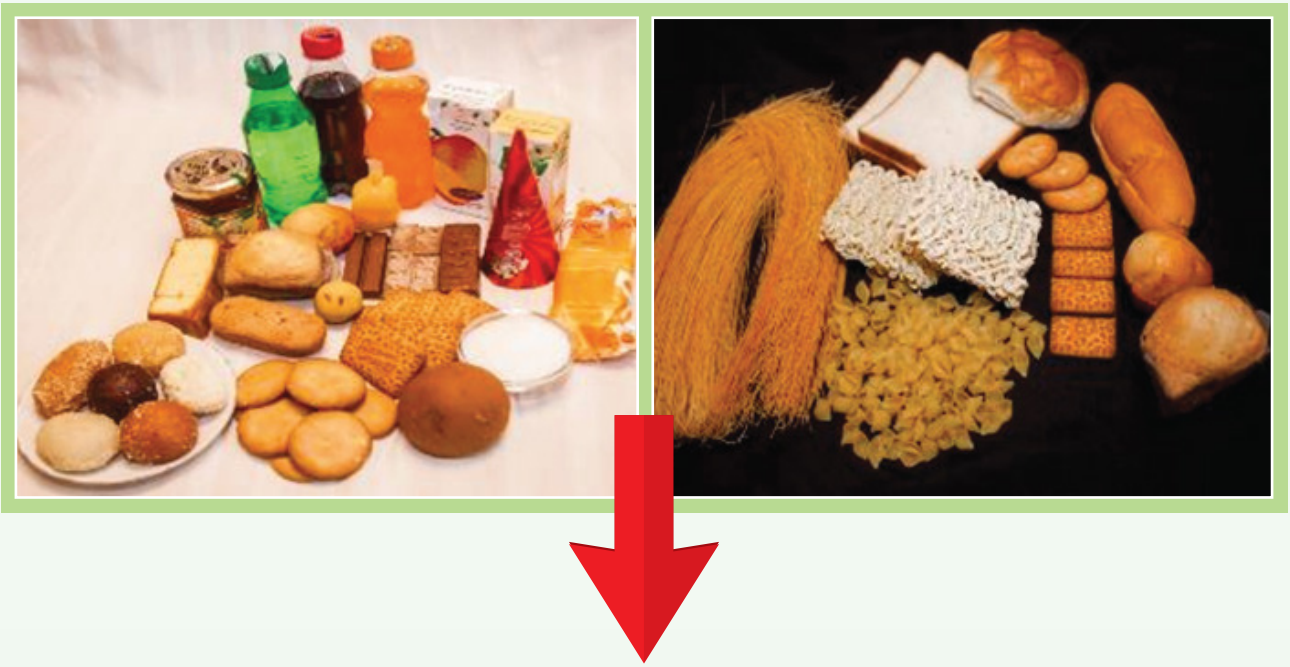
teaspoons) per capita per day while the WHO recommendation is less than 5 g (1 teaspoon)[19] salt per day. Foods that are rich sources of sodium include salted snacks like chips, chanachur, salted biscuits, instant noodles, salted hilsha, cheese, dry fish, table salt, pickles, fish sauce, ketchup, chilli and soy sauce.

Key messages

- Limit salt intake to less than one teaspoon (5 g) a day, equivalent to less than 2 g sodium. Use only iodized salt;
- Restrict the intake of added salt right from an early age. Discourage the use of added salt in foods prepared for infants (6 to 12 months);
- Develop a taste for foods/diets that are low in salt;
- Restrict intake of preserved and processed foods such as chips, chanachur, papar, jhalmuri, pickles, sauces, ketchup, salted biscuits, cheese and salted fish;
- Limit consumption of highly salted foods and condiments and avoid extra table salt with meals.

[19] National STEPS Survey for Non-communicable Diseases Risk Factors in Bangladesh 2018 https://cdn.who.int/media/docs/default-source/searo/bangladesh/publications/2018-steps-fact-sheet-bangladesh.pdf?sfvrsn=6db25e92_3&download=true

Guideline 4: Reduce consumption of sugar, sweets and sweetened drinks



The foods displayed in the picture above are high in sugar and refined starches. It is important to reduce their daily consumption.

Sugars occur both naturally and as an ingredient in many foods. It is a concentrated form of energy and consists of simple carbohydrates. Sugar is mainly used to sweeten food and beverages like tea, coffee and ice cream and desserts. A high intake of sugar may also contribute to excess energy intake leading to obesity, which in turn is a risk factor for diseases like coronary heart disease and diabetes mellitus. There is a link between sugar consumption and dental caries. Children who eat sugary foods often have less of an appetite and are prone to tooth decay. Honey and molasses also provide sugar but are better for health than refined sugar. For prevention of diet-related chronic diseases, sugars and refined cereals should be used cautiously.

Key messages

- WHO guidelines recommend that, to prevent obesity and tooth decay, adults and children reduce their consumption of free sugars to less than 10 percent of their daily energy intake (equivalent to around 12 teaspoons of table sugar for adults). The guidelines suggest further reducing intake of sugars to below 5 percent of daily energy intake (around 6 teaspoons of table sugar for adults) for additional health benefits[20,21];

[20] Guideline : sugars intake for adults and children, WHO 2015. https://www.who.int/publications/i/item/978924154902

[21] World Health Organization. (2017). Taxes on sugary drinks: Why do it?. World Health Organization. https://iris.who.int/handle/10665/260253. License: CC BY-NC-SA 3.0 IGO

- It is advisable to reduce the intake of refined sugar and sugar-based food especially sweetmeats and rich desserts like kheer, gulab jam, kalo jam, jilapi, chomchom, rasogolla, rabari, patishapta, sandesh;
- Limit consumption of foods rich in hidden sugar and foods with added sugar such as confectionery, cream and sugar-laden biscuits, cakes, jams, jelly marmalades, chocolates, toffee, candy, ice- creams and sweets and shakes;
- Limit consumption of sugary drinks and beverages containing free sugars and these include carbonated or non-carbonated soft drinks, fruit/vegetable juices and drinks, liquid and powder concentrates, flavoured water, energy and sports drinks, ready-to-drink tea, ready-to-drink coffee, and flavoured milk drinks[21,22];
- Encourage intake of natural sugars from a variety of seasonal fruits.

[21] World Health Organization. (2017). Taxes on sugary drinks: Why do it?. World Health Organization. https://iris.who.int/handle/10665/260253. License: CC BY-NC-SA 3.0 IGO

[22] Technical Report on Policy Options for Taxing Sugar-Sweetened Beverages in Bangladesh, 2021, Noncommunicable Disease Control Program, Directorate General of Health Service. Accessed from https://cdn.who.int/media/docs/default-source/searo/bangladesh/publications/technical-report-on-policy-options-for-taxing-sugar-sweetened-beverages-in-bangladesh-april-2021.pdf

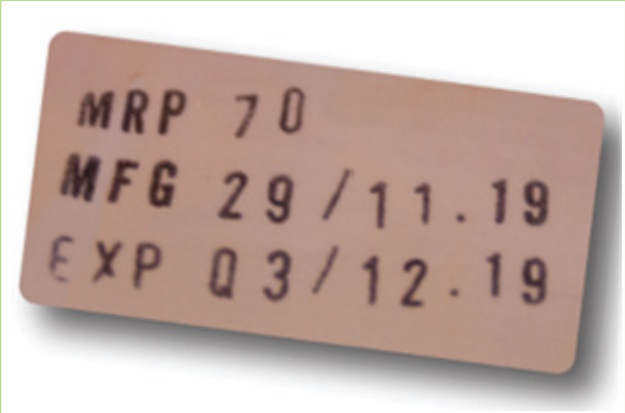
Guideline 5: Drink plenty of safe water daily

Water accounts for 70 percent of our body weight and is a constituent of blood and other vital body fluids. It is a major constituent of the human body and is an essential nutrient. Water is required for digestion, absorption, transportation, dissolving nutrients, elimination of waste products and thermo-regulation. Infants exclusively fed breast milk do not require supplemental water. A pregnant woman has increased water requirements because of expanding extracellular fluid and to meet the demands of the growing foetus and the amniotic fluid. Lactating women must drink adequate safe water to replenish the fluid lost in breast milk.

Key messages

- Drink 1.5 to 3.5 litres of pure safe drinking water daily (6 to 14 glasses) to meet daily fluid requirement;
- Boil the water before drinking, when the safety of water is in doubt;
- Drink coconut water and or non-sweetened fresh lime water as preferred beverages instead of sugary carbonated drinks (cola) and sugar-sweetened juices;
- Fresh fruit juices should be consumed in moderation due to their high sugar content and lack of fiber.

Guideline 6: Consume safe and clean foods and beverages



Accredited Product Certification Scheme
Bangladesh Standards and Testing Institute (BSTI)

Food contamination and adulteration are one of the major causes of various foodborne illnesses in the country. Consumption of unsafe food can cause severe illness and even death. Aflatoxins produced by certain moulds are transmitted to certain foods and cause contamination in grains, groundnuts, milk products, eggs and meat. Unsafe and contaminated foods cause many acute and lifelong diseases ranging from diarrhoeal diseases to various forms of cancer.

Natural enzymes present in food can also lead to its deterioration as a result of poor storage and processing. Besides, insects and rodents, adulterants, non-permitted food additives also make the food unsafe. Spoiled, stale, poor quality of food is made attractive by adding harmful chemicals and colours. Street food is also not considered safe food, as it is often prepared unhygienically, and might have pathogenic bacteria such as coliform organisms that are indicative of faecal contamination.

Selection of the right food is the first step to ensure a safe and good quality diet. Food items purchased from reliable sources where there is a high turnover ensure their freshness. Foods that conform to the Accredited Product Certification Scheme, Bangladesh Standards and Testing Institution (BSTI) should be purchased. In the case of packaged foods, always look for “best before“or “date of expiry“ labels as well as nutrient information on the label.

Raising awareness, ensuring safe water, sanitation and improved hygiene practise will play a significant role in reducing foodborne illness. Knowledge regarding food selection, food storage, food handling, cooking temperatures, sanitary and hygienic preparation practices, is critical for

safe food preparation. Perishable foods like milk, fish, meat, leafy vegetables and fruit need to be appropriately stored and should be consumed as soon as possible. Good personal hygiene should be observed throughout the process of handling food. The food handler should refrain from handling food if they have any wound or infection. The food handler must not spit, sneeze or cough over food. They should avoid touching their nose, mouth, hair and skin during food preparation. It is important to wash hands thoroughly and frequently and keep the surrounding area scrupulously clean. Dust, flies and dirt also contaminate the food, so food should always be kept well protected, properly stored and displayed.

Key messages

- Buy food items from reliable sources after careful examination;
- Wash vegetables and fruits thoroughly with safe water before use;
- Store raw and cooked foods separately and prevent microbial, rodent and insect invasion;
- Keep foods well covered from dust and flies;
- Store vegetables, fruits, dairy, eggs and flesh foods separately to prevent cross-contamination;
- Maintain good personal hygiene and keep the food preparation and storage areas clean and safe;
- Always wash your hands with soap and safe water before food handling;
- Always use clean utensils for cooking, storing, serving and eating;
- Refrigerate perishable food items until they are to be consumed;
- Reheat cooked foods thoroughly if they have been stored. Foods should be heated until they reach and maintain 70 ºC or above for 2 minutes;
- Be cautious when eating street foods as these are often contaminated with polluted water, pathogens and dust.

Guideline 7: Maintain desirable body weight through the intake of a balanced diet and regular physical activity

It is recommended that all healthy individuals engage in adequate levels of physical activities throughout their lives to achieve overall physical and mental health. Being physically active from an early age prevents many diseases and disabilities in adulthood. Exercise improves oxygen utilization, glucose uptake and increases working capacity. Many of the diet-related chronic diseases are closely linked to improper diet, poor activity patterns and faulty lifestyle.

In addition, one should follow a balanced meal plan and eat adequate calories. It is essential to remember that calories consumed must equal calories expended for a person to maintain a constant bodyweight (refer to Annex 3 for physical activity pyramid and annex 6 for self-evaluation checklist).

Key messages

- Eat food at regular hours and at the right time;
- Eat slowly and chew food properly;
- Eat food at timely intervals to avoid overeating;
- Avoid smoking, alcohol consumption and chewing betel nut;
- Maintain ideal body weight (IBW) by balancing food consumption with physical activity;

- For children and adolescents aged 5-17 years, do at least an average of 60 minutes per day of moderate-to-vigorous intensity, mostly aerobic, physical activity[23];
- For adults aged 18-64 years old, practise a minimum of 30 to 45 minutes of daily of moderate-intensity aerobic physical activities like walking, running, jogging, cycling along with daily household chores[24];
- Maintain a BMI of (18.5 to 25.0 kg/m2),[25] waist circumference (male 80 cm, female 90 cm) and waist to hip ratio (less than 0.95 for males, less than 0.80 for females) within normal limits;
- Engage in light physical activity post meals as it could help improve satiety after eating and is also effective in controlling blood sugar.

[23] Physical activity. 2022. https://www.who.int/news-room/fact-sheets/detail/physical-activity

[24] Ibid[23]

[25] Expert consultation held by the World Health Organization in 2004 recommended that for Asian populations, a BMI of 23 kg/m2 or higher, represents increased risk, and a BMI of 27·5 kg/m2 or higher represents high risk and should be considered as trigger points for public health action.

Guideline 8: Follow appropriate preparation and processing techniques and adopt healthy cooking methods

Proper methods of cooking render foods palatable by improving their appearance, taste, flavour and texture, thereby enhancing acceptability. Cooking softens the food so that it can be chewed easily, destroys germs and improves the digestibility of most foods. Foods should be washed well before cooking and consumption to remove contaminants like pesticide residues, parasites and other extraneous material. Vegetables should be cut into large pieces after washing. There are many methods of cooking like boiling, steaming, pressure-cooking, sautéing, stir-frying, shallow and deep-frying, roasting and baking. Boiling is the most common method of cooking. Pressure-cooking, steaming, roasting, sautéing or stir-frying in limited oil, cooking foods without discarding water are some of the healthy cooking methods that should be encouraged. Avoid reusing oils that have been deep-fried as they produce peroxides and free radicals that are associated with risk of cancer of the intestinal mucosa and related conditions.

Key messages

- Wash vegetables and other foods in safe water before cutting;
- Cut the vegetable into larger pieces;
- Do not expose vegetables and fruits in air and water after cutting;
- Cook foods in vessels covered with lids;
- Avoid reheating food more than once;
- Encourage consumption of raw vegetables such as carrots, cucumbers, tomatoes, as salads or chutneys;
- Make homemade salad dressings using lemon, vinegar, mustard powder and other fresh spices and herbs rather than oil;
- Use high-temperature, short time (HTST) method for cooking vegetables;
- Avoid reuse of oils particularly those used for deep-frying;
- Always use clean utensils for cooking, storing, serving and eating;
- Always wash your hands with soap and safe water before food handling.

Guideline 9: Eat additional food and take extra care during pregnancy and lactation

Photo courtesy: UNICEF/National Nutrition Services

Pregnancy and lactation are the most nutritionally demanding periods of a woman's life. The body needs enough energy and nutrients every day to support the growth of the baby and maintenance of the mother's body. All the nourishment that the baby needs comes from the mother, either through the food she eats or the nutritional supplements she takes. An average weight gain of about 12 kg (range 10–14 kg) during pregnancy can ensure a healthy baby and lower the risk of pregnancy-related complications. For lactating women, the higher the nutritional quality of the diet, the higher will be the nutritional quality of the breast milk. It is important that a lactating woman eats a well-balanced diet, drinks plenty of safe water, and gets as much rest as possible.

Key messages

- Eat good quality protein and bioavailable micronutrients (iron, zinc and calcium), such as eggs, beef, mutton, poultry and fish. Eat pulses, legumes and nuts and seeds that are good sources of protein and micronutrients preferably in combination with cereals;
- Germinated legumes, fermented foods and traditionally processed foods using roasting, steaming and soaking methods should be encouraged as they are easy to digest and have a higher nutritional quality;
- Consume leafy vegetables, yellow/orange and other vegetables for daily supply of iron, folic acid, vitamin A and dietary fibre;
- Eat seasonal fruits throughout pregnancy especially after meals. Fruits are good sources of vitamin C, potassium and dietary fibre;
- Drink milk and milk products daily for healthy skeletal development of the foetus;
- Engage in regular physical activity and maintain healthy body weight during pregnancy;
- Take iron and folic acid supplements as advised by the physician;
- If you are a lactating woman, eat a well-balanced diet, drink plenty of safe water to meet additional demands of milk production, and get enough rest.

Guideline 10: Practise exclusive breastfeeding for the first six months and introduce appropriate complementary foods from six months onwards

Photo courtesy: UNICEF

Breast milk is the ideal and essential food for infants. WHO recommends that breastfeeding be initiated within the first hour after birth, continued exclusively for the first six months of life and continued, with safe and adequate complementary foods, up to two years or beyond. Breast milk is the most natural and perfect food for normal growth and healthy development of infants. It reduces the risk of infections and acts as a natural contraceptive, delaying the next pregnancy. Complementary feeding (CF) is giving additional food to an infant from six months onwards when breast milk alone is no longer enough to meet the nutritional requirements of the growing child. Homemade complementary foods are recommended that are energy and nutrient-dense, and prepared using clean and sanitary practices.

Key messages

- Start breastfeeding as soon as the mother recovers from delivery usually within an hour of birth;
- Exclusively breastfeed for the first six months;
- Ensure active family support, time and rest for the mother;
- Choose homemade complementary foods after six months of age;
- Introduce appropriate complementary foods beginning six months and continue breastfeeding until two years;
- To prepare complementary foods, choose a minimum of four food groups of the recommended seven that include the following:
  - grains, roots and tubers;
  - legumes and nuts;
  - dairy products (milk, curd, cheese, poneer);
  - flesh foods (meat, fish, poultry and liver/organ meats);
  - eggs;
  - vitamin A rich fruits and vegetables;
  - other fruits and vegetables;
- Avoid giving salty and spicy foods; and restrict the addition of salt;
- Avoid giving juices/sweetened drinks during the first year of life;
- Avoid all forms of tobacco and alcohol intake during breastfeeding.

SECTION: 02

AGE SPECIFIC DIETARY GUIDELINES

AGE SPECIFIC DIETARY GUIDELINES

Adequate quality and quantity of food intake and good nutrition are basic human right and nutrition is fundamental to achieving optimal health and is a very important determinant of physical growth and cognitive development. Improving nutritional status can have a significant impact on survival and productivity.

National momentum to address malnutrition has increased significantly over the past few years. Despite of the achievements, Bangladesh continues to experience a high burden of under-nutrition (stunting 24 percent, wasting 11 percent, underweight 22 percent) of children under 5 years (BDHS, 2022). Poor infant and young child feeding (IYCF) practices (such as early initiation and exclusive breastfeeding and appropriate complementary feeding) have contributed to the problem significantly. Regardless of substantial improvements, the prevalence of exclusive breastfeeding is still only 53 percent, BDHS 2022 shows a decline in minimum acceptable diet by children under five years old. 30 percent of children age 6–23 months were fed a minimum acceptable diet, a drop from 35 percent in 2017–18.

Under-nutrition is also predomint among adult women and adolescent girls in Bangladesh. Overall 9 percent of ever-married women are below the cut of 145 centimeters tall (NIPORT, Mitra and ICF Int. 2014), 19 percent are undernourished or thin (BMI less than 18.5). At the same time, a rapid increase has been observed in prevalence of overweight and obesity (BMI >23) among women of reproductive age (e.g. 38 percent of women are overweight or obese).

Over the past decade, micronutrient deficiencies, remains as a challenge among children and women of reproductive age. Sub-clinical vitamin A deficiency is 50.9 percent and Zinc deficiency is 31 percent among preschool children. About 19.7 percent of children 6-59 months and 29.6 percent of women (NPNL) suffer from iodine deficiency. Prevalence of iron deficiency is 15.1 and 14.1 percent for children 6-59 months and NPNL women respectively. Twenty one percent of children 6-59 months, 28.9 percent of NPNL (National Micronutrient Survey 2019-2020) and 50 percent of pregnant women are anaemic (NIPORT, Mitra and ICF Int., 2014).

On average, the energy gap between requirements and actual calorie intake for a typical adult Bangladeshi is 190 kilocalories (2400 kcal versus 2 210 kcal). Since 1992, there has been an decrease in average per capita daily calorie intake from 2266 kcal in 1991-1992 to 2393 kcal in 2022 (BBS, 2022). As shown by high prevalence of micronutrient deficiencies for iodine, zinc, vitamin A and iron, Bangladeshi diets are typically lacking in important micronutrients are still largely dominated by cereals, which contributes around 70 percent of the per capita total caloric intake, which is much higher than the WHO/FAO recommendation (2003) of 60 percent.

The age specific dietary guidelines have been designed for professionals such as nutritionists, dietitians and clinicians who can help individuals, families and communities to consume healthy, nutritionally adequate, balanced diet and thus improve the nutrition situation of Bangladeshi population.

Guideline 1: Dietary guidelines for infant and young child feeding

A. Exclusive breastfeeding for infants 0-6 Months

Adequate nutrition during infancy and early childhood is essential to ensure growth, health and development of children to their full potential. WHO recommends that infants should be breastfed within one hour of birth and exclusively breastfed for the first six months of life.

▶ Early initiation of breastfeeding

Early initiation of breastfeeding ensures infants receive colostrum, the yellowish, sticky breastmilk, or "first milk", which is rich in protective factors.

Skin-to-skin contact between mother and infant shortly after birth helps to initiate early breastfeeding and increases the likelihood of exclusive breastfeeding for one to six months of life as well as the overall duration of breastfeeding.

▶ Pre-lacteal feeding

Because of the misconception of not having enough breastmilk immediately after childbirth, especially in case of surgery (caesarean), many people give pre-lacteal foods.

Pre-lacteals include honey, mollasses, sugar, water, mustard oil, flour or rice powder, semolina, milk from goats, cows, or powdered milk. These feeds cause infections such as diarrhoea, septicaemia, meningitis; neonatal and child death and often failure to breastfeeding.

▶ Exclusive breastfeeding

Exclusive breastfeeding can be defined as a practice whereby the infants receive only breastmilk without mixing it with water, other liquids such as honey, sugar candy water, herbal preparations, artificial milk (such as breastmilk substitutes), other animal milk, oil or any other food in the first six months of life, with the exception of vitamins, mineral supplements or medicines (BIRDEM, 2013).

▶ Nutritional and health benefits of breastfeeding

Breastfeeding an infant exclusively for the first six months of life carries numerous benefits. The long-term benefits of breastfeeding for mothers and children cannot be replicated by infant formula. When infant formula is not properly prepared, there are risks arising from the use of unsafe water and unsterilized equipment or the potential presence of bacteria in powdered formula.

For Infants

- Breastfeeding is safe and contains antibodies that protect infants from childhood illnesses, such as: gastrointestinal infection, pneumonia, meningitis and urinary tract infection; and contributes to child health and survival;
- Breastmilk provides all the nutrients needed for healthy growth and mental development;

- Beyond the immediate benefits for children, breastfeeding contributes to a lifetime of good health and better cognitive development;
- Adolescents and adults who were breastfed as babies are less likely to be overweight or obese. They are less likely to have type II diabetes.

For mothers

- Breastfeeding helps the mother by reducing the risk of ovarian and breast cancer;
- Breastfeeding helps the mother to rapidly return to her pre-pregnancy weight;
- Breastfeeding may help space pregnancies – this is a natural (though not fail-safe) method of birth control known as the Lactational Amenorrhoea method.

▶ Nutritional considerations

- **Working mother**

  Working mothers can express breast milk and leave it for another caregiver to feed to the baby in a clean and safe way while they are apart. Expressed breastmilk can be kept for up to 6 hours at room temperature, up to 4 days in refrigerator (4 degree centigrade) and 6 months in freezer (-18 degree centigrade) (CDC, no date), in a clean food-grade container, preferably glass container with tight fitting lids made from glass or plastic. Frozen breast-milk cannot be heated in oven, and need to be thawed before feeding. In work place crèche/daycare, breastfeeding breaks, paid maternity leave for 6 months and working hours should be adjusted for working mothers.

Special circumstances/cases

- Low birth weight infants who are able to breastfeed should be put to the breast as soon as possible after birth when they are clinically stable, and should be exclusively breastfed until six months of age. Very low birth weight infant below 1500 g may need to be fed by nasogastric tubes;
- Human immunodeficiency virus (HIV)-positive mothers are encouraged to practice exclusive breastfeeding while taking Anti-Retro Viral drugs and following WHO recommendations on HIV and breastfeeding, (National Institute of Nutrition [NIN], 2019) to prevent and control transmission of HIV to babies;
- Infants born to Hepatitis B virus infected mothers can start breastfeeding upon receiving hepatitis B immune globulin and the first dose of hepatitis B vaccine within 12 hours of birth. There is no need to delay breastfeeding until the infant is fully immunized (second dose at age 1–2 months and third dose at six months) (CDC, no date)[26];
- It is recommended that, mothers with suspected or confirmed COVID-19 should be encouraged to initiate or continue to breastfeed. Mother and infant should be enabled to remain together while rooming-in throughout the day and night during establishment of breastfeeding, whether they or their infants have suspected or confirmed COVID-19(WHO, no date)[27];

[26] https://www.cdc.gov/breastfeeding/

[27] Breastfeeding and COVID-19 2020. https://www.who.int/news-room/commentaries/detail/breastfeeding-and-covid-19

- During emergencies, the life-saving protection of breastfeeding is more important than ever. In the settings of conflicts, natural disasters and epidemics breastfeeding guarantees a safe, nutritious and accessible food source for infants and young children and a protective shield against disease and death;
- The frequency and duration of breastfeeding should be increased when the child is sick.

▶ Other considerations

- Use of bottles, teats or pacifiers must be discouraged;
- The child should be allowed to breastfeed as long as they want;
- Mothers should receive practical support from families, communities, service providers and work places to enable them to initiate and practice exclusive breastfeeding, and manage common breastfeeding difficulties;
- Mothers should be motivated and treated if needed if there are common breastfeeding difficulties including engorged breast, mastitis, cracked nipples, inverted nipples, sore nipples, breast abscess, and psychological barriers such as lack of confidence to breastfeed (refer to IYCF module)[28];
- To sustain adequate breastmilk output, frequent sucking by the baby and complete emptying of the breast is important;
- Mothers should be taught how to express breastmilk and practice proper positioning and attachment during breastfeeding. Refer to *Baby Friendly Hospital Initiative* module (WHO and UNICEF, 2018).

B. Dietary guidelines for children aged 6 to 23 Months : Complementary Feeding (CF)

Complementary foods should be introduced after six months of age (180 days) while breastfeeding continues. Breastfeeding should be continued frequently and on demand until two years of age or beyond. Complementary feeding constitutes one of the most important periods within the 1000-days window of opportunity for optimizingnutritional, health, and development outcomes. This is the period when homemade nutritious foods – called complementary foods – are provided along with breastmilk. This process begins when breastmilk alone is insufficient to meet the fast-growing energy and nutrient requirements of infants, usually from six months of age. While the young child gradually becomes accustomed to eating family foods during the first 18 months of complementary feeding (following six months of exclusive breastfeeding), breastfeeding continues to provide important nutrients and protective factors until the child is at least two years old.

Nutritional principles of complementary feeding

As per National Strategy for Infant and Young Child Feeding in Bangladsh 2007 and WHO Guideline for complementary feeding of infants and young children 6–23 months of age, 2023; the following recommendations should be followed for complementary feeding:

[28] National Strategy for Infant and Young Child Feeding in Bangladesh, 2007. http://etoolkits.dghs.gov.bd/sites/default/files/national_strategy_for_iycf.pdf

- **Characteristics:** Complementary foods should provide enough energy, protein, and micronutrients (particularly iron, zinc, calcium, vitamin A, vitamin C and folate) to cover a child's energy and nutrient gaps, so that together with breastmilk, they meet all the child's needs. CF should not be too sweet (no added sugar), spicy or salty, it must be easy for the child to eat and digest, acceptable by the child, locally available and affordable, and easy to prepare.

- **Timeliness:** CF should be introduced when the child has completed six months (180 days) of life, when the need for energy and nutrients exceed what can be provided through exclusive and frequent breastfeeding. If CF is started too early (before 6 months), it is likely to cause undesirable effects to the child. Before 6 months, the gastrointestinal tract is not ready to digest and absorb the foods, and unhygienic preparation and feeding can quickly cause diarrhoea. Too early introduction of CF may merely help fill the stomach, but will not be nutritionally adequate to meet the infant's growing nutritional needs and may compete with breastmilk intake. Early introduction of CF will also deprive the child of protective factors in breastmilk, as there will be less of a supply of breastmilk from the mother. On the other hand, if CF is introduced too late into the infant's diet, it is likely to lead to failure to gain appropriate weight. It also becomes more difficult to persuade the baby to start eating solid foods at a later stage.

- **Hygiene and food safety:** CF should be clean and safe (no microbes, harmful chemicals or toxins; no bones or hard bits that may choke a child), hygienically prepared and stored and fed with clean hands or spoons, using clean utensils (cups or bowls), and not with bottles and teats. Most often, diarrhoea is caused by the mothers' or caregivers' unhygienic handling, preparation and feeding practices. Foods should be stored safely and served immediately after preparation (Complementary Feeding: Family foods for breastfed children, WHO, 2000a).

- **Adequacy:** CF should provide sufficient energy, protein and micronutrients from different food groups in the right proportion.

The recommended energy and macronutrient requirements, quantity of food and feeding frequency for CF are given in Table 5.

Table 5: Energy requirements, * amount and feeding frequency, Compelementary feeding for children 6 to 23 months[29]

Age group	Energy requirement per day	Meal frequency per day	Amount	Number of snacks	Dietary Diversity (refer to Table 6)	Texture
6-8 months	200 kcal	2- 3 meals	125 ml (half of a 250 ml bowl)	1-2	Equal to or more than 4	Start with well mashed foods Continue with mashed family foods
9-11 months	300 kcal	3-4 meals Depending on the child's appetite, 1–2 snacks may be offered	125 ml (half of a 250 ml bowl)	1-2	Equal to or more than 4	Finely chopped or mashed foods, and foods that baby can pick up
12-23 months	550 kcal	3-4 meals Depending on the child's appetite, 1–2 snacks may be offered	250 ml (one of a 250 ml bowl)	1-2	Equal to or more than 4	Family foods, chopped or mashed if necessary

*Does not include energy intake from breastmilk

[29] Guidelines for complementary feeding in Bangladesh, adapted from WHO (2000) Guidelines on complementary feeding : family foods for breastfed children, Infant and young child feeding: model chapter for textbooks for medical students and allied health professionals

- **Consistency:** From 6 to 23 months, the diets for infants and children should be diversified regarding the flavours and textures of food, and should gradually become more varied and complex. During this period, neurological and physiological development allows infants and young children to eat increasingly complex food textures, commencing with liquid and progressing to semi-liquid, soft and hard consistency. Smooth textures with semiliquid foods pureed, roughly mashed foods and small tender pieces with puree should be given at 6 to 8 months and 9 to 11 months respectively. Soft and hard small pieces should be introduced from 12 months onwards. Finger foods such as carrot, biscuits, breads, pieces of apple should be encouraged as CF.

- **Responsive Feeding:** Children gradually develop the skills to feed themselves independently. However, in the earlier stage of complementary feeding, as the child totally relies on the mother or caregiver to feed them, responsive feeding should be followed. Responsive feeding refers to the behaviours and practices adopted by the parents or caregivers that provide the stimulation and emotional support to the child during feeding. The following are recommended:

  - Infants should be fed slowly and patiently and should not be forced to eat;
  - If they refuse to eat or do not express any sign of appetite, the mother or caregiver should experiment different food combinations, tastes, textures and methods of encouragement;
  - Infants should be fed directly, and older children should be assisted when they feed themselves, being sensitive to their hunger and satiety cues;
  - If the child loses interest easily then minimize distractions during meals;
  - Remember that feeding times are periods of learning and love – talk to children during feeding, with eye contact.

- **Dietary Diversity:** Increasing the variety of foods across and within food groups is recommended by CF dietary guidelines for Bangladesh. Intake of a diverse diet helps to ensure adequate intake of macro and micronutrients and promote optimum growth and good health. Complementary foods should come from different food groups so that the young child's diet contains all the required energy and essential nutrients (UNICEF and IPHN, 2007).

  According to recommendations from WHO Guideline for complementary feeding of infants and young children 6–23 months of age[30]

  - Animal source foods, including meat, fish, or eggs, should be consumed daily;
  - Fruits and vegetables should be consumed daily;
  - Pulses, nuts and seeds should be consumed frequently, particularly when meat, fish, or eggs and vegetables are limited in the diet.

[30] WHO Guideline for complementary feeding of infants and young children 6–23 months of age, 2023

Table 6: The eight food groups for CF dietary diversity [26,31]

Number	The food groups
1	Breastmilk
2	Flesh foods (meat, fish, poultry, and liver/organ meats
3	Dairy products (milk products, yogurt, cheese)
4	Eggs and egg products
5	Legumes and nuts
6	Vitamin-A rich fruits and vegetables (dark green and colourful)
7	Other fruits and vegeables
8	Grains, roots and tubers

▶ Unhealthy Foods and Beverages

Consumption of unhealthy foods and beverages[32] among infants and young children is increasing due to primarily palatability, convenience, often low cost compared to more nutritious foods, ubiquity, and aggressive promotion. The following recommendations are made[33]

- Foods high in sugar, salt and trans fats should not be consumed;
- Sugar-sweetened beverages should not be consumed;
- Non-sugar sweeteners should not be consumed;
- Consumption of 100 percent fruit juice should be limited.

Examples of improved CF recipes

Selected improved CF recipes are included below. These recipes are based on the results of research conducted in seven Divisions of Bangladesh (using the Trial of Improved Practices (TIPs) technique) (GoB/USAID/EU/FAO/BBF. 2013). These recipes have been developed using a variety of affordable and locally available foods, with appropriate preparation methods and processing

[31] UNICEF. 2017. Meeting Report on Reconsidering Refining and Extending the World Health Organization Infant and Young Child Feeding Indicators. New York. 64 p. https://data.unicef.org/wp-content/uploads/2017/11/IYCF-consultation-report-1.pdf

[32] Often referred to as highly processed or ultra-processed, that contain high amounts of free sugars, salt, and unhealthy fats such as saturated fats and trans fats. They are also generally high in energy and low in nutrients

[33] Ibid[30]

technologies. The recipes serve to fulfil the energy and nutrient requirements for the three age categories of children, namely 6–8 months, 9–11 months and 12–23 months. The nutritive values have been calculated using the Food Composition Table for Bangladesh 2013. The examples of meal are given below and recipe can be found in the *Improved Recipes Book for Complementary Feeding of Children aged 6-23 months* (GoB/USAID/EU/FAO/BBF. 2013a).

- Egg/Chicken khichuri;
- Fish cutlet;
- Vegetable omelet;
- Pumpkin soup;
- Mango payesh.

▶ Other considerations

- Monitor child's growth chart every month to track the growth (GMP-Growth Monitoring and Promotion);
- The child should receive vitamin A supplements as per national guidelines (children aged 6-11 months receive a blue capsule, while those aged 12-59 months receive a red capsule.);
- Provide oral re-hydration salt (ORS) and zinc to the child with diarrhoea;
- Avoid commercial formulated complementary foods (canned, tinned, packaged etc);
- Be physically active several times a day in a variety of ways, particularly through interactive floor-based play or at least 30 minutes in prone position (infant less than 1 year);
- Spend at least 180 minutes in a variety of types of physical activities at any intensity, including moderate to vigorous-intensity physical activity, spread throughout the day (children 1-2years of age).

Guideline 2: Dietary guidelines for children aged 2-5 years

Toddler's continual development between 24 and 36 months requires a steady supply of nutrients. According to the National Institute of Nutrition, India and the Indian Council of Medical Research (ICMR) nutrient requirements and recommended nutrient intake, in general children gain about 2 to 2.5 kg body weight/year and 5 to 6 cm height/year for this age group. During this period, the child's digestive tract matures and is able to digest and utilize more complex foods and fluids.

Nutritional and dietary considerations

▶ Foods to select

- About 50 percent of the total calorie intake should be consumed from cereals; including whole grains in the diet, such as brown rice without discarding the water, brown flattened rice, whole-wheat roti/bread, oats. Cereals are rich in dietary fibre and help prevent constipation, intestinal diseases and prolong the feeling of satiety;
- Intake carbohydrate primarily from whole grains, vegetables, fruits and pulses;
- Ensure 0.8 g - 1.2 g/kg IBW protein daily;
- Nearly 10 percent of the total calories should be consumed from fruits, vegetables leafy vegetables and dairy products. Eat at least 250 g of fruits and vegetables every day. These contain a wide range of minerals, vitamins, antioxidants and dietary fibre;
- Give iron-rich food such as meat and eggs, iron is also available from plant sources, including nuts, beans and dark green, leafy vegetables;
- Increase the consumption of iron rich foods except for certain blood diseases such as thalassemia. Iron helps transport oxygen around the body and contributes to the toddler's brain development. A high level of iron can be found in dry fish (tengra), hilsha fish, mola fish, liver, eggs, red meat, data shak, methishak, lalshak, mustard leaves, Bengal gram, green gram, whole grain *(chira, khoi)*, water melon etc and nuts;
- Change the food types within a food group often to ensure diet variety and diversity;
- Consume calcium-rich foods such as dry fish (vetkifish, prawn), molafish, rueefish, milk, yogurt, cheese;
- Intake 250 g vegetables and fruits along with 15 g naturally occurring dietary fibre daily;
- Encourage drinking enough safe water (43 ml/kg/day).

Table 7: Sample Food list for a child of 2-3years (1250 kcal)

Groups	Servings	Name of foods	Raw amount of total food consumption (g/ml)	Energy (kcal)	Protein (g)	Fat (g)	CHO (g)
Grains, White Roots and Tubers	4.5	Rice	75	258	4.9	0.3	58
		Wheat-flour (ata), roti	30	100	3.4	0.6	19
		Potatoes	50	33	0.6	0.1	7
Pulses (beans, peas and lentils)	1	lentils dal	30	95	8.3	0.2	13
Chicken/Meat/Fish	2	Mola	50	54	8.6	2.2	0
		Chicken, deshi	50	64	9.6	2.9	0
Eggs	1	Egg (boiled)	40	72	6.0	5.3	0
Dark green leafy vegetables	0.5	Pat shak	50	16	1.45	0.15	1
Other vegetables	0.5	Gourd bottle	50	17	0.55	0.05	3
Other fruits	2	Guava	50	32	0.5	0.3	10
		Mango	50	1	0.4	0.2	9
Other vitamin A rich vegetables and fruits	1	Pumpkin	50	9	0.7	0.2	1
Milk and milk products	3.0	Milk (cow, whole fat)	300	190	9.4	11.2	12
		Sweet curd	75	71	2.4	3.0	9
Nuts and seeds	-	Nuts (peanuts)	5	29	1.125	2.33	1
Spices	-	Spices	5	13	-	-	-
Oils	1	Soya bean	15	135	0.0	15.0	0

- 1 serving of cooking oil = 5 ml;
- 1 serving of spices = 20 g;
- 1 serving of cereals/pulses = 30 g;
- 1 serving milk /curd = 1 cup = 150 ml.

▶ Foods to limit/avoid

- Limit intake of high fat sugar salt (HFSS) food and beverage;
- Limit refined, processed and salty foods (chips, chanachur, sausages, salami etc) trans-fat rich foods (fried chicken, french fries, pizza, burger, bakery food etc), deep-fried savoury snacks;
- Limit the intake of sugar, sugary foods (candies, chocolates, pastry, ice cream etc), sugar sweetened beverages;
- Avoid offering tea, coffee or other caffeinated drinks.

▶ Other considerations

- Eating family meals together without distractions of television, computer games or phone will encourage the child to enjoy a variety of foods and develop good eating habits;
- Ensure consumption of three major meals including breakfast and two healthy snacks;
- As per physician's prescription give deworming tablets twice a year on a full stomach. This significantly reduces intestinal worm infections, a direct cause of anaemia and malnutrition;
- The child should receive vitamin A supplements, as per national guidelines (children aged 6-11 months receive a blue capsule, while those aged 12-59 months receive a red capsule.);
- Ensure regular water sanitation and hygiene practice specially washing of hands with soap and water after use of the toilet and before eating;
- Monitor the child's growth on a chart regularly;
- Encourage sun exposed outdoor game daily;
- Sick child needs to be fed smaller quantities at frequent intervals;
- Share the family meals with the child: Three complete meals and two healthy snacks;
- Ensure consumption of all major meals including breakfast and foods from all food groups for a balanced diet;
- Spend at least 180 minutes in a variety of types of physical activities at any intensity, of which at least 60 minutes is moderate- to vigorous- intensity physical activity, spread throughout the day.

Guideline 3: Dietary guidelines for school aged children (6-9 years)

Children of this age are highly active, grow rapidly and need sufficient energy and nutrients for optimum growth, mental and physical development. To provide energy and nutrients for the growth and prevention of illness these children require regular meals.

Nutritional and dietary considerations

▶ Foods to select

- About 50 percent of the total calorie should be consumed from cereals. Include whole grains in the diet, such as brown rice without discarded water, brown flattened rice, whole wheat roti/bread and oats. They are rich in cereal dietary fibre;
- Intake carbohydrate primarily from whole grains, vegetables, fruits and pulses;
- Ensure 0.8 g - 1.2 g/kg IBW protein daily;
- Nearly 10 percent of the total calories should be consumed from vegetables, leafy vegetables and dairy products. These contain a wide range of minerals, vitamins, antioxidants and dietary fibre. Eat at least 350 g of fruits and vegetables every day;
- Ensure consumption of three major meals including breakfast and two healthy snacks including school tiffin;
- Change the food types within a food group quite often to ensure diet variety and diversity;
- Consume calcium-rich foods, which include dry fish (vetki fish, prawns), molafish, ruhi fish, milk, yogurt, cheese;
- Intake 350 g vegetables and fruits along with 21 g naturally occurring dietary fibre daily
- Encourage the child to drink safe water frequently.

Table 8: Sample food list for a child of 7 years (around 1650 kcal)

Food groups	Servings	Name of foods	Raw amount of food (g/ml)	Energy (kcal)	Protein (g)	Fat (g)	CHO (g)
Grains, white roots and tubers	6	Rice	120	413	7.8	0.5	92
		Wheat-flour (ata), roti	60	200	6.8	1.3	37
Pulses (beans, peas and lentils)	1.5	Masoor dal	45	143	12.5	0.4	19
Chicken/meat/fish	2	Katlafish	50	52	10.0	1.3	0
		Chicken, deshi	50	64	9.6	2.9	0
Eggs	1	Egg (boiled)	60	107	9.1	7.9	0
Dark green leafy vegetables	0.5	Pat shak	75	24	2.175	0.225	1
Other vegetables	2	Okra/Ladies finger	50	20	1.05	0.1	3
		Gourd bottle	100	34	1.1	0.1	7
Other fruits	2	Apple (without skin)	50	26	0.15	0.05	6
		Banana	100	95	1.3	0.8	19

Table 8: Continued

Food groups	Servings	Name of foods	Raw amount of food (g/ml)	Energy (kcal)	Protein (g)	Fat (g)	CHO (g)
Other vitamin A rich vegetables and fruits	1	Pumpkin	100	18	1.4	0.3	1
Milk and milkproducts	2	Milk (cow, whole fat)	300	189	9.3	11.1	13
Nuts and seeds	0.5	Nuts (peanuts)	15	88	3.375	6.99	2
Spices	1	Spices	20	50	-	-	-
Oils	1	Soybean	15	135	0.0	15.0	0

Note: * CHO - carbohydrates

- 1 serving of cooking oil = 5 ml;
- 1 serving of spices = 20 g;
- 1 serving of cereals/pulses = 30 g;
- 1 serving milk /curd = 1 cup = 150 ml.

▶ Foods to limit or avoid

- Limit intake of high fat sugar salt (HFSS) food and beverages;
- Limit intake of refined, processed and salty foods (chips, chanachur, sausages, salami etc) trans-fat rich foods (fried chicken, french fries, pizza, burger, bakery food etc), deep-fried savoury snacks;
- Limit the intake of sugar, sugary foods (candies, chocolates, pastry, ice cream etc), sugar sweetened beverages;
- Avoid offering tea, coffee or other caffeinated drinks;
- Avoid snacking all day in place of meals, as this usually results in eating an unbalanced diet.

▶ Other considerations

- Eating family meals together without distractions of television, computer games or phone will encourage the child to enjoy a variety of foods and develop good eating habits;
- Ensure regular water sanitation and hygiene practices specifically wash hands with soap and water after use of the toilet and before eating;
- As per physician's prescription give deworming tablets twice a year on a full stomach. This will significantly reducing intestinal worm infections, a direct cause of anaemia and malnutrition;
- Maintain ideal body weight;
- Encourage children to join sun exposed outdoor sports for good bone health. Children should be encouraged to do moderate or vigorous physical activity games for at least 60 minutes per day.

Guideline 4: Dietary guidelines for adoelesents (10 to 19 years)

Adolescence is defined as a period of human growth and development that occurs after childhood and before adulthood. According to the United Nations, adolescents are those persons aged between 10 to 19 years (WHO, 2014). The foundation of adequate growth and development is laid before birth, during childhood, and is followed during adolescence with accelerated physical, biochemical, emotional development and reproductive maturation. Growth during adolescence is faster than at anyother time in an individual's life. Malnutrition in girls during this period not only contributes to increased morbidity and mortality associated with pregnancy and delivery, but also to increased risk of delivering low birth-weight babies.

▶ Nutritional and dietary considerations

The nutritional requirements of adolescents are detailed and explained below:

- **Energy:** Calorie needs to be increased to meet the metabolic demands of growth and energy expenditure during adolescence. During this period, boys need 1900 to 3100 kcal/day and girls need 1800 to 2400 kcal/day (10 to 17 years age range), depending on the physical activity level values;

- **Protein:** According to the WHO/FAO expert committee (2003) protein requirement for adolescents is 0.8g/kg- 1 g/kg body weight, to meet growth for the pubertal changes in both sexes and for the development of muscle mass;

- **Calcium:** Intake of 1 300 mg of calcium is recommended during adolescence for accelerated muscular, skeletal, endocrine development and achieved peakbone mass;

- **Iron:** During adolescence, girls need to ensure adequate intake of iron as they lose 0.5 mg/day through menstruation. For 10 percent bioavailability of iron, the recommended value for iron is around 10 mg/day to 15 mg/day for males, and 10 mg/day to 30 mg/day for females;

- **Vitamin C:** Vitamin C rich fruits such as Indian gooseberries (amloki), guava, gourd (small bitter), drumstick leaves, ripe mango and citrus fruits improve iron absorption from plant foods. The RNI for vitamin C is 40 to 45 mg/day for adolescents;

- **Zinc** is essential to ensure growth and sexual maturation during this period. The current recommended requirements for zinc is 4.3 to 14.4 mg/day for girls and 5.1 to 17.1 mg/day for boys, based on bioavailability. Good sources of zinc include Bengal gram, ripe papaya, peas, fish and meat;

- **Folic acid** deficiency during adolescence causes megaloblastic anaemia, peripheral neuropathy, birth defects (in adolescent pregnancy), and depression. The RNI for folic acid is 400 mcg;

- Intake carbohydrate primarily from whole grains, vegetables, fruits and pulses;

- Eat at least 400 g of fruits and vegetables along with 25 g naturally occurring dietary fibre daily.

Table 9: Sample of food list for 13 years old adolescent of 2400 kcal

Food groups	Servings	Raw amount of total food consumption (g/ml)	Energy (kcal)	Protein (g)	Fat (g)	CHO* (g)
1. Cereals	11	322	1 109	26.01	2.39	241.9
2. Fish/chicken/meat	2	60	80.4	11.46	3.87	0
3. Egg	1	60	94.8	7.98	6.96	0
4. Milk and milk products	2	300	235.5	9.45	11.55	23.55
5. Pulses	3	90	302.7	22.68	2.28	43.68
6. Vegetables	5	500	267.5	7.2	3.8	52.7
7. Leafy vegetables	1	150	37.5	3.6	0.45	3.15
8. Fruits	2	150	126.5	1.8	1.05	24.65
9. Oils and fats	3	15	135	0	15	0
10. Nuts and seeds	1	30	176	6.75	13.98	4
11. Spices	1	20	45.8	2.04	0.44	8.4

Note: * CHO - carbohydrates

- 1 serving (cereals/pulses) = 30 g (raw);
- 1 serving (milk/curd) = 150 ml;
- 1 serving oil = 5 ml;
- 1 serving spices = 20 g.

▶ Foods to select

- Consume calcium-rich foods, which include dry fish (vetki fish, prawn fish etc), mola fish, ruee fish, milk, yogurt and cheese;
- Whole-grain (chira, khoi), plant foods such as leafy vegetables (data shak, methi shak, lalshak, mustard leaves), legumes (Bengal gram, green gram), dry fruits contain iron and animal source foods like meat, fish and liver are excellent sources of iron;
- Consume iodized salt.

▶ Foods to limit or avoid

- Limit intake of high fat sugar salt (HFSS) food and beverage;
- Consume less than 5 g salt/day, less than 10 percent calories from free sugars and less than 10 percent of total fat calories from saturated fats;
- Reduce intake of free sugar (such as table sugar and soft drinks);
- Limit the energy intake from total fats and provide an equal balance saturated, monounsaturated and polyunsaturated fats;
- Limit intake of refined, processed and salty foods (chips, chanachur, sausages, salami etc) trans-fat rich foods (fried chicken, french fries, pizza, burger, bakery food etc), deep-fried savory snacks;
- Limit the intake of sugar, sugary foods (candies, chocolates, ice cream, pastry etc) sugar sweetened beverages;
- Avoid snacking all day in place of meals, as this usually results in eating an unbalanced diet.

▶ Other considerations

- Take deworming medicine on full stomach at least twice a year as per physician's prescription and/or national programme;
- Practice good personal hygiene;
- Maintain ideal body weight;
- Encourage drinking of safe water (8-12 glasses water, 1 glass=240 ml);
- Regular exercise and physical activity are imperative to maintaining ideal body weight and good health. Children and teenagers (5-17 years) should be encouraged to do moderate or vigorous physical activity games for at least 60 minutes per day[34].

[34] WHO Guidelines on Physical Activity and Sedentary Behavior, 2020. https://www.who.int/publications/i/item/9789240015128.

Guideline 5: Dietary guidelines for pregnant woman

Pregnancy is a physiologically and nutritionally highly demanding period. A diversified diet, in an additional amount, and extra care are essential during pregnancy. During pregnancy, significant percentage of brain development of the foetus occurs. Therefore, essential micronutrients are required along with an additional 77000 calories throughout the pregnancy to ensure meeting the pregnancy weight gain. It is essential to know the parents' blood group and pre-pregnancy glycemic status for a healthy outcome.

Table 10: Recommended weight gain during pregnancy[35]

Pre-pregnancy weight	Recommended weight gain (lb)	Recommended weight gain (kg)
Underweight	28-40	13-18
Average weight	25-35	11-16
Overweight	15-25	7-11
Obese	11-20	5-9

▶ Nutritional and dietary considerations

The recommended nutrient intake for energy and macronutrients during pregnancy period are given in the Annex 8.

- **Calories:** According to the Expert Committee the requirement for extra calories during the first trimester is 85, second trimester is 285, and third trimester is 475 kcal/day. During pregnancy the metabolism increases by 15 percent;
- **Carbohydrates:** Carbohydrate should comprise 45 to 64 percent of daily calories during pregnancy. RNI for women during pregnancy is 175 g/day, increased from 130 g/day for non-pregnant women. These quantities are needed to provide enough calories in the diet, prevent ketosis, and maintain appropriate blood glucose level during pregnancy;
- **Dietary fiber:** The RNI for fiber during pregnancy is 28 g/day;
- **Protein** intake during pregnancy is 60 g/day, which represents an increase from 46 g/day in non-pregnant states. In other words, this increase reflects a change to 1.1 g/kg/day protein, an additional 25 g/day to meet the needs of pregnancy from 0.8 g of protein/kg/day for non-pregnant states;
- **Lipids:** Total fat intake should comprise 20 to 35 percent of daily calories, similar to non-pregnant women. During pregnancy the recommended RNI for polyunsaturated fatty acids (linoleic acid) is of 13 mg/day and linolenic acid is 1.4 g/day. The ratio of the two fatty acids should be no more than 5:1;
- **Folic acid:** The RNI for folic acid during pregnancy increases to 600 µg/day. In pre-conception and early pregnancy 400 µg/day of folic acid is necessary for the prevention of neural tube defects, the most common of which are spina bifida and anencephaly;
- **Iron:** The RNI for iron during pregnancy is 27 mg/day, and is particularly vital to meet this recommendation during the second and third trimesters. During the last three months, the baby is accumulating iron for use during early life;

[35] Modified from Institute of Medicine National Research Council. 2009. Weight gain during pregnancy: reexamining the guidelines. Washington, DC. The National Academies Press. https://doi.org/10.17226/12584

- **Vitamin B12:** The RNI of vitamin B12 is 2.6 µg/day during pregnancy;
- **Vitamin C:** The Expert Committee recommends an intake of 55 mg/day during pregnancy;
- **Calcium:** The RNI for calcium for pregnant women is 1200 mg/day. Milk and dairy products, green leafy vegetables (example spinach), small bony fish, dry fish, molafish are good sources of calcium. The increased amount of calcium is required during gestation for mineralization of the foetal skeleton;
- **Vitamin D:** The recommendation for vitamin D during pregnancy is 1000 IU daily;
- **Vitamin A:** The RNI of vitamin A is 800 µg/day during pregnancy. This can be achieved by consuming organ meat (limited consumption), oils, egg yolk green leafy vegetables in the diet;
- **Magnesium:** The RNI for magnesium during pregnancy is 220 mg/day. The best dietary sources of magnesium are peanuts, bran, wheatgerm, nuts and legumes;
- **Zinc:** The RNI for zinc during pregnancy is 11 mg/day. Adequate zinc is important during the first trimester, when baby's organs are formed, zinc plays play a role in assisting in development of the immune system;
- **Iodine:** The recommendation for iodine during pregnancy is 220 µg daily;
- **Choline:** The RNI for pregnant women is 450 mg/day. Good sources of choline are whole, reduced-fat, and low-fat milk, liver, egg (especially egg yolk), and peanuts.

Table 11: Sample of foodlist for pregnant mothers (2300 kcal)

Groups	Servings	Name of foods	Raw amount of total food consumption (g/ml)	Energy (kcal)	Protein (g)	Fat (g)	CHO* (g)
Grains, white roots and tubers	9	Rice	120	413	7.8	0.5	92
		Chira	30	78	1.4	0.2	17
		Wheat-flour (ata)	60	200	6.8	1.3	37
		Beet	120	55	2.4	0.12	9
		Potatoes	100	66	1.2	0.2	14
Pulses (beans, peas and lentils)	3	Chola dal	30	105	6.1	1.8	13
		Masoor dal	60	190	16.6	0.5	26
Chicken/meat/fish	2.5	Kachki	75	70	12.1	2.4	0
		Chicken, deshi	50	64	9.6	2.9	0
Eggs	1	Egg (boiled)	60	107	9.1	7.9	0
Dark green leafy vegetables	1	Pat shak	150	48	4.35	0.45	3
Other vegetables	1	Okra/Ladies finger	110	43	2.31	0.22	6
Other fruits	2	Guava	50	32	0.5	0.25	10
		Banana	100	95	1.3	0.8	19
Other vitamin A rich vegetables and fruits	1	Pumpkin	100	18	1.4	0.3	1
Milk and milk products	2	Milk (cow, whole fat)	150	95	4.65	5.6	6
		Curd	150	141	4.8	6.0	17

Nuts and seeds	1	Nuts (peanuts)	30	176	6.75	13.98	4
Spices	1	Spices	20	50	-	-	-
Oils	2	Soybean	30	270	0	30	0

Note: *CHO - carbohydrates

- 1 serving (cereals/pulses) = 30 g (raw);
- 1 serving (milk/curd) = 150 ml;
- 1 serving oil = 5 ml;
- 1 serving spices = 20 g.

▶ Foods to select

- Eat whole grain products including brown rice, whole-wheat bread, whole wheat-rotis;
- At least half of the total protein should be quality protein containing all essential amino acids. Good sources of quality protein include chicken, fish, lean meat, dairy products, egg, pulses, beans and nuts;
- Eat plenty of fruits and vegetables. These are a healthy source of many micronutrients and soluble dietary fibre. Yellow, orange, dark green, red and dark violet color fruits and vegetables are richer source of pro vitamin A, phytonutrients and many micronutrients;
- Eat whole fresh fruit instead of fruit juice;
- Eat foods rich in iron (redmeat, fish) and vitamin C-rich foods along with meal to help in the absorption of iron;
- Always use iodized salt in cooking to prevent iodine deficiency disorder;
- Drink an adequate amount of water (8 to 10 glasses) to keep the body hydrated and improve digestion.

▶ Foods to limit or avoid

- Limit intake of high fat sugar salt (HFSS) food and beverage;
- Avoid half cooked food and unpasteurized milk including soft cheeses (always consume safe food such as pasteurized milk);
- Limit intake of saturated and trans-fats (such as fried foods), added sugars;
- Avoid intake of processed foods, junk foods, cold cuts, and luncheon meats;
- Limit the intake of sugars and sugar sweetened beverages;
- Limit intake of table salt and salty foods;
- Avoid intake of beverages containing caffeine. Restrict coffee and tea;
- As per national guidelines, avoid additional vitamin A supplements during pregnancy;
- Avoid all forms of tobacco and alcohol intake.

▶ Other considerations

- Eat small frequent meals at regular intervals. Eat 5 to 6 meals: breakfast, lunch, dinner and two to three snacks;
- Take iron and folic acid during pregnancy, in line with national recommendations;
- Avoid taking medicines in the first trimester, unless indicated for any medical issue;
- Practice pregnancy exercise as per expert's advice along with exposure to the sun.

Guideline 6: Dietary guidelines for lactating mothers

Lactation is nutritionally demanding, especially for the mother who nurses her infants exclusively for six months. Milk production is most affected by the frequency of suckling and the volume can be affected by maternal hydration.

▶ Nutritional and dietary considerations

The nutritional requirements for lactating mothers are detailed and explained below:

- **Energy:** During the first six months of lactation the average milk production is 675 ml/day with a range of 550 ml/day to more than 1 200ml/day. The RNI for energy during lactation is additional 675 kcal for the first six months and 460 kcal for the second six months. Dietary reference intake for fiber during lactation is 27 to 30 g/day;
- **Protein:** For adequate milk production during lactation the RNI for protein is an additional 19 g for the first six months and 13 g during 7 to 12 months;
- **Fat:** Maternal diet directly reflects the amount and type of fat in breastmilk. It is recommended that fat provide 20 to 35 percent of total calories. The long chain PUFA in the maternal diet is crucial for foetal and infant retina and brain development;
- **Calcium:** During lactation the Expert Committee recommends 1000 mg of calcium;
- **Iron:** The iron requirement is the sum of that required by the mother and what is required to make up the iron lost in breastmilk. The RNI for iron during lactation is 10 to 30 mg/day according to different bioavailability;
- **Folic Acid:** RNI of folic acid for the first 6 months of lactation is 500 µg /day;
- **Zinc:** The RNI for zinc during lactation is 4.3 to 17.5 mg/day according to different bioavailability;
- **Vitamin A:** The quantity of vitamin A present in 650 ml of breast milk is 300 mcg. During the first six months of lactation, the RNI of vitamin A is 850 µg/day. This can be achieved by including organ meat (limited consumption), oils, egg yolk green leafy vegetables in the diet;
- **Vitamin D:** Increase the consumption of whole egg, tilapia, pangash fish, dairy products and exposure to sunlight each day;
- **Vitamin C:** The Expert Committee recommends an additional intake of 70mg/day during lactation;
- **Iodine:** The RNI of iodine during the first six months of lactation is 200 mcg/day

Table 12: Sample food list for lactating mothers (2350 kcal)

Groups	Servings	Name of foods	Raw amount of total food consumption (g/ml)	Energy (kcal)	Protein (g)	Fat (g)	CHO* (g)
Grains, white roots and tubers	8.5	Rice	150	516	9.8	0.6	115
		Chira	30	78	1.4	0.2	17
		Wheat-flour (ata)	60	200	6.8	1.3	37
		Beet	50	23	1	0.05	4
Pulses (beans, peas and lentils)	4	Masoor dal	60	190	16.6	0.5	26
		Mung dal	30	105	7.1	0.4	18
		Cowpeas	120	47	3.6	0.48	3
Chicken/Meat/Fish	2	Chicken, deshi	50	64	9.6	2.9	0
		Katlafish	50	52	10.0	1.3	0
Eggs	1	Egg (boiled)	60	107	9.1	7.9	0
Dark green leafy vegetables	1	Data shak	150	38	3	0.45	2
Other vegetables	2.5	Shim	100	54	3.9	2	3
		Drumstick/Shojne	150	65	4.35	0.3	8
		Cucumber	50	9	0.4	0.05	1
Other fruits	2	Guava	50	32	0.5	0.25	10
		Banana	100	95	1.3	0.8	19
Other vitamin a richvegetables and fruits	1	Pumpkin	100	18	1.4	0.3	1
Milk and milk products	2	Milk (cow, whole fat)	150	95	4.65	5.6	6
		Curd	150	141	4.8	6.0	17
Nuts and seeds	1	Nuts (peanuts)	30	176	6.75	13.98	4
Spices	1	Spices	20	50	-	-	-
Oils	1.5	Soybean	22	198	0	22	0

Note: * CHO - carbohydrates

- 1 serving (cereals/pulses) = 30 g (raw);
- 1 serving (milk/curd) = 150 ml;
- 1 serving oil = 5 ml;
- 1 serving spices = 20 g.

▶ Foods to select

- An emphasis of the diet should be on both quality and quantity especially protein and iron;
- Choose antioxidant-rich leafy vegetable such as spinach, red amaranth, and vegetable ssuch as bitter gourd, broccoli. Orange/yellow vegetables and fruits including carrots, tomato, pumpkin, riped papaya, ripe mango, can also be consumed;
- Focus on whole fruits rather than juices for more fibre and vitamins;
- Consume iodized salt in daily cooking;
- Drink plenty of water to keep the body hydrated, to produce adequate milk and prevent constipation.

▶ Foods to limit or avoid

- Limit intake of high fat sugar salt (HFSS) food and beverage;
- Limit the intake of beverages containing caffeine. Restrict coffee and tea just after the meal;
- Avoid half cooked food and unpasteurized milk. Always consume safe food and pasteurized milk;
- Limit the intake of foods rich in saturated and trans-fats and added sugars;
- Limit the intake of processed foods, sugars and sugar sweetened beverages;
- Limit the intake of table salt and salty foods. Always use iodized salt;
- Restrict the intake of alcohol.

▶ Other considerations

- Eat a total of five meals, i.e. breakfast, lunch, dinner and two snacks. Consume small frequent meals at regular intervals;
- Control body weight to avoid excess weight gain;
- Ensure the mother has sufficient rest, family support, and freedom from anxiety. The desire to nurse the baby is as important as an adequate diet for successful lactation;
- Practice exercise as per expertis advice with exposure to the sun.

Guideline 7: Dietary guidelines for older people (60 years and above)

People aged 60 years or over are considered as old people. During old age nutritional requirements vary ; linked to the health status and are not well defined. However, the older population is vulnerable to malnutrition. Aging is marked by an approximate 25 to 30 percent loss of lean mass per decade. During this period there is loss of the most metabolically active tissue and BMI decreases 15 to 20 percent. Since, both lean body mass and basal metabolic rate decline with age, an older person's energy requirement per kilogram of body weight is also reduced.

The sense of taste, smell, sight, hearing and touch diminish at individual rate in the older adults. They can also experience poor dental health, missing teeth, dental caries which can make it difficult to chew foods like meats, fresh fruits and raw vegetables. There are also changes in organ function that often occur with aging. During aging, osteoporosis can occur because of the deficiency of calcium, protein, vitamins, minerals, hormones.

This is a particular period where more attention should be given to meet the special dietary needs and ensuring adequate dietary intake.

▶ Nutritional and dietary considerations

- **Calories:** During this period because of a decrease in lean muscle mass low levels of physical activity and unchanged levels of energy absorption; lower energy intakes are required to prevent obesity. Average energy requirements for aged people are 2000 kcal/day for men, 1600 kcal/day for women, this varies according to physical activity level, BMR and body weight;

- **Carbohydrates:** 45 to 65 percent of required calories should come from carbohydrates. The RNI for dietary fibre is 25 g/day;

- **Protein:** 15-20 percent of the calorie requirement should come from protein. The RNI for protein for an older person is 33 to 66 g/day or, a protein intake of 1 to 1.25 g/kg is generally safe for older adults;

- **Fat:** 20 to 35 percent of total dietary energy requirement should come from fat. However, consumption of saturated fats should be minimized and be less than 10 percent of total energy;

- **Vitamins:** It is recommended that 600 IU/day is taken of vitamin D, as this vitamin is necessary for maintaince of bone health. During the latter stage of life, the antioxidant properties of vitamin E may help reduce the risk of cardiovascular disease. It is recommended that, at this age, 15 mg/day of vitamin E is taken;

- **Calcium:** Because of the changes in Vitamin D metabolism an age-related decrease in calcium absorption is seen among older people. The RNI of calcium is 1000 to 1300 mg;

- **Sodium:** It is suggested that the dietary sodium intake is limited to approximately less than 2 g/day.

Table 13: Sample food list for older people (around 1800 kcal)

Groups	Servings	Name of foods	Raw amount of total food consumption (g/ml)	Energy (kcal)	Protein (g)	Fat (g)	CHO* (g)
Grains, white roots and tubers	8	Rice	120	413	7.8	0.5	92
		Muri	30	79	1.5	0.0	18
		Wheat-flour (ata)	60	200	6.8	1.3	37
		Potatoes	50	33	0.6	0.1	7
Pulses (beans, peas and lentils)	2	Lentils dal	60	190	16.6	0.5	26
Chicken/ meat/fish	2	Katlafish	50	52	10.0	1.3	0
		Chicken, deshi	50	64	9.6	2.9	0
Eggs	1	Egg (boiled)	60	107	9.1	7.9	0
Dark green leafy vegetables	0.5	Data shak	75	19	1.5	0.225	1
Other vegetables	3	Green banana	50	39	1	0.15	8
		Gourd, bottle	50	17	0.55	0.05	3
		Gourd, bitter	50	16	1.05	0.15	2
Other fruits	2	Guava	50	32	0.5	0.25	10
		Apple (without skin)	50	26	0.15	0.05	6
Other vitamin A rich vegetables and fruits	1	Pumpkin	50	9	0.7	0.15	1
Milk and milk products	2	Milk (cow, whole fat)	150	95	4.65	5.6	6
		Curd	150	141	4.8	6.0	17
Nuts and seeds	0.5	Nuts (peanuts)	15	88	3.375	6.99	2
Spices	1	Spices	20	50	-	-	-
Oils	1	Soybean	15	135	0	15	0

Note: CHO* - carbohydrate

- 1 serving (cereals/pulses) = 30 g (raw);
- 1 serving (milk/curd) = 150 ml;
- 1 serving oil = 5 ml;
- 1 serving spices = 20 g.

Nutritional and dietary considerations

▶ Foods to select

- If chewing is difficult, adjust the meals to include finely minced or chopped meats, soft roti, soaked flattened rice, fruits and vegetable juice (unsweetened without straining);
- Eat seasonal fruits, vegetables and dark green leafy vegetables and nuts;
- It is encouraged to take folate rich foods such as liver, broccoli, spinach;
- Prefer fish which are rich in omega-fatty acids;
- Eat plenty of foods rich in fibre (such as beans, lentils, brown roti/bread, dried fruits) to keep your bowel active and help in digestion;
- Eat four or five small meals when the appetite is poor;
- Consume low-fat or fat-free milk, yoghurt for bone health;
- Drink fluids frequently fluid intake daily to prevent dehydration, hyponatremia and constipation.

▶ Foods to limit or avoid

- Limit intake of high fat sugar salt (HFSS) food and beverage;
- Use less than 10 percent calories from free sugars and less than 10 percent of total fat calories from saturated fat;
- Avoid processed foods with artificial colours and preservatives;
- Avoid fried, salty, spicy and junk foods.

▶ Other considerations

- Maintain appropriate oral hygiene;
- Maintain optimum hygiene during food handling, preparation, serving and conservation to avoid food contamination;
- Be active, by practicing regular physical activity (such as walking).

SECTION: 03

DISEASE SPECIFIC DIETARY GUIDELINES

These guidelines will serve as a basic document for dieatry management and provide guidance for managing patients. These Guidelines are to be used by the certified dietitians, nutritionists in consultation with respective physicians and health professionals. However, clinical management will vary from patient to patient and can be modified by physicians and clinical dietitians as per patient conditions and comorbidities.

DISEASE SPECIFIC DIETARY GUIDELINES

Non-communicable diseases (NCDs), which include cardiovascular diseases, diabetes, chronic respiratory diseases such as chronic obstructive pulmonary disease (COPD) and bronchial asthma, hypertension, chronic kidney diseases, cancers and hypothyroidism have become a global and national problem. Bangladesh is in the midst of an epidemiological transition as are many low and middle-income countries with profiles shifting from communicable diseases to NCDs. The deaths and disability caused by these NCDs are significant social and economic development issue in Bangladesh. Every year, 67 percent of the total number of deaths in Bangladesh; i.e. 580000 deaths are caused by NCDs (Progress Monitor, 2017. WHO, 2017). The major NCDs that contribute to total deaths include cardiovascular diseases (17 percent), cancers (10 percent) and diabetes (3 percent).

The 2022 National STEPS[36] survey, showed that, BMI was ≥25.0 kg/m2 among 28.9 percent respondents (WHO Country Office for Bangladesh. 2018). Based on BMI 5.2 percent people were obese (BMI≥ 30 kg/m2) and the proportion was much higher among women (7.8 percent) than men (2.4 percent). On average, the survey population ate fruits 1.6 days a week. Considering the minimum requirement of servings of fruits or vegetables (at least five servings per day), 96.2 percent respondents did not consume an adequate amount on an average day. Overall, 37.2 percent (men 23.6 percent and women 44.1 percent) of the respondents always or often added salt to their food before eating or as they are eating. From the same survey, it has been found that, 13.3 percent respondents always or often eat processed foods high in salt. Almost 23.5 percent respondents have raised BP and under medication for this. In 2017, 452 080 lives were lost in WHO SEAR from consuming diets high in salt. Among the SEAR countries, death rate due to high salt intake is highest in Bangladesh. The death rate increased from 5.66 to 28.04 deaths per 100000 population within 17 years.[37]

Childhood obesity is one of the most serious public health challenges of the twenty-first century that is steadily affecting many low and middle-income countries, particularly in urban settings. Overweight and obese children are likely to stay obese into adulthood and therefore, are more likely to develop non-communicable diseases such as diabetes and cardiovascular diseases at a younger age. These are largely preventable through maintaining energy balance and can be maintained through out the life span. The Bangladesh Multiple Indicator Cluster Survey, (UNICEF and GHDX, 2019)[38] stated that, 2.4 percent and 0.8 percent of children under age five are overweight and obese respectively.

In Bangladesh one in every three people suffers from liver disease. According to a Hepatology Society study, 10 million Bangladeshis are diagnosed with chronic hepatitis B and C while more than 40 million have fatty liver disease. These findings were revealed during the Fifth International Hepatology Conference. According to the latest WHO data published in 2020 Liver Disease Deaths in Bangladesh reached 21 024 or 2.94 percent of total deaths. It is the eighth most common cause of death in Bangladesh, and the age-adjusted death rate is 16.64 per 100000 populations (World Life Expectancy com, No date)[39].

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[36] The WHO STEPwise approach to Surveillance (STEPS) is a simple, standardized method for collecting, analysing and disseminating data in WHO member countries.

[37] National STEPS Survey for Non-communicable Diseases Risk Factors in Bangladesh 2018

[38] https://www.unicef.org/bangladesh/media/3281/file/Bangladesh%202019%20MICS%20Report_English.pd

[39] https://www.worldlifeexpectancy.com/bangladesh-liver-disease#:~:text=According%20to%20the%20latest%20WHO,choose%20the%20full%20health%20profile

In Bangladesh more than 20 million people are suffering from any form of kidney disease. A systematic review and meta-analysis study revealed an overall prevalence of chronic kidney disease (CKD) in Bangladeshi people of 22.48 percent, which was higher than the global prevalence of CKD.

Diarrhoea is an important cause of morbidity and also a leading cause of malnutrition in children less than five years old. Most children that are affected are aged 6 to 23 months. In Bangladesh, diarrhoea was responsible for almost 20 percent of total deaths in 1980 but 6 percent in 2015. The key factor responsible for this substantial reduction in diarrhoea-specific mortality rate is scaling up of prevention and treatment of diarrhoeal dehydration with oral rehydration salt solution, administration of zinc, and feeding advice. However, 6.9 percent of children age 0-59 months had an episode of diarrhoea in the past two weeks according to MICS, 2019.

According to the WHO, an estimated 1 million children became ill with tuberculosis (TB) globally in 2017 and out of these 35000 were estimated to be in Bangladesh. In 2017 globally 233000 children died of TB and about 96 percent of these deaths are children who did not access any TB treatment. According to the National TB Control Programme statistics, 68 percent of the estimated children to have had TB were missing in 2018. According to Global TB Report 2024, Bangladesh is one of the eight countries accounting for more than two thirds of the global total, with prevalence of 3.5 percent.

According to the Bangladesh Endocrine Society, 50 million Bangladeshis are suffering from thyroid disease, with 30 million from the total not even aware of their condition. Females are 10 times more at risk of thyroid hormone problems than males and around 20 to 30 percent of women suffer from some form of thyroid disease.

Deaths and disabilities from these diseases are avoidable and can be prevented by eliminating common risk factors including smoking, unhealthy diet, and physical inactivity. About 80 percent of heart diseases and strokes, 80 percent of type 2 diabetes and over 30 percent of cancers can be prevented by eradicating these risk factors (WHO and SEARO, 2017)[40].

These findings highlight the urgent need for stronger public health and nutrition interventions focused on prevention, early detection, healthy diet and lifestyle modification, along with improved access to healthcare services for NCD management.

[40] The growing crisis of non-communicable diseases in the South-East Asia region. New Delhi: WHO SEARO; 2017

Guideline 1: Dietary guidelines for overweight and obesity

Adult overweight and obesity

Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health. A crude population measure of obesity is the body mass index (BMI), a person's weight (in kilograms) divided by the square of their height (in metres) (WHO, no date b)[41]. A person with a BMI of 30 or more is generally considered obese. A person with a BMI equal to or more than 23 is considered overweight.

Table 14: Classification of overweight in adults according to body mass index[42,43]

Classification	BMI (kg/m^2) Global (1)	BMI (kg/m^2) Asian	Risk of comorbidities
Underweight	<18.50	<18.50	Low (but risk of other clinical problems increased)
Normal weight	18.50 - 24.99*	18.50 - 22.99*	Average
Overweight	25.0-29.9	23- 24.99*	Increased
Obese	≥30	≥25	
Class I	30.0–34.9	25- 29.99	Moderate
Class II	35.0–39.9	≥30	Severe
Class III	≥40		Very severe

Waist circumference

Waist circumference is an indicator of health risk associated with excess fat around the waist. It is a convenient simple measure that is unrelated to height and correlates closely with BMI. Furthermore, changes in waist circumference reflect changes in risk factors for cardiovascular disease and other forms of chronic diseases, even though the risks seem to vary in different populations. There is an increased risk of metabolic complications for men with a waist circumference ≥ 90 cm, and women with a waist circumference ≥80 cm (Holt (ed) *et al. 2017. Diabetes Mellitus, Fifth Edition)*.

▶ Common health consequences of overweight and obesity

However, overweight and obesity are the risk factors for chronic disorder such as glucose intolerance, insulin resistance, dyslipidaemia, hypertension, polycystic ovary syndrome, metabolic syndrome, fatty liver, some cancers, including endometrial, breast, ovarian, prostate, liver, gallbladder, kidney and colon.

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[41] Obesity 2023. https://www.who.int/health-topics/obesity#tab=tab_1

[42] WHO Consultation on Obesity (1999: Geneva, Switzerland) & World Health Organization. (2000). Obesity : preventing and managing the global epidemic : report of a WHO consultation. World Health Organization. https://iris.who.int/handle/10665/42330

[43] https://onlinelibrary.wiley.com/doi/pdf/10.1539/joh.45.335

▶ Nutritional and dietary considerations

- Low calorie/low energy diet: Energy intake should be reduced in accordance with weight reduction goals. A reduction of 0.5 kg body weight/week is considered appropriate;
- Low fat diet: Total fat intake including visible and invisible fat should be less than 30 percent of the total calories per day. Provide an equal balance saturated, monounsaturated and polyunsaturated fats;
- Increase fibres in diet that reduce weight, blood glucose, cholesterol and triglycerides;
- Consume diet rich in lean protein and low in carbohydrates, especially refined ones;
- Consume plenty of fruits and vegetables, which will not only result in satiety but maintain adequate micro-nutrient intake;
- Intake low density, diversified foods;
- Intake low GI foods (leafy vegetables, vegetables and citrus fruits) and low GL diet;
- Sodium restriction varies with individual health status, usually in a range of <2000 mg/day is recommended;
- Drink safe water;
- For infants aged less than six months ensure exclusive breastfeeding.

▶ Foods to limit or avoid

- Reduce daily intake of free sugars to less than 10 percent of their total energy intake. A further reduction to below 5 percent per day would provide additional health benefits (Sugars intake for adults and children-Guideline, WHO, 2015);
- Restrict the intake of energy dense, micronutrient poor foods (e.g. packaged snacks, fast foods);
- Restrict foods with empty calories;
- Restrict refined sugars and alcohol that provide empty calories;
- Limit the energy intake from total fats;
- Limit intake of refined, processed and salty foods, which include chips, chanachur, sausages, salami etc; trans-fat rich foods such as fried chicken, french fries, pizza, burger, bakery food; deep-fried savoury snacks;
- Limit the intake of sugar, sugary foods (candies, chocolates, ice cream, pastry), sugar sweetened beverages;
- Restrict the use of added sugars and starches when feeding formula to non breastfed children.
- Avoid commercial formulated complementary foods (canned, tinned, packaged etc)

▶ Other considerations

- Encourage regular physical activity and exercise to maintain an ideal body weight, under supervision of a dietitian and physician;
- Limit mobile, computer, television and other screen time watching while eating meal;
- Eat smaller but frequent meal (3-4 hourly, 5-6 time/day);
- Limit the amount of cooking oil to 15 ml/person/day;
- WHO recommends daily exercise for about 30 to 45 min to maintain ideal body weight. Exercising may include briskwalking, running, cycling, swimming, jogging, aerobics (WHO, 2020b)[44].

Childhood obesity

Obesity is defined as a body mass index (BMI) at or above the 95th percentile of the CDC sex-specific BMI-for-age growth charts.

Table 15: Body mass index for children and teens: classification of overweight in children according to body mass index[45]

BMI (kg/m2)	Classification
≥ 95th percentile	Obese
85th to < 95th percentile	Overweight
5th to < 85th percentile	Healthy weight
< 5th percentile	Underweight

For children under 5 years of age[46]:

- overweight is weight-for-height greater than 2 standard deviations above WHO Child Growth Standards median; and
- obesity is weight-for-height greater than 3 standard deviations above the WHO Child Growth Standards median.

[44] WHO Guidelines on Physical Activity and Sedentary Behavior, 2020. https://www.who.int/publications/i/item/9789240015128

[45] WHO. 1995. WHO Expert Committee on Physical Status: the Use and Interpretation of Anthropometry (1993 : Geneva, Switzerland) & World Health Organization. (1995). Physical status: the use of and interpretation of anthropometry, report of a WHO expert committee. Geneva, World Health Organization. https://apps.who.int/iris/handle/10665/

[46] Obesity and Overweight 2021. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight

For children aged between 5–19 years[47]:

Overweight and obesity are defined as follows for children aged between 5–19 years:

- overweight is BMI-for-age greater than 1 standard deviation above the WHO Growth Reference median; and
- obesity is greater than 2 standard deviations above the WHO Growth Reference median.

World Health Organization general recommendations

▶ Foods to select

- Increase consumption of fruit and vegetables, as well as legumes, whole grains and nuts;
- Provide healthy breakfast daily before children start for school;
- Serve healthy school snacks to children (whole grains, vegetables, fruits, lean meat).

▶ Foods to limit or avoid

- Restrict intake of energy-dense, micronutrient-poor foods (e.g. packaged snacks);
- Limit the intake of sugar, sugary foods (candies, chocolates, ice cream, pastry), sugar sweetened beverages and salty foods;
- Limit energy intake from total fats and shift fat consumption away from saturated fats to unsaturated fats;
- Limit intake of refined, processed and salty foods include chips, chanachur, sausages, salami; trans-fat rich foods such as fried chicken, french fries, pizza, burger, bakerd goods; deep-fried savoury snacks;
- Limit the intake of sugar, sugary foods (candies, chocolates, ice cream, pastry), sugar sweetened beverages;
- Limit eating out, especially at fast-food restaurants, and teach the child how to make healthier choices.

▶ Other considerations

- Be physically active – incorporate at least 60 minutes of appropriate, regular, moderate-to-vigorous-intensity activity each day;
- Limit exposure to unhealthy food marketing practices (e.g. limit television-viewing, teach children to resist temptation);
- Provide information and skills to make healthy food choices;
- Make time for family meals;
- Adjust portion sizes appropriately for age;
- Limit television and other screen time to less than two hours a day for children older than two, and do not allow television or screen time for children younger than two years of age;
- Be sure child gets enough sleep.

[47] Ibid[46]

Guideline 2: Dietary guidelines for diabetes mellitus

Diabetes mellitusis a metabolic disorder resulting in raised blood glucose (hyperglycaemia) and a chronic disease caused by inherited or acquired deficiency in production of insulin by the pancreas, or by the ineffectiveness of the insulin produced. Such a deficiency results in increased concentrations of glucose in the blood, which in turn damage many of the body's systems, in particular the blood vessels and nerves. There are four types of diabetes :

- **Type 1** diabetes (formerly known as insulin-dependent or juvenile diabetes) in which the pancreas fails to produce the insulin which is essential for survival. This form develops most frequently in children and adolescents.

- **Type 2** diabetes (formerly named non-insulin-dependent) is much more common and accounts for around 90 percent of all diabetes cases worldwide. It occurs most frequently in adults, but is being noted increasingly in adolescents as well (Diabetes Atlas, Eighth Edition ADA, 2018).

- **Gestational diabetes mellitus** is diagnosed in the second or third trimester of pregnancy that was not clearly overt diabetes prior to gestation. Diabetes in pregnancy may give rise to several adverse outcomes, including congenital malformations, increased birthweight and an elevated risk of perinatal mortality. Strict metabolic control may reduce these risks to the level of those of non-diabetic expectant mothers.

- **Specific types of diabetes mellitus** resultiing from other causes such as neonatal diabetes, drug, disease, genetic syndrome and maturity onset diabetes of the young.

Table 16: Diagnostic criteria for diabetes mellitusis

Oral glucose tolerance test interpretation (according to WHO)

	FBG mmol/litre	2HAG mmol/litre
Normal	<6.1*	<7.8
Impaired fasting glycaemia	6.1-6.9	<7.8
Impaired glucose tolerance	<7.0 and	7.8-11.0
Diabetes mellitus	≥ 7.0 and/or	≥ 11.0
	*<5.6 (ADA)	

Table 17: HbA1c Interpretation (According to ADA 2022)[48]

Normal	<5.7 %
Pre diabetes	5.7-6.4
DM	≥ 6.5

[48] ADA 2018, IDF Diabetes Atlas, 8th Edition.
https://diabetesatlas.org/upload/resources/previous/files/8/IDF_DA_8e-EN-final.pdf

Target of blood sugar level to be maintained. According to the American Diabetes Association (ADA) the target of blood sugar level.

Table 18: Target of blood sugar level

HbA1c	< 7.0%
Pre-prandial capillary plasma glucose	4.4-7.2 mmol/litre
Peak postprandial capillary plasma glucose	< 10 mmol/litre

Lifestyle modification

Despite the blood glucose level, all patients with diabetes need lifestyle modification to reach the goal in addition to antidiabetic medication. It is considered as the foundation of diabetes management. Lifestyle modification means adequate balanced diet, increased physical activity which includes regular exercise (30 to 45 minutes/day) or 150 minutes walking/week with moderate intensity and maintain ideal body weight.

▶ Nutritional and dietary considerations for Type-1 Diabetes

- Type 1 diabetes diet plan should be full of very nutrient-dense foods that provide vitamins, minerals and other healthful properties for every calorie consumed. A meal plan is based on the individual's usual food intake, insulin therapy, and exercise pattern;
- Timing and amount of foods depends on energy requirement, insulin, and physical activity;
- Age-specific calorie calculating chart must be followed.

Table 19: Nutritional and dietary considerations[49]

Age	Energy required boys kcal	Energy required girls kcal
First year	1000	1000
Up to 12 (per year)	+125	+100
13-15 (per year)	+200	+100
Adult (minimum req)	1 500-1 800	1 200-1 500

[49] IDF. 2018. IDF Diabetes Atlas, Eighth Edition. International Diabetes Federation. IDF Diabetes Atlas, eighth edition. Brussels, International Diabetes Federation. Belgium: 2021. www.diabetesatlas.org.

▶ Nutritional and dietary considerations for Type-2 diabetes

Diet, exercise and medication are the major tools for the management of diabetes. A moderate caloric restriction of 500 to 750 calories from the usual daily intake and an increase in physical activity by 45 minutes/day is required to improve insulin sensitivity.

- **Calorie intake:** Total calorie for an individual can be estimated by using formula:
  Daily calorie allowance (DCA) (kcal/day) = Ideal body weight (IBW) x Calorie Factors (CF)

Table 20: Calorie calculation for adults[50]

Body weight	Activity level		
	CF for Sedentary	CF for Moderately active	CF for Active
Obese	20	25	30
Overweight	25	30	35
Normal	30	35	40
Underweight	35	40	45

- **Carbohydrates:** The present recommendation is to provide generous amounts complex carbohydrate and fibre. Carbohydrates should provide 55 to 60 percent of total daily calories (realistic goal is 50 percent). Complex carbohydrates account for approximately two-thirds of total carbohydrate. Among which:
  - 50 percent is from cereal carbohydrate;
  - 20 percent is from non-cereal (vegetables, leafy vegetables and milk) carbohydrate.

  Foods should be selected that contain complex carbohydrates and low glycemic index, which have plenty of fibre, antioxidants and phytochemicals should be selected. Diabetics who are overweight require reduction in carbohydrates to even as low as 33 percent which should be individualized;

- **Fibre:** High fibre intake improves glycemic control and reduces insulin requirements. Soluble fibres are more effective in producing a favourable affect on carbohydrate and lipid metabolism when compared to insoluble fibre. Generally, 25 to 30 g/day fibre is required;

- **Fat:** A high fat diet (ketofood) offers short term benefits for glycemic control and has no adverse effects on insulin requirements over two or three weeks. The amount of fat and oil containing food should be restricted as people with diabetes are at higher risk of coronary heart diseases and other vascular diseases. The present recommendation for total fat is 20 to 30 percent of daily calorie intake. Saturated, monounsaturated and polyunsaturated fatty acids are given in the ratio of 1:1:1. Dietary cholesterol is recommended at less than 200 mg/day;

[50] Diabetic Association of Bangladesh. 2018. Diabetes Mellitus 5th Edition, Certificate Course on Diabetology Distance Learning Program. 173 p.

- **Protein:** Protein is recommended to provide 10 to 20 percent of energy intake. Protein from vegetable source is preferable to that from animal sources;
- **Vitamin and minerals:** It is encouraged to eat diet that is rich in all vitamins particularly in vitamin C and E, antioxidants and minerals especially magnesium and zinc. Calcium and vitamin D deficiency may contribute to impaired glucose tolerances o 800 mg/day calcium supplements helps to maintain euglycemic status. Chromium supplementation decreases the requirement for insulin or oral hypoglycemic agents in patients with type 2 diabetes;
- **Sodium** restriction varies with individual health status, usually in a range of <2000 mg/day is recommended.

▶ Foods to select:

- Prefer whole grain cereals brown rice, parboiled or minimally milled rice, whole grain flour and whole pulses. Emphasize on low GI and GL, complex carbohydrate foods to promote satiety and reduce hyperinsulinemia;
- Prefer whole rice flour and whole-wheat flour rather than refined flour;
- Increase intake of non-starchy vegetable such as green spinach, lettuce, cabbage, broccoli, cauliflower, tomato, cucumber, beets, turnip, okra;
- Use low fat and fat free cooking methods such as boiling, steaming, broiling, baking, roasting and grilling.

▶ Foods to limit or avoid

- Limit whole milk and prefer skimmed milk for tea, coffee, curds;
- Limit white bread, biscuits, noodles, pasta and other high GI foods;
- Limit roots and tubers such as potato, sweet potato, sago, arrowroot and refined flour preparations;
- Restrict refined sweetened drinks, carbohydrates like sugar, jaggery, juices, energy drinks sweets, molasses, sweetened drinks, jams, jellies, sugar candies, honey, condensed milk, glucose and chocolate. Thesefoods can raise/spike blood glucose;
- Limit saturated fat such as butter, cheese and others;
- Remove visible fat of meats and skin from chicken before cooking.

Timing of food: 3 to 3.5 hourly 5 to 6 times/day

Amount of food: It depends upon the gender, BMI, age, physical activity level and other comorbidities. Total food intake should be distributed consistently throughout the day as follows:

- Three main meals: breakfast (15-20 percent), lunch (30-35 percent) and dinner (25-30 percent) of daily calorie intake;
- Two to three snacks at mid-morning, mid-evening and bed time (each is 10 to15 percent of daily calorie intake).

▶ **Exercise** regularly (30 to 45 min/day) and adopt a healthy lifestyle.

For gestational diabetes mellitus patients

▶ **Nutritional and dietary considerations**

- Energy: 30 kcal/kg desirable body weight in first trimester + 300 kcal/day in second and third trimester are recommended. For BMI > 30 kg/m2 calorie requirementis 25 kcal/kg present body weight;
- Carbohydrate 50-60 percent, fat 30 percent, protein 10-20 percent is recommended;
- Fibre: 20-30 g of dietary fibre per day;
- Protein: Recommended quantity is +10 g/day of normal adults RNI;
- Vitamin and minerals: Increased fruits and vegetables consumption is recommended;
- Meal plan: Except for the three major meals, snacks should be taken during mid-morning, mid-afternoon and bedtime. A bedtime snack is essential to prevent fasting ketoneuria.

Table 21: Target glucose levels during previous gestational diabetes and gestational diabetes mellitus

Timing	mmol/l
Fasting	<5.3
2 hours aftermeal	<6.7
HbA1c	< 6.0 %
To avoid hypoglycaemia (i.e. blood glucose should not be<4.0 mmol/l)itre	

▶ **Foods to limit or avoid**

- Sugar: Foods high in sugar content for example, cake, pastry, juice, sweet biscuit, glucose, honey, jam, jelly, sweet products and junk foods;
- Soft drinks: Fizzy high sugar drinks like cola or any other sugar sweetened beverages;
- Sodium rich foods, processed foods, saturated fat rich foods.

▶ **Other considerations**

- Moderate exercise 30 to 45 min/ day is encouraged to reduce glucose levels;
- Avoid all forms of tobacco and alcohol intake, betel leaf and betel nut.

Guideline 3: Dietary guidelines for renal diseases

In renal disease, waste products and fluid increase in the body. The quantity of hormones produced by the kidneys fall which affects bones and blood cells and leads to anaemia, and weakness of bones. Because of extra fluid and sodium accumulating in the blood stream, risk of raised blood pressure increases. Dietary management largely varies with the stage of the disease and the condition of the patients level of blood urea, potassium, calcium, phosphorous, oedema, volume of urine and proteinurea.

▶ Stages of chronic kidney diseases

Dietary management depends on the stage of the disease. There are five stages, which are based on decreasing glomerular filtration rate (GFR).

Table 22: Stage of glomerular filtration rate

Stage	Glomerular filtration rate	Description
1	90 or higher	Kidney damage with normal kidney function
2	60 – 89	Kidney damage with mildly reduced kidney function
3a	45 – 59	Mild to moderate loss of kidney function
3b	30 - 44	Moderate to severe loss of kidney function
4	15 – 29	Severely loss of kidney function
5	Lessthan 15	Very severe or end stage kidney failure

Patients in stage 1, 2 or 3 (a.b) may not need strict, dietary control than lowering their protein intake. In stage 4 and 5, patients are in difficulty of maintaining a balance of electrolytes, minerals and fluids. A special renal diet is essential at this late stage to manage the disease, maintain electrolytes minerals, water balance and prevent further deterioration resulting from the disease.

▶ Nutritional and dietary considerations for chronic kidney disease[51]

- **Energy:** In general, energy requirement of approximately 35 to 40 kcal per kg of ideal body weight is needed. For kidney transplants the recommended calorie requirement is 30 to 35 kcal/kg of dry body weight;
- **Fats and oil:** Around 20 to 30 percent of calories can be taken from fat as form of monounsaturated and polyunsaturated fats. All patients with chronic kidney disease (CKD) should target LDL levels of 100 mg/dl and triglyceride levels less than 150 mg/dl. Cholesterol intake limited to less than 300 mg/day, and limited total fat;

[51] These guidelines for chronic kidney disease can be modified as per patient conditions, comorbidities by physiscins and dietitians.

- **Proteins:** An appropriate level of protein is selected based on the level of kidney disease, age and weight of the patient. An intake of 0.6 to 1.0 g of protein/kg body weight /day is recommended for stage 4 and stage 5. A diet containing 50 percent protein of high biological value (meat, poultry, milk and milk products, eggs and fish) is encouraged to ensure provision of all the essential amino acids.

  For kidney transplant patients, protein intake should be relatively high, 1.3 to 1.5 g/kg body weight/day is recommended during the post-operative period up to six weeks and 1 g/kg body weight/day is recommended for long-term management. If overweight or underweight, the protein is calculated using ideal body weight.

  For heme dialysis and perotoneal dialysis, protein requirements are 1.1 g/per kg ideal body weight and 1.3 g/kg body weight respectively;

Table 23: Generally accepted levels of protein restriction for patients with chronic kidney disease[52]

Stage I to III is – 0.75 g/kg body weight per day
Stage IV to V is – 0.6 g/kg body weight (when the GFR is less than 25 mL/min)

- **Vitamins and minerals:** Supplementation of folic acid 1 mg/day, pyridoxin-5 mg/day, ascorbic acid 60 to 100 mg/day is needed;

- **Salt (Sodium chloride):** When patient's renal failure progresses to a GFR of about 10 percent of normal, sodium excretion falls and reducing salt intake to 1 to 3 g/day is recommended;

  In case of kidney transplant sodium or salt restriction is usually required right after the transplant;

  - ❍ Limit foods with added salt especially processed foods;
  - ❍ Low sodium, no salt added, sodium free, sodium reduced and unsalted food are preferred;

- **Potassium:** During this time serum potassium levels increase (hyperkalaemia) to more than 5.0 mg/dL, restrict dietary potassium to approximately 3 to 4 g/day may be needed. To reduce potassium level, foods can be soaked for half an hour after peeling and cutting into small pieces and by boiling in large amount of water for advance stage GFR 4 and GFR 5;

[52] Patel, T.V., Singh, A.K. 2009. Kidney disease outcomes quality initiative guidelines for bone and mineral metabolism: emerging questions. Seminars in Nephrology. March; 29(2):105-12. doi: 10.1016/j.semnephrol.2009.01.003. PMID: 19371801; PMCID: PMC2696636.

- **Phosphorus:** When the kidney function has deteriorated, up to GFR 25 to 30 ml/min, phosphate retention occurs. Restriction of phosphate upto 800 to 1000 mg/day is necessary for patients with stage 3 onwards when the serum phosphorus level is greater than 4.6 mg/dl. Restrict dietary phosphates to 30 mmol per day;

- **Calcium:** According to the National Kidney Foundation (NKF, United States) clinical practice guidelines, also known as Kidney Disease Outcomes Quality Initiative, total calcium intake for people with renal disease should not be greater than 2.0 g mg daily. This includes calcium from the diet, calcium supplements and calcium basedphosphorus binders. This requirement is reduced to 1.2 g/day;

- **Fluid intake:** In the latter stages of CKD, the amount of fluid required equals to the volume of urine output plus 500 ml/day. A daily allowance of fluid should be equal to 500ml of fluid plus the equivalent to the previousday's urine output (only in late stages).

Renal disease with dyslipidaemia:

Dyslipidaemia among post-transplant patients can lead to cardiovascular and cerebrovascular complications. Exercise, limiting total fat intake especially saturated and trans fats, consuming a cholesterol reducing diet would be beneficial.

Guideline 4: Dietary guidelines for renal calculi/stones

Kidney stones, or renal calculi, are solid masses made of crystals. Kidney stones usually originate in the kidneys. However, they can develop anywhere along your urinary tract, which consists of these parts- kidneys, ureters, bladder, urethra.

▶ Nutritional and dietary considerations

- **Protein** intake should not exceed the RNI of 0.8 to 1.0 g/kg body weight/day (only first-class protein is recommended);
- **Carbohydrate:** In the case of hemodialysis or peritoneal dialysis, the diet should be rich in carbohydrate to provide adequate calorie;
- **Calcium** restriction does not prevent stone formation and may cause or worsen osteoporosis. Current RNI is 1000 mg/day calcium for men and women age 50 years or younger and 1200 mg/day of calcium for those older than 50 years, which aligns well with calcium recommendations for kidney stone formation;
- **Fluids:** A liberal water intake is important. High urine flow rate will tend to wash out any formed crystals. To achieve dilution, the goal for a urine volume shouldbe 2000 ml to 2500 ml/day;
- **Oxalate:** If the stone contains oxalate, oxalate rich foods such as beans, beets, peanuts, legumes, chocolates, cocoa, dried figs, plums, nuts, wheat bran, sweet potatoes, tea and tomatoes should be omitted. Recommendation of intake is less than 40 to 50 mg/day;
- **Sodium:** Salt may be used in moderation. Salt intake should be reduced for patients with hypercalciuria to less than 2000 mg/day;
- **Citrates** are urinary stone inhibitors. Normal daily urinary citrate level should be more than 640 mg. Lemonade made with lemon juice diluted in 2 litres of with water should be encouraged for consumption in patients with low urinary citrates;
- **Fibre** intake should be increased. No change in urinary calcium or oxalate is observed when fiber intake from fruits, vegetables and cereal sources is increased up to 25 g/day.

▶ Other considerations

- Drink plenty of safe water everyday;
- Avoid excess intake of salt, high potassium containing fruits;
- Restrict protein amount if CKD is present;
- If thereis a kidney stone in chronic renal failure, the glomeruli and tubules are heavily damaged. In this case, modify potassium, sodium and protein requirement;
- Chronic kidney stones are often treated with potassium citrate.

Guideline 5: Dietary guidelines for liver diseases

The liver plays a major role in carbohydrate, protein, lipid and steroids metabolism and involved in the storage, activation and transport of many vitamins and minerals.

Chronic liver disease is caused by a variety of etiologies such as non-alcoholic fatty liver disease, chronic viral hepatitis and alcohol. Consistent advanced and chronic hepatocellular damage results in cirrhosis which is a state of irreversible liver damage. Proper nutrition therapy and management will improve survival. Good nutritional status increases the survival after a liver transplant for patients with chronic liver disease.

A. Fatty liver

Fatty liver disease occurs when an abnormal amount of fat accumulates in the liver and further builds-up the fat; leading to further liver damage, which may result in inflammation and scarring of the liver. Traditionally fatty liver disase has classified as alcoholic or non-alcoholic.

▶ Nutritional and dietary considerations

- **Calorie** reduction in 500 to 1000 kcal/day. Avoid rapid weight loss;
- **Protein** for alcoholic fatty liver 1.0 to 1.5 g/kg body weight of protein is recommended. Protein with high biological value such as: low fat fish, egg, chicken should be considered;

Table 24: Protein intake in case of different liver disease state

In compensated liver disease	1.2 – 1.3 g/kg/day
In decompensated liver disease	1.5 – 2 g/kg/day
In post-transplant	1.5 – 2 g/kg/day
Acute (fulminant) liver failure	1.2 – 1.5 g/kg/day

- **Fat:** About 60 g fat or 30 percent of daily calorie intake is advised. Limiting intake of fats to help prevent or treat non-alcoholic fatty liver disease or non alcoholic steatohepatitis. Replacing saturated fats and trans fats in diet with monounsaturated fats and polyunsaturated fats, especially omega-3 fatty acids, may reduce inflammation and reduce the chance of heart disease if someone has non-alcoholic fatty liver disease;
- **Carbohydrates:** Excess carbohydrates contribute to fatty liver so carbohydrates should be moderated. Carbohydrates should comprise 40 to 50 percent of total dietary energy. It is advisable to increase the amount of complex carbohydrates rich in dietary fibre. Ingestion of simple carbohydrates should not exceed 10 percent of total energy intake;
- **Vitamins and minerals** required are iron, folic acid and Vitamin B12.

B. Hepatitis

Hepatitisis an infectious disease characterized by inflammatory and degenerative changes of the liver. The viral type is more common and occurs as type A (formerly called infectious), type B (serum), or type C (post transfusion).

▶ Nutritional and dietary considerations

A high protein, high carbohydrate, moderate fat is recommended.

- **Calories:** A high calorie diet is recommended for hepatitis. About 35 to 45 kcal/kg/ body weight is prescribed;
- **Protein:** The protein requirement is 1.5 to 2 g/kg body weight/day. Intake of protein is essential for regeneration of liver cells;
- **Fat:** 20 to 30 g of fat is recommended daily for hepatitis;
- **Carbohydrates:** High carbohydrate content in the diet is essential to supply enough calories so that tissue proteins are not broken down for energy;
- **Vitamin:** 500 mg of vitamin C, 10mg of vitamin K and supplements of vitamin B complex are essential to meet the daily needs;
- **Minerals:** Oral feeds of fruit juice, vegetables and meat soups with added salt, given orally or through a nasogastric tube help to maintain electrolyte balance. Normal serum level of sodium and potassium must be maintained with supplements.

C. Liver cirrhosis

Cirrhosis is a condition in which liver cells are destroyed as a result of necrosis, fatty infiltration, fibrosis and nodular rege neration. It is a serious and irreversible disease. Vitamin A deficiency favours the formation of cirrhosis.

Stages of the disease

1. Compensated cirrhosis: The patient may not be symptomatic with up to 80 percent of the liver damaged;
2. Decompensated cirrhosis: In this type, the patients dispaly symptoms of liver disease such as oedema, jaundice and fatigue are evident.

Malnutrition is seen in 20 percent of compensated cirrhosis patients and 60 percent of decompensated cirrhosis patients.

▶ Nutritional and dietary management

A high calorie, high protein, high carbohydrate, moderate or restricted fat, high vitamin diet helps to regenerate the liver and prevent the formation of ascites. Low fat with supplementation of fat soluble vitamins and minerals should be given.

- **Calories:** Patients with cirrhosis need more calories.

  For compensated liver disease 25–35 kcal/kg/day and

  For decompensated liver disease 25–45 kcal/kg/day is required;

- **Protein:** Patients with cirrhosis need considerably higher minimal daily protein intake of around 60 g to maintain nitrogen balance in contrast to 35g needed by healthy individuals. A very high level of protein (e.g. 100 g a day) is best to avoid in decompensated cirrhosis. All measures to reduce ammonia should be taken.

  For compensated liver disease 1.2-1.3 g/kg/day

  For decompensated liver disease 1.5-2 g/kg/day is required;

- **Fat** intake is recommended at around 25 percent of total calories. Fried foods should be avoided. Low to moderate fat (25 percent of total calories) should be provided in cirrhosis if bile is inadequate;

- **Carbohydrates:** Adequate carbohydrates, 300 to 400 g/day should be provided to spare protein in cirrhosis;

- Vitamins and minerals: In cirrhosis, the liver concentration of folate, riboflavin, nicotinamide, vitamin B12 and vitamin A are reduced. Choline and methionine are useful if fatty infiltration is present. Sodium is restricted in ankle oedema and ascites. In ascites, 400 to 800 mg/day of sodium is recommended. A diet low in sodium can help treat ascites and oedema as it will minimize the work of the kidney, as less sodium will be available for re-absorption;

  Folic acid 1 g/day orally is indicated in the treatment of macrocytic anaemia. Vitamin K is essential for the management of cirrhosis, because it helps to prevent bleeding of liver tissues. Increase intake of vitamin K by adding broccoli, spinach, cabbage and eggs. Cirrhotic patients have significantly reduced antioxidant enzymes and antioxidant nutrients, therefore foods rich in carotenoids, selenium, vitamin E, and zinc are encouraged;

- **Fluid:** Restrict fluid intake 800 to 1000 ml/day is required for patients with hyponatremia;

- **Branched-chain amino acids and enteral feeding for liver cirrhotic malnourished patients:** Wasting is common in 65 to 90 percent of patients with cirrhosis. Blood concentrations of branched-chain amino acids serve as both indicators of nutritional status and predictors of survival rate, hence it is encouraged to consume protein food with branched chain amino acid such as egg white.

▶ Foods to select

- Eat more low-glycemic index foods such as most fruits, vegetables, and whole grains. These foods affect blood glucose less than high-glycemic index foods, such as white bread, white rice, and potatoes;
- In fatty liver disease increase the intake of monounsaturated fat such as extra virgin olive oil, olives, and nuts (almonds and cashews). Also increase polyunsaturated fat: sunflower seeds and oil, canola oil, soybeans and soymilk, nuts (walnuts, hazelnuts, Brazil) and seeds (chia, flaxseed, sunflower), oilyfish and seafood (salmon, sardines, tuna, mussels).

▶ Food to limit or avoid:

- Avoid foods and drinks that contain large amounts of simple sugars, especially fructose,which is found in sweetened soft drinks, sports drinks, sweetened tea, and juices;
- Limit saturated fat: animal fat (butter, ghee), coconut oil, full fat dairy, deep fried foods and pastries, fat on meat, cream and sour cream in case of fatty liver;
- Alcohol is highly toxic to the liver. Individuals with liver disease should abstain from alcohol completely.

Table 25: Requirements of nutrients

Nutrients	Hepatitis	Cirrhosis
Calorie	35 to 45 kcal/kg/body weight	30 to 35 kcal/kg/ body weight
Proteins	High: 1.5-2g/kg body weight	Adequate: l-1.5 g/kg body weight
Fats	25-30% pof total calories	25-30% of total calories as tolerated
Others		Vitamin supplements especially thiamine, folic acid, B_6 and B_{12}. It may be necessary to restrict sodium and fluids.

▶ Other considerations

- Ensure complete bed rest;
- Practice proper hygiene. Since hands commonly spread germs, be sure to wash hands thoroughly after using the bathroom;
- Do not share any personal toiletry items, including toothbrushes and razors;
- Avoid coffee, cold drinks, strong tea;
- Stop smoking and drinking alcohol;
- Avoid sedative drugs and harmful substances;
- Avoid junk foods;
- A weightloss of 0.5 to 1 kg per week of current body weight can improve liver function tests, decrease fatty liver and improve blood sugar control.

Guideline 6: Dietary guidelines for coronary heart disease

Coronary heart disease is caused by the narrowing or blockage of the arteries and vessels that provide oxygen and nutrients to the heart. The pathological process is called atherosclerosis, which is the gradual buildup of fatty materials in the inner linings of the small arteries. Sudden and complete blockage or clotting of blood in the arteries of the heart can cause a heart attack.

Different types of coronary heart disease

- Stable angina;
- Unstable angina;
- Myocardial infarction ("Heart attack").

▶ Nutritional and dietary considerations

- **Carbohydrates:** Daily dietary requirement of carbohydrate is 50 to 55 percent of total calories. Very high intake of carbohydrates (greater than 60 percent of total energy intake) is associated with an increase in serum triglyceride. Complex carbohydrate such as whole-grain bread, cereal products, fruits and vegetables should be consumed;
- **Fibre:** 14 g of fibre per 1000 kcal of energy is recommended. Increasing soluble fiber to 10 to 25 g/day is accomplished by an approximately 5 percent reduction in LDL cholesterol;
- **Protein** intake is recommended at 15 to 20 percent of total calories;
- **Total fat:** 20 to 25 percent of total calories is recommended;
    - **Saturated fat:** Less than 7 percent of total calories is recommended;
    - **Trans-fat:** 1 percent of total energy or less is recommended;
    - **Polyunsaturated fat:** This type of fat is recommended at 6 to 10 percent of total calories. Polyunsaturated fat, particularly linoleic acid (Omega-6 fatty acid), reduces LDL cholesterol levels by 13 mg/dl when used instead of saturated fats. Fish oil contains omega-3 fatty acids – eicosapentaenoic acid (EPA) reduces serum triglyceride concentration;
    - **Monounsaturated fat:** This fat is recommended at up to 20 percent of total calories. Olive oil lowers serum cholesterol level when substituted for saturated fat in the diet;
- **Sodium** restriction varies with individual health status, usually in a range of <1.5 g/day is recommended. Dietary modification of sodium in patients with hypertension is must.

▶ Other considerations

Combining animal protein with plant-based protein (legumes, dry beans, nuts, whole grains and vegetables) has been reported to decrease LDL cholesterol. Consumption of dairy products, egg, skinless poultry, and lean cuts of beef should be ensured so that the cholesterol intake does not exceed 200 mg/day/person.

A. Myocardial infarction

Patients with myocardial infarction may go into shock. During the period of shock, the patient should be given a soft diet. Intravenous fluids can be given to maintain fluid balance.

Once the patient recovers from the shock, a liquid diet can be started and gradually changed to a soft diet. Small and frequent meals are safer as large meals may increase cardiac workload. When the patient is stable, dietary guidelines for coronary heart diseases can be followed.

B. Heart failure

▶ Nutritional and dietary consideration

- **Energy** requirement is increased because of the working of the heart and respiratory system. Patients with normal weight are prescribed to maintain their weight at 30 to 35 kcal/kg body weight; a 20 to 25 kcal/kg body weight diet is suitable for an obese patient in bed;
- **Fluid:** Sodium and water have to be restricted as fluid retention aggravates the condition. Sufficient but not excessive fluid intake is needed. Daily fluid requirement must be individualized according to the condition of the patient;
- **Protein:** 1 to 1.3 g per kg body weight of protein is recommended to maintain the body and for bodily functions;
- **Vitamins and minerals:** Patient may need to take folate, magnesium, thiamine, zinc and iron depending on serum levels. Increasing intake of vitamin E, B6, B12 and thiamine may be beneficial;
- **Sodium** restriction varies with individual status, usually in the range of 1 to 2 g/day is recommended. Sodium restriction also depends on the capacity to re-absorb the sodium.

▶ Other considerations

- Nutrient dense, soft, non-gaseous, easily digestible and comfortable foods are recommended;
- Large meals should be avoided at a times becasue of the risk of carbon-dioxide (CO2) accumulation and respiratory failure. Instead, liquid formulas, nutrient dense preparations or foods in small quantity with increased frequency are preferred.

Guideline 7: Dietary guidelines for hypertension

Hypertension is one of the main risk factors for coronary heart diseases, renal diseases and the greatest risk factor for stroke. Diagnosis of hypertension is made if there is a systolic blood pressure (SBP) ≥140 mmHg and/or diastolic blood pressure (DBP)≥90 mmHg is recorded in two visits. Unhealthy lifestyle with imbalanced eating habits may significantly contribute to high blood pressure levels, even in older age, when blood pressure levels typically rise as part of the aging process. The need to make dietary improvements (e.g. follow a healthy low-fat diet and to avoid extra salt) is at the top of the recommendations to reduce or prevent the onset of hypertension.

▶ Nutritional and dietary considerations

- Consume carbohydrate 50 percent-55 percent, protein 20 to 25 percent, total fat <25 percent of total calorie, cholesterol 150 mg, fibre 30g, sodium <1.5 g;
- Consume at least five varieties of fresh fruits and vegetables a day (caution for kidney patients);
- Reduce the intake of total and saturated fat. Include adequate amounts of mono and poly unsaturated fats in diet;
- Increase potassium (caution for kidney patients), calcium (1000 to 2000 mg/day) and magnesium intake particularly in the form of fruits and dairy products;
- Increase consumption of DASH diet (dietary approaches to stop hypertension); rich in fruits, vegetables, and low- fat milk products;
- Encourage consumption of nuts and legumes every day.

▶ Other considerations

- Reduce overweight and obesity and maintain normal weight for adults (body mass index 18.5-23 kg/m2);
- At least 5 to 6 hours sound sleep is helpful;
- Maintain serum lipid profile, body weight within the normal limit;
- Reduce salt intake to less than 1tsp/day, preferably three-quarters of a teaspoon/day;
- Avoid consumption of all forms of tobacco and alcohol.

Guideline 8: Dietary guidelines for diarrhoea

Diarrhoea is defined as the passage of unusually loose or watery stools, usually at least three times in a 24-hour period. It is accompanied by an excessive loss of fluid and electrolytes, especially sodium and potassium. Dehydration occurs when these losses are not replaced.

There are four types of diarrhoea:

- Acute watery diarrhoea; characterized by passage of profuse watery stools, lasting several hours to <14 days, common pathogens are rotavirus, *Vibrio cholerae, E. coli,* and *Salmonella;*
- Acute bloody diarrhoea; stools contain blood and mucus, also called dysentery, main cause is infection with *Shigella*;
- Persistent diarrhoea; which begins acutely and lasts 14 days or longer;
- Diarrhoea associated with severe acute malnutrition.

▶ Nutritional and dietary considerations[53]

- Acute diarrhoea is most dangerous in infants and children who are easily dehydrated by large fluid losses. In these cases replacement of fluid and electrolytes must be promptly done using standard ORS (hypo osmolar as suggested by WHO). ORS solution contains the optimum proportion of salts and glucose and is absorbed in the small intestine and replaces the water and electrolytes lost in the faeces. The correct dose of ORS for a child or an adult with diarrhoea should be checked using the National Control of Diarrhoea or the WHO Manual on Prevention and Treatment of Diarrhoea (WHO, no date d);
- Zinc supplements: Results of various studies done in Bangladesh and else where have shown that zinc supplements reduce the duration of a diarrhoea episode by 25 percent and are associated with a 30 percent reduction in stool volume. The WHO and UNICEF have now recommended that oral zinc be given to children during an episode of diarrhoea at a dosage of 20 mg/day for children older than 6 months or 10 mg/day in those younger than 6 months, for 10 to 14 days;
- Severe diarrhoea is accompanied by dehydration and electrolyte depletion. It can also have associated infections, immuno-deficiency or inflammatory conditions, malabsorption of vitamins, minerals and proteins or lipid may also occur, and the nutrients will have to be replenished;
- Rehydration is required with intravenous fluids in the case of severe dehydration or shock;
- Sugar and alcohol, and foods containing large amounts of lactose, fructose and sucrose may worsen osmotic diarrhoea and their intake should be limited;

[53] These guidelines are for simple diarrhoea. Diarrhoea with other complications/comorbidities will require further management by a physician or dietititan.

- Normal amount of fibre in diet helps to restore normal mucosal function, increases electrolyte and water absorption and increases the firmness of stool;
- Gluten intolerance describes patients with symptoms and who may or may not have celiac disease. Removing gluten from the diet (for example, wheat products) improve symptoms, heals damage to small intestine, and prevents further damage. However, indiscriminate removal of gluten from diet without any basis can compromise nutrition of an individual and should be avoided;
- For infant and young children breastfeeding should be continued on demand.

▶ Different types oral rehydration solutions

- Glucose ORS: Used for all patients of all ages;
- Rice based G-ORS: Used for <6months to adult;
- Home based Rice-ORS: On emergency, used for <6 months to adult.

Home based rice oral rehydration solutions

Ingredients:

- Rice - one fistful;
- Salt - 1 pinch measured with three fingers;
- Water- half liter and 50 ml extra (for evaporation loss).

Procedure

At first take the rice and soak in water for 10 to 15 minutes. Then grind it with clean appropriate equipment either into a paste or powder form. Then put it into a clean saucepan and add boiled cool drinking water (according to measurement). Then cook it properly. During cooking the mixture needs to be stirred continuously with a spoon. It takes one minute after the first bubbles rise. This solution is ready to eat. This home-based rice ORS can be kept at room temperature for six hours in summer and eight hours in winter season

Table 26: Diarrhoeal diet

Infant (0 to 6 months)	Child (>6 months to 2 years)	Children and adults
Only breastmilk	Breastmilk+ home based diet without lactose	Home based normal diet

Table 27: Foods that may be better tolerated during diarrhoea

Fruits and Vegetables	Green coconut water, boiled green-banana, potato
Breads and Cereals	Sago, rice, flat rice, bread
Protein foods	Yoghurt, eggs, lean fish, skinless poultry

▶ Foods to limit or avoid

- Artificial milk, formula milk and bottle feeding may worsen diarrhoea. Discourage bottle feeding and formula milk. If prescribed by physician it is advised to feed by spoon and bowl/cup;
- Avoid alcohol, fruit juices, fizzy drinks, caffeine, as these can irritate the gut;
- Limit beans, pulses, cabbage, broccoli, cauliflower;
- Limit fibre, spicy foods as it may irritate the gut;
- Avoid greasy, fatty and fried foods;
- For adults, limit milk because of the risk of lactose intolerance;
- Limit high fat, salt and sugar (HFSS) foods.

▶ Other considerations

- Ensure access to safe drinking-water;
- Practice personal hygiene, handwashing and proper sanitation;
- Practise and promtote exclusive breastfeeding for the first six months of life;
- Practise good food hygiene;
- Have rotavirus and cholera vaccination.

Guideline 9: Dietary guidelines for tuberculosis

Tuberculosis, commonly known as TB, is caused by an infection that is caused by any single agent from a group of bacterium called Mycobacterium tuberculosis. Multiple micronutrient deficiencies are usual in tuberculosis infected patients. Deficient protein intake in TB patients may have a particular detrimental affect on the ability of the body to fight against tuberculosis. To combat these, nutrition and dietary habits play an important role in the prevention of TB and treatment of patients, who invariably suffer from several micronutrient deficiencies.

▶ Nutritional and dietary considerations

- **Energy** needs of TB patients are increased because of the disease itself. In general, an additional 200-300 kcal/day (depending on body weight) is required for TB patients. (Approximately 35 to 40 kcal per kg of ideal body weight);
- **Carbohydrates:** The proportion of carbohydrates in the diet that are recommended for TB patient is 55 to 75 percent of total energy intake. It is important to emphasize that the intake of complex carbohydrates includes foods that are contain low GI (as found in low glycemic index foods) and adequate dietary fibre;
- **Protein** is important in preventing the wasting of body stores. An intake of 1.2 to 1.5 g of protein/kg body weight/day or 10 to 15 percent of energy of total daily intake or approximately 75 to 100 g of protein is sufficient for a day. Patients who have TB need to eat eggs, meats and poultry. Consideration should be given to the provision of a variety of protein rich foods, which come from fish, beans, peas, nuts and seeds. For TB patients who are underweight, 1.7 g of protein/kg body weight/day is required, while those who are overweight should limit their protein intake to 1 g/kg body weight/day;
- **Fat:** Total intake of fats/oils for TB patients are recommended at 20 to 30 percent of their total calories, with most fat coming from polyunsaturated and monounsaturated fat, such as oily fish, nuts and vegetable oils;
- **Vitamins and minerals:** Patients with active TB also suffer from micronutrient deficiencies, especially from iron and folate, vitamin A, zinc, vitamin D as a result of taking anti-TB drugs. Vitamins that are particularly important for developing healthy immune system include vitamins A, C, E, D and vitamin B complex. Vitamins A, C and E are antioxidants that protect the body by destroying harmful oxygen.

  The requirement of iron and calcium for a TB patient is higher than that for a healthy individual who does not have TB. The requirement for all micronutrients, particularly selenium, zinc, copper, potassium and manganese is also increased. These are required by the body to initiate and enhance the immune response.

  It is recommended that salt/ sodium intake per day is limited to 2000 mg (approximately one teaspoon of salt). Choose low-sodium foods, and do not add salt when cooking. Also, eat potassium-rich foods, such as fruits and vegetables.

▶ Foods to select

- Consume foods and drinks with little or no added sugars or caloric sweeteners;
- Sprouted pulses are beneficial because these have an additional amount of vitamin C and bioavailability of iron;
- Eat a variety of fruits and vegetables, especially those that are rich in potassium and vitamin C, which are required to cure the disease. Eat locally grown dark green leaves,

legumes, yellow colour varieties of fruits and starchy vegetables such as oranges, pineapples, watermelon, papaya, banana, lemon, pomegranate, grapes, guava, custard apple, bottle-gourd, tomato, potato, pumpkin, spinach, beans, drum stick-leaves and carrot;

- Eat five to six smaller meals per day instead of three large meals;
- The meals should be appetizing in appearance and taste and should provide sufficient energy and protein;
- There are many fat-free and low-fat choices of foods that do not require adding sugars that are available and consistent with an overall healthy dietary plan;
- Consume nuts daily, as they contain mono and polyunsaturated fatty acids which boost the immune response, such as cashews, walnuts, peanuts;
- It is important to drink adequate fluid, at least 10 to 12 glasses per day;
- Consume 500 to 750 ml of milk or yogurt daily to ensure an adequate intake of calcium;
- Consume different types of seasonal fresh fruits to meet micronutrient and antioxidant requirements.

▶ Foods to limit or avoid

- Limit coffee and other caffeinated drinks;
- Avoid drinking alcohol. It can add to the risk of liver damage caused by some drugs used to treat TB;
- Avoid saturated fat, cholesterol and foods rich in trans-fat;
- Avoid the intake of street-foods, which are prepared in unhygienic conditions;
- Avoid raw, undercooked vegetables.

▶ Other considerations

- Complete the TB drugs/doses;
- Stop all forms of tobacco intake;
- Avoid drinking alcohol;
- Eat five to six smaller meals per day instead of three large meals;
- If patients have a poor appetite, consider preparing foods that are appetizing and take the patient's likes and dislikes into consideration;
- During acute stage infection with TB, high calorie, fluid and soft diet are effective;
- Initially, meals should be given once every two hours around the clock. When the fever is reduced, and the condition of the patient has improved, the interval between meals can be revised to every four hours;
- Undertake regular exercise. The patient needs to maintain a healthy body weight by consuming a normal, healthy diet and building up their strength to overcome tuberculosis and reduce the risk of a relapse;
- Avoid unhealthy habits, for example: smoking, drinking alcohol.

Guideline 10: Dietary guidelines for cancer[54]

Cancer is a generic term for a large group of diseases characterized by the growth of abnormal cells beyond their usual boundaries. Cancer can then invadead joining parts of the body and/or spread to otherorgans. It more correctly refers to a disease process where development is thought to be multi-step, both reversible and irreversible. Some of the reversible steps may be influenced by dietary factors that can also limit the multi-step process from progressing and thereby protect against the development of clinical cancer.

▶ Nutritional and dietary considerations[55]

- **Calorie:** For hypermetabolic, 30 to 35 kcal/kg/IBW is recommended;
- **Protein:** A protein intake of about 1.2 to 1.5 g/kg/day is adequate for most patients with cancer to maintain and restore lean body mass. Plant protein should be encouraged. In some instances, such as cachexia, protein supplementation may be necessary;
- **Fat:** 20 to 30 percent of total calories from fat is recommended;
- **Fibre:** Fibre consumption should be increased. Fibre-rich diets are associated with a protective effect in colon cancer as well as other cancers. At least 4 g dietary fibre in each meal is required to help reduce constipation;
- **Vitamins and minerals:** Green leafy vegetables, other vegetables and fruits such as: amaranth, arum leaves, spinach, Indian spinach, bottle gourd leaves, ripe mango, ripe papaya, amla, guava, grapefruit, hogplum along with nuts, legumes, whole-grains, seeds are an excellent source of β-carotene, Vitamin C and Vitamin E. These types of antioxidant rich foods help to protect and reduce damage to body cells caused by continuous oxidative damage;
- **Fluid:** A person with cancer may need extra fluids if they have vomiting, diarrhoea, or even if they are not eating much. Drinking 2 to 3 litres of fluid is advisable to replace fluids lost from cancer-related diarrhoea.

▶ Foods to select

- Consume high-protein foods while appetite is highest. For loss of appetite- feeding small, frequent meals is more effective. Always try to add calorie and protein rich snacks and beverages to the diet;
- Small portions of meals and snacks are often easier to tolerate than large and help to manage nausea and vomiting. For vomiting, avoid eating or drinking until vomiting is controlled—then try sipping on small amounts of liquids such as soup, rice water, sago water, barley water, water of boiled vegetable, green coconut water;

[54] Cancer with other complications/comorbidities will require further management from physician and dietititan.

[55] Drug-diet interaction should be recognized and follow expert opinion

- Increase intake of naturally low in calories high fibre foods such as whole grains, fresh and cooked vegetables, fresh and dried fruits, and foods containing peels, nuts, and seeds;
- Red meat often becomes less appealing, so try poultry, fish, beans, nuts, and eggs;
- Being dehydrated can make fatigue worse. Aim for at least eight glasses of hydrating fluid each day unless advised to restrict fluids for another medical condition. Hydrating fluids include water, clear juices, or broth.

▶ Foods to limit or avoid

- Avoid high sugar, high salt and high fat foods;
- Avoid refined carbohydrates and limit foods that are low in fibre;
- Avoid processed meat (grilled/tandoori, sausage, salami, ready made patty), foods from salad bars, and delicatessens, as these foods create the risk of colorectal cancer;
- Avoid eating raw or undercooked animal products, including meat, poultry, eggs, and fish, overcooked and reheated food;
- Avoid greasy foods and foods with strong odours, spices and acidic fruits;
- Choose foods that are easy to chew, swallow and digest for managing nausea and vomiting.

▶ Other considerations

- Maintain a healthy body weight;
- Eat six small meals throughout the day instead of three large meals;
- Over feeding must be avoided;
- Get regular exercise and optimum rest;
- Stop all forms of tobacco and alcohol intake.

Guideline 11: Dietary guidelines for hypothyroidism

Hypothyroidism, is a disorder of the endocrine system in which the thyroid gland does not produce enough hormone and there is a deficient activity of the thyroid gland.

▶ Nutritional and dietary considerations

- Foods rich in iodine include cheese, milk, salt water fish, seaweed, whole eggs are recommended;
- Foods rich in selenium including: tuna, shrimp, beef, chicken, eggs, oatmeal, whole-wheat bread, nuts and legumes, help to increase the activity of thyroid hormones;
- Foods rich in zinc include: beef, chicken, legumes, pumpkin seeds and yogurt are recommended;
- Whole-grain-based carbohydrates such as brown rice, oats and non-starchy vegetables should be consumed, as they provide energy with no inflammatory or auto-inmune responses;
- Protein rich foods as fish, legumes, whole eggs, nuts and nut butters should be consumed. Protein transports the thyroid hormone throughout the body;
- High fibre foods: 30 to 40 g of daily fibre intake is recommended;
- Always consume iodized salt.

▶ Foods to select

- Consume healthy fat foods as oily fish, extra virgin olive oil, flax seeds;
- Seaweed is a good source of iodine and especially for those with heart problem or high blood pressure who eat restricted amounts of table salt;
- Eat garlic and onions, pulses like masoor dal, mung dal and pulses;
- Fruits such as apple, grapefruit, papaya and antioxidants are necessary to combat damage from free radicals and lowering inflammation;
- Seasonal fruits, colourful and dark green vegetables are encouraged;
- Drink plenty of safe water.

▶ Foods to limit/restrict

- Limit consumption of free sugar and cereals;
- Limit consumption of food containing goitrogens, which are compounds that may interfere with the normal functioning of the thyroid gland. Many everyday foods contain goitrogens, including:
  - ❍ Soy foods: soymilk, soysauce;
  - ❍ Cruciferous vegetables: cabbage, broccoli, cauliflower, turnips, spinach;
  - ❍ Fruits and starchy plants: sweet potatoes, strawberries, pears;
  - ❍ Nuts and seeds: walnuts, peanuts, almonds, cashew nuts, flaxseeds;
- Limit consumption of food containing gluten, which is a protein found in grains: wheat, semolina, rye barley, bread, pasta and cereals;
- Limit ingesting processed foods: avoid processed foods that tend to be calorie-dense and offer little nutritional benefit. These types of foods also promote weight gain;
- Limit energy bars and foods from genetically modified organisms, which may hinder cell receptors and disrupt feedback in the hormonal or endocrine system;
- Limit consumption of high fat salt sugar (HFSS) foods;
- Limit consumption of coffee, tea and alcohol as these may irritate the thyroid gland.

SECTION: 04

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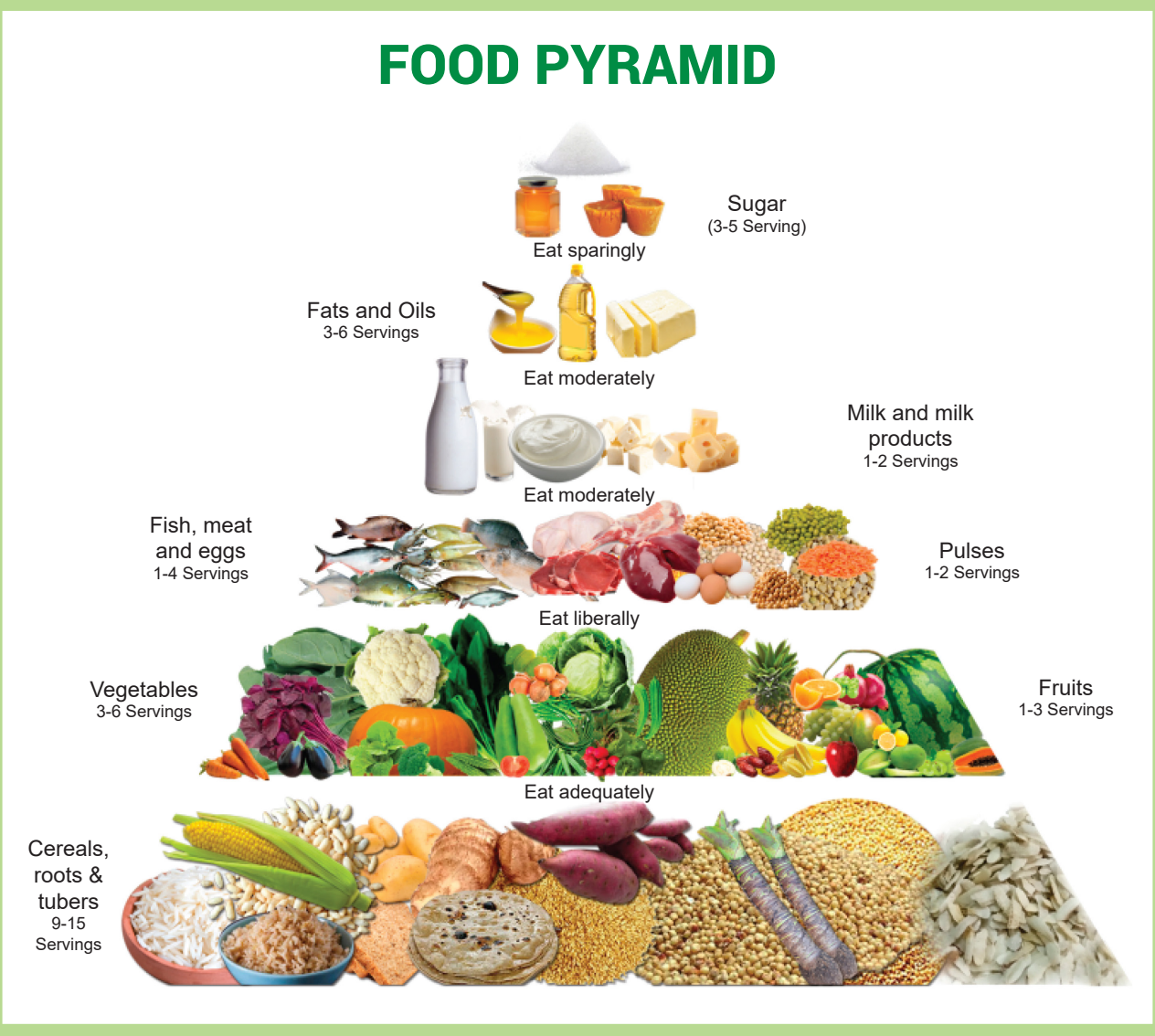
ANNEXES

Annex 1: Food guide pyramid for Bangladesh

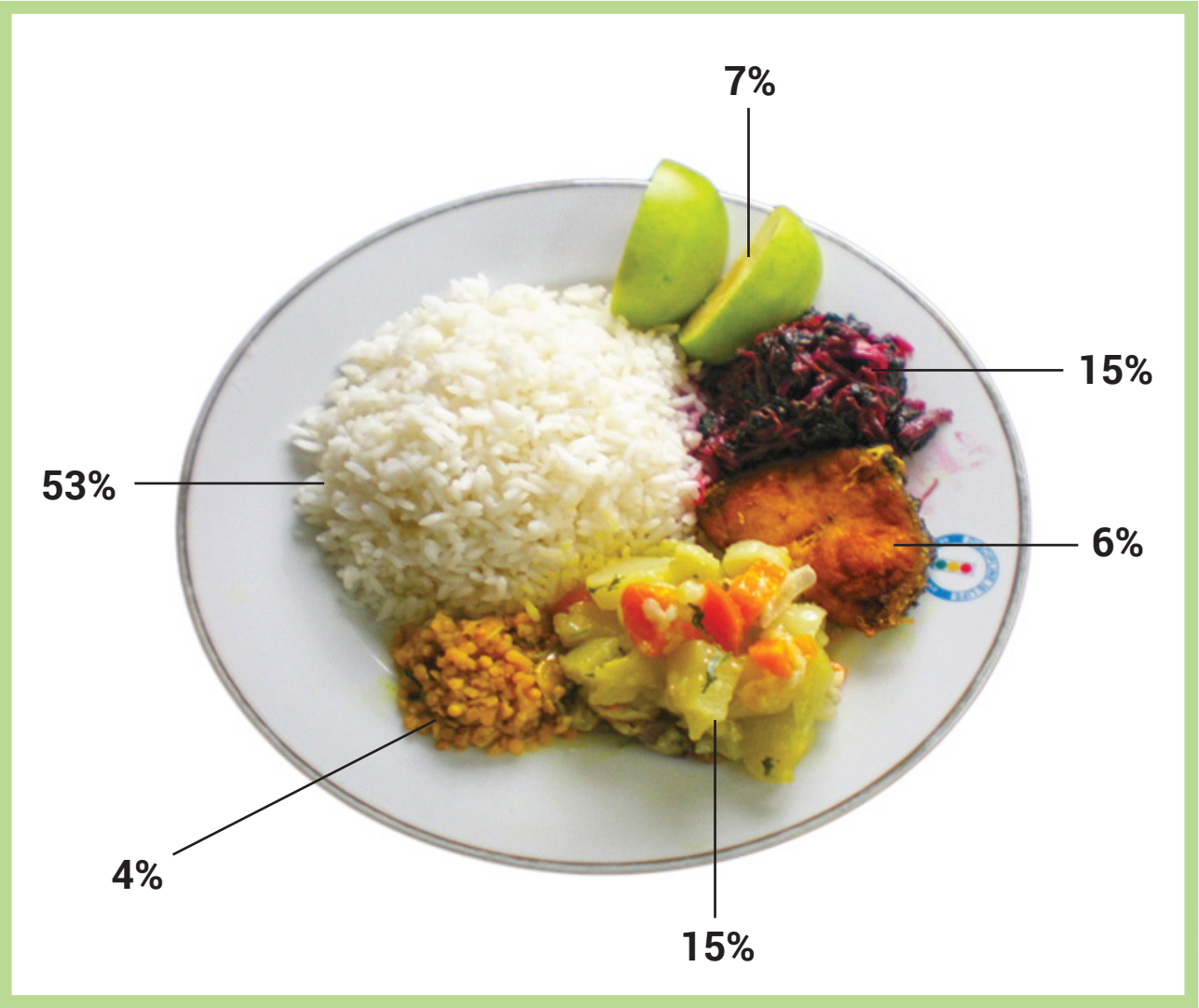
The Food Pyramid is designed to make healthy eating easier. Healthy eating is about getting the correct amount of nutrients – protein, fat, carbohydrates, vitamins minerals and water you need to maintain good health. Foods that contain the same type of nutrients are grouped on each of the shelves of the Food Pyramid. This gives a choice of different foods from which to choose a healthy diet.

The large portion at the base of the pyramid is whole grain-based foods which are recommended to be consumed adequately, while sugar, sugar products and fats need to be consumed sparingly as they provide very little of the essential vitamins and minerals that body needs and form the top of the food pyramid. Limiting these is essential for healthy eating.



Annex 2: Recommended healthy food plate for Bangladesh (based on research conducted by BIRDEM research team under a project implemented by Ministry of Food and FAO)

Food plate method: Proportion of foods for a healthy diet (Lunch)



Annex 3: Physical activity pyramid

The physical activity pyramid guides on the frequency and the type of physical activities that are essential for a healthy life.

- Be active
- Engage in outdoor games
- Engage in household chores (washing utensils, mopping the floor, washing clothes)
- Carry out work manually with minimum use of machine
- Get involved in gardening
- Take stairs instead of elevators/escalators
- Walk whenever possible

Annex 4: Standardization of weights and measures for foods

The standard measuring cups, bowls and spoons, used at BIRDEM Hospital, Dhaka have been adapted for standardizing serving sizes. The approximate energy value (kcal) of each of the servings is also provided.

	
200 g cooked vegetable (2 servings) provides 100kcal	100 g banana (1 serving) provides 95 kcal
	
100 g cooked rice (1 serving) provides 100 kcal	10 ml oil (2 servings) provides 90 kcal
	
100 ml thin cooked dal (1 serving) provides 50 kcal	150 ml milk (1serving) provides 100 kcal
	
80 g cooked fish (1 serving; 2 pieces) provides 100 kcal	60 g egg (1 serving) provides 100 kcal

Annex 5: Food exchange list

Annex food exchange list is a grouping of foods based on similarities in energy content as well as carbohydrate, protein and fat.

Each serving of grains, pulses, fish and meat provides 100 kcal; fruits and vegetables provide 50 kcal.

Food	Serving size	g/serving	Portion size (uncooked)	kcal
Rice	8—12	30	1/3 cup	100
Wheat	1—3	30	1/3 cup	100
Potato	1-4	50	1 medium	50
Pulses and legumes	1-2	30	1/3 cup	100
Leafy vegetables	1-2	125	1 bunch	50
Vegetables	2-3	150	1.5 cup	50
Fruits	1—3	80	1	50
Fish/ meat/ poultry	1-2	80	2 pieces	100
Egg	1	60	1	100
Milk	1-3	150	1 cup	100
Sugar	1-5	5	5 tsp	100
Cooking oil	3-6	5	2 tsp	100
Spices*	1	20	4 tsp	50

* Spices include onion, garlic, ginger, turmeric and chilli

Annex 6: Self-evaluation checklist

Keeping in mind the 10 rules of dietary guidelines for the good health of the people of Bangladesh, it is now time to evaluate your eating behaviours and lifestyle patterns

- Place a tick(√)for your answer in the space provided below in accordance with your eating behaviour and lifestyle pattern;
- For any of the 17 eating behaviours and lifestyle patterns mentioned below, tick **regular** if the behaviour or pattern is a part of your daily life, tick **occasional** if the behaviour or pattern is practised for 3 days/week and tick **never** if the behaviour or pattern is practised for less than 3 days/week;
- The sum of marks will help obtain your evaluation score.

Eating behaviours andlifestyle pattern	Frequency of eating		
	Regular	Occasional	Never
1. Eat a variety of food from 6-8 food groups of the food pyramid			
2. Eat unpolished rice, wheat			
3. Eat citrus and vitamin A rich fruits			
4. Eat vegetables (leafy and non leafy)			
5. Eat fish/meat			
6. Eat pulses			
7. Restrict foods containing fats and oils			
8. Restrict sweetened foods			
9. Drink milk			
10. Eat fresh, well prepared foods			
11. Avoid overeating			
12. Eat food with proper chewing			
13. Always wash hands before meals			
14. Have your body weight measured weekly			
15. Perform exercise			
16. Undertake clinical check-up at least once a year			
17. Take enough rest and sleep			

Evaluation score

Good	Moderate	Poor
15-17	11-14	<10

Annex 7: Meal planning

Meal plans have been developed considering body weight, physical activity level, physiological status, food cost and dietary diversity scores. The following menu with moderate cost has been developed for a man engaged in moderate activity.

Adult man

Age	:	(19-29 years)
Activity level	:	Moderate
Present energy requirements	:	2430 kcal/day
Weight	:	60 kg

Determine the quantity (g) of carbohydrate, fat and protein based on energy requirements

Step 1

70% of the kilocalories from carbohydrate

20% of the kilocalories from fat

10% of the kilocalories from protein

For 2 430 kilocalories, the division of nutrients mentioned above translate as follows:

- **Carbohydrates:**

70% × 2430 kcal = 1701 kilocalories; 1701 kcal ÷ 4 kcal/g= 425 g.

(So the man needs 425 g carbohydrate).

- **Fat:**

20% × 2430 kcal = 486 kcal; 486 kcal ÷ 9 kcal/g= 54 g.

(So the man needs 54 g fat).

- **Protein:**

10% × 2430 kcal = 243 kcal; 243 kcal ÷ 4 kcal/g = 61 g.

(So the man needs 60 g protein)

Sample menu plan

Age	28
Height (cm)	170
Weight (kg)	60

Gender	Male
PAL (Physical Activity Level)	1.5
BMR (Basal Metabolic Rate) (Kcal/kg/day)	27

Calorie Requirement	2430 (Kcal)
Carbohydrate	70 % (1722 Kcal)
Protein	12 % (283 Kcal)
Fat	18 % (426 Kcal)

Breakfast + Mid-morning snacks		**700 Kcal**
Name of the Foods		Quantity (g)
Breakfast	Ata	60
	Chola	15
	Chichinga	125
	Spices+Salt	5
	Oil	10
Mid-morning Snacks	Banana (ripen)	100
	Chira	50
	Gur	10

Lunch + Evening Snacks		**940 Kcal**
Name of the Foods		Quantity (g)
Lunch	Rice	150
	Masoor Dal	10
	Potatoes	50
	Ladies Finger	125
	Fish	30
	Pui Shak	100
	Spices+Salt	10
	Oil	10
Evening Snacks	Gur	10
	Watermelon	100
	Muri	30

Dinner + Bedtime		**790 Kcal**
Name of the Foods		Quantity (g)
Dinner	Rice	120
	Masoor Dal	10
	Lau	125
	Lal Shak	100
	Murgi (Farm)	40
	Spices+Salt	10
	Oil	10
Bedtime	Cow's Milk (Whole)	130

Food List and Nutritive Value

Name of the Foods	Quantity (g)	Fiber (g)	Energy (Kcal)	Energy (KJ)	Protein (g)	Fat (g)	Carbohydrate (g)	Calcium (mg)	Fe (mg)	Vitamin B1 (mg)	Vitamin B2 (mg)	Vitamin C (mg)	Vitamin A (mcg)	Vitamin B3 (mg)	Folic Acid (mcg)	Zn (mg)	Mg (mg)	Na (mg)	K (mg)	P (mg)
Chira	50	0.65	178	755	3	0.55	40	13	3.4	0.1	0.02	0	0	2	0	1	24	1	75	65
Muri	30	0.42	108	462	2	0.03	25	3	0.21	0.06	0.04	0	0	1.05	3.49	0	14	195	46	40
Ata	60	6.42	200	846	7	1.26	37	31	2.94	0.29	0.1	0	0	3.72	17.4	2	91	10	170	184
Rice	270	9.18	929	3926	18	1.08	207	24	1.89	0.57	0.14	0	0	12.42	29.7	4	116	5	394	340
Chola	15	2.61	53	221	3	0.9	7	30	1.32	0.04	0.04	0	1	0.74	27.9	0	20	5	107	55
Masoor Dal	20	2.64	63	268	6	0.16	9	5	1.02	0.16	0.02	0	1	1.26	7.2	1	14	7	127	52
Lal Shak	100	4.2	32	131	5	0.3	1	256	6	0.03	0.13	42	793	1.6	85	1	181	59	261	32
Pui Shak	100	2.2	25	105	2	0.3	2	111	2.2	0.02	0.36	52	170	0.5	140	0	179	69	187	31
Spices+Salt	25	0.42	48	55	2	1.54	7	5	0.19	0	0.03	1	0	0.07	4.18	0	5	1180	46	6
Potatoes	50	1.05	33	141	1	0.1	7	6	0.25	0.04	0.04	10	1	0.4	9	0	11	8	143	20
Lau	125	0.75	43	178	1	0.12	9	33	0.88	0.01	0.02	11	2	0.5	7.5	1	14	49	188	66
Chichinga	125	1	30	129	1	0.38	6	39	0.5	0.05	0.08	24	0	1	20	0	21	49	194	35
Ladies finger	125	3.88	49	205	3	0.25	7	116	1.12	0.05	0.2	22	24	1.75	75	0	25	46	223	35
Musturd Oil	30	0	270	1110	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Banana (Ripen)	100	2.6	95	400	1	0.8	19	11	0.3	0.05	0.08	1	2	0.9	20	0	23	10	411	36
Water melon	100	0.4	22	93	1	0.2	4	12	0.4	0.02	0.04	24	29	0.3	3	0	11	17	107	12
Koii Mach	30	0	42	174	5	2.31	0	19	0.36	0.01	0.05	0	65	0.78	0	0	16	16	64	48
Chicken (Fram)	40	0	51	215	8	2.28	0	7	0.4	0.04	0.05	0	0	3.8	1.6	1	12	22	120	72
Cow's Milk (Whole)	130	0	82	342	4	4.81	6	134	0.13	0.08	0.36	3	41	1.04	11.7	1	17	66	170	117
Gur	20	0	77	326	0	0.02	19	18	0.32	0	0	0	0	0	0	0	24	16	58	14
TOTAL	**1545**	**38.42**	**2430**	**10080**	**72**	**47.39**	**410**	**873**	**23.83**	**1.62**	**1.8**	**188**	**1128**	**33.83**	**462.67**	**13**	**816**	**1832**	**3099**	**1261**
RDA	**-**	**38**	**2430**	**10206**	**62**	**20**	**425**	**1000**	**27.4**	**1.2**	**1.3**	**45**	**600**	**16**	**400**	**7**	**260**	**2092**	**3750**	**700**

Breakfast: Roti 2 pieces, Chola (medium Consistency) ½ Cup, Chichinga ½ Cup; **Mid-morning:** Banana (Medium) 1 Piece, Chira-Gur ½ Cup; **Lunch:** Rice 4½ Cup, Fish 1 small Piece, Masoor Dal ½ Cup, Vegetables (Potatoes, Puishak, Ladies finger) 1½ Cup; **Evening Snacks:** Muri-Gur 1 Cup, Watermelon 1 Cup, **Dinner:** Rice 3½ Cup, Masoor Dal ½ Cup, Vegetables (Lal shak, Lau) ½ Cup, Chicken (Farm) 1 small Piece; **Bedtime;** Milk 1 Cup (Salt = 5 g /day/person)

IDDS: 10 out of 12

Food Cost: 62 tk (according to the price of 2010 Agricultural ministry

Annex 8: Nutrient requirements

8.1: Requirements of protein, fat and fibre for males and females in different age groups

Age (yrs)	Body weight (kg)		Protein g/day (FAO/WHO 2007)		Total Fat (% of total Energy) (FAO/WHO 2008)		Fibre g/day	
	Male	Female	Male	Female	Male	Female	Male	Female
<1	7.47	6.91	10.2	9.4	40-60	40-60	No adequate intake has been set	No adequate intake has been set
1	11.43	10.79	11.6	10.8	35	35	14	14
2	13.51	13	11.9	11.4	35	35	14	14
3	15.67	15.06	13.1	12.7	25-35	25-35	14	14
4-6	17.69-18.46	16.81-17.81	17.1	16.2	25-35	25-35	18	18
7-8	20.37-22.55	19.76-22.09	25.9	26.2	25-35	25-35	18	18
9-10	25-27.8	24.82-28.21	25.9	26.2	25-35	25-35	24	20
11-14	30.88-43.96	32.36-43.22	40.5	41	25-35	25-35	24	20
15-18	49.87-45-75	44.99-40-75	57.9	47.4	25-35	25-35	28	22
19-50	45-75	40-75	33-66	33-66	20-35	20-35	30	25
51-65+	45-75	40-75	33-66	33-66	20-35	20-35	30	25
• Pregnancy (1st trimester)				+ I				25-28
• Pregnancy (2nd trimester)				+ 10				25-28
• Pregnancy (3rd trimester)				+ 31				25-28
• Lactation (0-6 Month)				+ 19				27-30
• Lactation (7-12 Month)				+ 13				27-30

8.2: Requirements of vitamins for males and females in different age groups[A]

Age (years)	Body weight (kg)		Vit-A (REq)		Thiamine		Riboflavin		Niacin		Vit-B12		Folate (DFE)[B]		Vit-C RNI	
			mcg/day		mg/day		mg/day		mg NEs[C]/day		mcg/day		mcg/day		mg/day	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
<1	7.47	6.9	375-400	375-400	0.2-0.3	0.2-0.3	0.3-0.4	0.3-0.4	2-4	2-4	0.4-0.7	0.4-0.7	80	80	25-30b	25-30[b]
1-3	11.4-15.7	11-15	400	400	0.5	0.5	0.5	0.5	6	6	0.9	0.9	150	150	30b	30b
4-6	17.7-18.5	17-18	450	450	0.6	0.6	0.6	0.6	8	8	1.2	1.2	200	200	30b	30b
7-9	20.4-25	20-25	500	500	0.9	0.9	0.9	0.9	12	12	1.8	1.8	300	300	35b	35b
10-18	27.8-75	28-75	600	600	1.2	1.1	1.3	1	16	16	2.4	2.4	400	400	40	40
19-65+	45-75	40-75	600	600	1.2	1.1		1	16	14	2.4	2.4	400	400	45	45
Pregnancy				800		1.4		1.4		18		2.6		600		55
Lactation				850		1.5		1.6		17		2.8		500		70

b Arbitrary values

[A] WHO. 2005. *Vitamin and mineral requirements in human nutrition, second ed.* Geneva, World Health Organization. https://apps.who.int/iris/handle/10665/42716

[B] Dietary folate equivalent (DFE)

[C] Niacin equivalents (NEs)

8.3: Requirements of macrominerals for males and females in different age groups

Age (yrs)	Body weight (kg)		Ca mg/day (FAO/WHO 2004)		Phosphorus mg/day (FAO/WHO 2002)		Iron (FAO/WHO 2004) Recommended nutrient intake (mg/day) for a dietary iron bioavailability								Na mg/day (RI), NIN 2010		K mg/day (RI), NIN 2010		Mg (mg/day) (FAO/WHO 2004)	
							15%	12%	10%	5%	15%	12%	10%	5%						
	Male	Female	Male	Female	Male	Female	Male				Female				Male	Female	Male	Female	Male	Female
<1	7.47	6.91	300d-400g	300d-400g	90-275	90-275	6.2	7.7	9.3	18.6	6.2	7.7	9.3	18.6	407	407	628	628	26d-54h	26d-54h
1-3	11.43-15.67	10.79 - 15.06	500	500	460	460	3.9	4.8	5.8	11.6	3.9	4.8	5.8	11.6	589	589	1100	1 100	60	60
4-6	17.69-18.46	16.81-17.81	600	600	500	500	4 .2	5.3	6.3	12.6	4.2	5.3	6.3	12.6	1005	1005	1550	1 550	76	76
7-9	20.37-25	19.76-24.82	700	700	500	500	5.9	7.4	8.9	17.8	5.9	7.4	8.9	17.8					100	100
10	27.8	28.21	1300	1300	1250	1250	5.9	7.4	8.9	17.8	5.9	7.4	8.9	17.8					230	220
11-14 Pre-menarche											9.3	11.7	14	28						
11-14	30.88-43.96	32.36-43.22	1300	1300	1250	1250	9.7	12.2	14.6	29.2	21.8	27.7	32.7	65.4					230	220
15-17	49.87-58.64	44.99-48.51	1300	1300	1250	1250	12.5	15.7	18.8	37.6	20.7	25.8	31	62					230	220
18	45-75	40-75	1300	1300	1250	1250	9.1	11.4	13.7	27.4	19.6	24.5	29.4	58.8					230	220
19-50	45-75	40-75	1000	1000	700	700	9.1	11.4	13.7	27.4	19.6	24.5	29.4	58.8	2092	1902	3750	3225	260	220
51-65	45-75	40-75	1000	1300	700	700	9.1	11.4	13.7	27.4	19.6	24.5	29.4	58.8	2092	1902	3750	3225	260	220
65+	45-75	40-75	1300	1300	700	700	9.1	11.4	13.7	27.4	19.6	24.5	29.4	58.8	2092	1902	3750	3225	224	190
Pregnancy				1200		700					+7.5	+9.4	+11.3	+22.6						220
Lactation				1000		700					+10.0	+12.5	+15.0	+30.0						270

d Breastfed; g Cow milk fed; h Formula-fe

8.4: Requirements of micro minerals for males and females in different age group

Age (yrs)	Bodyweight (kg)		Iodine µg/day		Zinc mg/day					
					High bioavailability	Moderate bioavailability	Low bioavailability	High bioavailability	Moderate bioavailability	Low bioavailability
	Male	Female	Male	Female	Male			Female		
<I	7.47	6.9	90	90	1.1[D]-2.5	2.8-4.1	6.6-8.4	I.Id-2.5	2.8-4.1	6.6-8.4
1-3	11.4-15.7	11-15	90	90	2.4	4.1	8.3	2.4	4.1	8.3
4-6	17.7-18.5	17-18	90	90	2.9	4.8	9.6	2.9	4.8	9.6
7-9	20.4-25	20-25	120	120	3.3	5.6	11.2	3.3	5.6	11.2
10-12	27.8-34.9	28-37	120	120	5.1	8.6	17.1	4.3	7.2	14.4
13-18	38.6-75	41-75	50	150	5.1	8.6	17.1	4.3	7.2	14.4
19-65+	45-75	40-75	150	150	4.2	7	14	3	4.9	9.8
Pregnancy (1st trimester)				200				3.4	5.5	11
Pregnancy (2nd trimester)				200				4.2	7.0	14
Pregnancy (3rd trimester)				200				6.0	10	20
Lactation (0 -6month)				200				5.8-5.3	9.5-8.8	19-17.5
Lactation (7-12month)				200				4.3	7.2	14.4

[D] Breastfed

Annex 9: Glossary

Early initation of breastfeeding: Early initation of breastfeeding is referred to provision of mother's breastmilk to infants within **one hour of birth.**

Cholesterol: Cholesterol is a component of animal and human cell membranes and is used to produce hormones and bile acids. Humans synthesize sufficient cholesterol to meet biological requirements. Excess cholesterol gets deposited inside blood vessels leading to atherosclerosis. Cholesterol is present only in animal sources of food like organ meat (liver, kidney and brain), beef, eggs, bacon, sausages, butter, whole milk and cheese.

Curd: Curd is the part of milk that coagulates when milk sours or is treated with lactobacillus culture, previous curd culture or related substances.

Decreased refined sugar intake: Added sugar should contribute no more than 10 per cent of energy intake

Decreased salt intake: Sodium intake should be less than 2 g per day (equivalent to about 5 g of table salt a day)

Dietary diversity: Dietary diversity is defined as the number of individual food items or food groups consumed over a given period (usually measured through 24-hour dietary recall). CF should contain the minimum dietary diversity (4 or more food groups out of the 8 groups given in table 6) to meet the growing child's nutrition needs.

Dietary diversity score (DDS): Dietary diversity score is an indicator that measures food variety. It also reflects in part the nutrient/micronutrient adequacy of the diets of household members. For household DDS (HDDS) which measures access to household food variety, FANTA/FAO classified foods into 12 groups (cereals, white tubers and roots, vegetables, fruits, meat, eggs, fish and seafood's, legumes and seeds, milk and milk products, oils and fats, sweets and spices). Consumption of each food group/day (30 g for solid and single ingredient and 60 g for liquid and mixed dishes) counts one score. HDDS less than 5 is considered as poor, 6-8 as moderate and >=9 is good.

Dietary fibre: Dietary fibre is the non-digestible portion of fruits, vegetables and grains. There are two forms of fibre: soluble and insoluble. Soluble fibre contains pectin, gums and mucilage which can be found in fruits, beans, okra, leafy vegetables, stalks and oats. Soluble fibre dissolves in water, reduces LDL cholesterol, reduces blood sugar and improves bowel function. Insoluble fibre includes cellulose, hemicellulose and lignin, which can be found in whole grains and vegetables. Insoluble fibre does not dissolve in water and helps to decrease cholesterol.

Fish oils: Fish oils are a good source of omega-3 fatty acids. Fish oils play a crucial role in the prevention of atherosclerosis, heart attack, depression and cancer.

Free Sugars: The term "free sugars" refers to all monosaccharides and disaccharides added to foods by the manufacturer, cook or consumer, plus sugars naturally present in honey, syrups and fruit juices.

Ideal bodyweight: A weight that is believed to be maximally healty for a person, based chiefly on height but modified by factors such as age, build and degree of muscular development. A crude estimate to measure ideal body weight is:

- Women: body height in centimetres minus 100 and deduct 15 percent from the result;
- Men: body height in centimetres minus 100 and deduct 10 percent from the result.

Increase Dietary Fiber intake: Adults should eat about 28 g of fibre each day.

Increase consumption of complex carbohydrates: WHO recommends that 70 percent of our total calorie intake should be from complex carbohydrates which include fruit and vegetables, pulses, and grains.

Increased fruit and vegetable intake: Leafy green and yellow vegetables are particularly good sources of vitamins, minerals, and antioxidants. The WHO recommends that we eat more than 400 g each day (about five servings a day).

Prelacteal feeds: Pre-lacteal feeds are foods given to newborns before breastfeeding is established or before breastmilk "comes in," usually on the first day of life.

Minimum Dietary Diversity for Women (MDD – W): Women of reproductive age (WRA) are often nutritionally vulnerable because of the physiological demands of pregnancy and lactation. Insufficient nutrient intakes before and during pregnancy and lactation can affect both women and their infants. Over half of the diets of WRA in Bangladesh seem to be inadequate with gaps between intakes and requirements for a range of micronutrients. As per the available statistics from the Bangladesh Demographic and Health Survey (BDHS), 2014, women in reproductive age (15-49 years) suffer from malnutrition, with 19 percent being underweight, 39 percent having BMI>23 kg/m^2 and 24 percent having BMI of 25 kg/m^2.

The Minimum Dietary Diversity for WRA (MDD-W) indicatoris a food group diversity indicator that has been shown to reflect one key dimension of diet quality: micronutrient adequacy summarised across 11 micronutrients. MDD-W is a dichotomous indicator of whether or not women 15–49 years of age have consumed at least five out of ten idefined food groups the previousday or night. The proportion of women 15–49 years of age who reach this minimum in a population can beused as a proxy indicator for higher micronutrient adequacy, an important dimension of diet quality.

The tenfood groups* are:

1. Grains, white roots and tubers, and plantains;
2. Pulses (beans, peas and lentils);
3. Nuts and seeds;
4. Dairy;
5. Meat, poultry and fish;
6. Eggs;
7. Dark green leafyvegetables;
8. Other vitamin A-rich fruits and vegetables;
9. Other vegetables;
10. Other fruits.

*Consumption of trivial amounts (<15 g) of a food group did not count in dietary diversity scores. A score of one isgiven for each of the food groups consumed. Higher the score, more diverse is the diet.

Women consuming foods from five or more food groups have a greater likelihood of meeting their micronutrient needs than women consuming foods from fewer food groups.

Moderate protein intake: This should be about 10-15 percent of total calorie intake

Obesity: Accumulation of adipose tissue determined by BMI> 30 is known as obesity.

Parboiled rice: Paddy that is subjected to steam resulting in partial cooking of rice before dehulling.

Polyunsaturated fatty acids (PUFA): Polyunsaturated fatty acids are fatty acids having two or more carbon-carbon double bonds in its carbon chain. They are "essential," meaning that the body needs them to function but cannot synthesize them, so a person must get PUFAs from their diet. There are two types of PUFA called omega 6 and omega 3. Omega-3 fatty acids are essential for the functioning of the body's cells. They help with energy production and play important roles in the heart, lungs, blood vessels, and immune system. There are three main types of omega-3s: eicosapentaenoic acid, docosahexaenoic acid (DHA) and alpha-linolenic acid (ALA).

Reduce cholesterol intake: Restrict consumption to less than 300 mg per day.

Reduced total fat consumption: WHO suggest that only 15-30 percent of food energy should come from fat with a maximum of 10 percent as saturated fat.

Restrict alcohol consumption: Consume no more than one ounce (30 ml) of pure alcohol a day.

Saturated fats: Saturated fats are fat molecules that have no double bonds between carbon molecules because they are saturated with hydrogen molecules. Saturated fats are typically solid at room temperature. Most fats derived from animal sources are saturated fats. Hidden saturated fats are found in cakes, biscuits, pastries, other bakery products, fried foods and chocolates. These fatty acids increase LDL cholesterol and contribute to the development of coronary heart diseases and other vascular diseases.

Sugar sweetened beverages (SSBs): All types of beverages containing free sugars and these include carbonated or non-carbonated soft drinks, fruit/vegetable juices and drinks,liquid and powder concentrates, flavoured water, energy and sports drinks, ready-to-drink tea, ready-to-drink coffee, and flavoured milk drinks.

Skim milk: Milk from which the cream has been removed. Sometimes, only half of the cream is removed, resulting in semi-skimmed milk.

Trans-fats: Trans fats or trans-fatty acids are unsaturated fatty acids that come from either natural or industrial sources. Naturally-occurring trans fat come from ruminants (cows and sheep). Industrially-produced trans fats are formed in an industrial process that adds hydrogen to vegetable oil converting the liquid into a solid, resulting in "partially hydrogenated" oil (PHO).

Trans-fatty acids, more commonly called trans-fats, are made by heating liquid vegetable oils in the presence of hydrogen gas and a catalyst, a process called hydrogenation. Trans-fats are used to make foods last longer and give them a better flavour. Vegetable shortenings, margarine, crackers,

cookies, and snack foods like potato chips often contain trans fats. Consumption of foods with trans-fats increases the risk of heart diseases and stroke.

Unsaturated fats: Unsaturated fat is a fat or fatty acid in which there is at least one double bond within the fatty acid chain. A fatty acid chain is monounsaturated if it contains one double bond, and polyunsaturated if it contains more than one double bond. Unsaturated fats, which are liquid at room temperature, are considered beneficial fats because they can improve blood cholesterol levels and ease inflammation. Unsaturated fats are predominantly found in foods from plants, such as vegetable oils, nuts, and seeds.

Waist circumference: Waist circumference is an indicator for the assessment of central obesity. More than normal value (40 inches for men, and less than 35 inches for women) is associated with NCD.

Waist–hip ratio (WHR): Waist–hip ratio (WHR) was suggested as an additional measure of body fat distribution and used as a measurement of obesity, which in turn is a possible indicator of other more serious health conditions (waist circumference divided by the hip circumference). The WHO states that abdominal obesity is defined as a waist-hip ratio above 0.90 for males and above 0.85 for females.

What does "lots" mean? Every person should drink eight to ten glasses (1 glass=250 ml) of clean, safe water every day.

People need extra water when they:

- sweat a lot during hot weather and when;
- work in the sun or do physical work on hot days;
- do strenuous exercise;
- have a fever;
- lose water as a result of diarrhoea or vomiting.

What does "plenty" mean? Plenty means that you should eat at least five portions of vegetables and or fruit per day. For example:

1. Eat fruit with breakfast e.g. orange or an apple;
2. Add raw vegetables such as carrots or shredded cabbage to your lunchbox. You can also eat fresh fruit or fresh vegetables as a snack between meals.

What does "regularly" mean? Regularly means atleast three times a week. If you are unfamiliar with legumes, add them to your eating pattern gradually. Dry beans, lentils and split peas should be cooked until soft before eating. Once cooked, beans can be kept in a covered container in the refrigerator for upto five days. In the freezer, they can be kept, in an airtight container, for upto six months.

Annex 10: Special Acknowledgement (Not according to seniority)

No.	Name	Designation and Organization/ Institution
1	Prof. Dr. Md. Abu Jafor	Director General, Directorate General of Health Services, Ministry of Health & Family Welfare
2	Md Mahbubur Rahman	Director General, FPMU, Ministry of Food
3	Prof. Dr Anjuman Ara Sultana	Line Director, National Nutrition Services
4	Dr Syed Kamrul Islam	Director (PHC and ITHC), DGHS
5	Dr Md Moinul Ahsan	Director (Hospital and clinics), DGHS
6	Dr S.M. Mustafizur Rahman	Retired Line Director, National Nutrition Services
7	Dr Mostafa Faruq Al Banna	Research Director, FPMU, Ministry of Food
8	Dr Sharmin Shahnaz	Assistant Director (PHC and ITHC), DGHS
9	Dr Md Saiful Islam	Program Manager 2, National Nutrition Services
10	Dr Ajmari Sharmin	Deputy Program Manager-8, National Nutrition Services
11	Dr Supta Chowdhury	Deputy Program Manager-1, National Nutrition Services
12	Dr Mahfuza Haque	Deputy Program Manager-11, National Nutrition Services
13	Dr S M Hasan Mahmud	Deputy Program Manager-6, National Nutrition Services
14	Dr Jannatun Naiem	Deputy Program Manager-7, National Nutrition Services
15	Prof. Md. Faruque Pathan	Director, BIRDEM Academy & Chairman, Steering Committee BADAS Nationwide Diabetes Registry (BNDR)
16	Prof. Dr Nazma Shaheen	Former Director and Professor Institute of Nutrition and Food Science (INFS), University of Dhaka
17	Prof. Dr Sheikh Nazrul Islam	Former Director and Professor Institute of Nutrition and Food Science (INFS), University of Dhaka
18	Dr Tahmeed Ahmed	Executive Director, ICDDR,B
19	Dr S K Roy	Chairperson, Bangladesh Breastfeeding Foundation
20	Prof. Dr Sarwar Iqbal	Former Head of the Department of Nephrology BIRDEM General Hospital. Senior Interventional Nephrologist Popular General Hospital
21	Prof. Dr Mohammad Golam Azam	Head, Department of Gastrointestinal, Hepatobiliary and Pancreatic Disorders (GHPD), BIRDEM
22	Dr Tareen Ahmed	Endocrinologist (BIRDEM), Additional Coordinator, Distance Learning Program (DLP), Diabetic Association of Bangladesh (BADAS)
23	Dr Md Zahid Alam	Professor and Head, Department of Cardiology, BIRDEM
24	Prof. Dr Mohammad Delwar Hossain	Professor and Senior Consultant, Dept of Respiratory Medicine and Director, Clinical Services, BIRDEM

No.	Name	Designation and Organization/ Institution
25	Dr Md. Khalequzzaman	Associate Professor, BMU
26	Prof. Dr Sohel Reza Choudhury	Professor and Head Department of Epidemiology and Research, National Heart Foundation Hospital and Research Institute
27	Prof. Syeda Saliha Saliheen Sultana	Professor, Faculty of Institutional Food Management and Dietetics, Govt. College of Applied Human Science
28	Rehana Begum	Associate Professor, Department of Food and Nutrition, Govt. College of Applied Human Science
29	Moffashara Sultana Ratna	Associate Professor, Department of Food and Nutrition, Govt. College of Applied Human Science
30	S. N. Shampa	Principal Nutritionist, Food and Nutrition Dep, Samorita Hospital
31	Chowdhury Tasneem Hasin	Chief Clinical Dietitian, United Hospital
32	Nujhat Manzoor	Dietitian, Dietary and Patient Nutrition Services, Square Hospital
33	Shamsunnahar Nahid	Chief Nutrition Officer Dept of Food and Nutrition, BIRDEM
34	Dr Shayla Nasreen	Nutritionist, Head of Nutrition, ICMH
35	Tripti Chowdhury	Nutritionist, BMU
36	Khaleda Khatun	Principal Nutrition Officer and Head, Dept of Nutrition, Dept of Food and Nutrition, BIRDEM
37	Nasrin Sultana	Dietitian, National Heart Foundation
38	Nusrat Nury Alam	Senior Dietitian, Hospital Diet, icddrb
39	Parveen Begum	Nutrition Consultant, Gulshan Maa o Shishu Hospital
40	Dr Zeba Mahmud	Senior Advisor, FHI 360
41	Tasnima Mahjabin	Senior Scientific Officer, BIRTAN
42	Dr Golam Mohiuddin Khan	Nutrition Specialist, UNICEF
43	Taskeen Chowdhury	Former Nutrition Advisor, USAID
44	Saiqa Siraj	Former Country Director, Nutritional International
45	Dr Lalita Bhattacharjee	Former Senior Nutrition Advisor, FAO and Consultant, Results for Development (R4D)-FCDP
46	Bhami Vora	Nutrition Specialist, FAO
47	Dr Dia Sanou	Deputy Country Representative, FAO
48	Faria Shabnam	National Professional Officer-Maternal and Child Nutrition, WHO
49	Samina Israt	Programme Officer- Diet Related Risk Factor, WHO
50	Farhana Sharmin	Former National Consultant, WHO

Annex 11: Approval from curriculum review committee (DGHS)

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
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বরাবর,
অধ্যাপক ডা. আনজুমান আরা সুলতানা
লাইন ডাইরেক্টর
জাতীয় পুষ্টিসেবা (এনএনএস)
মহাখালী, ঢাকা।

বিষয়ঃ "National Dietary Guidelines For Bangladesh" গাইড লাইনটি কারিকুলাম কমিটি কর্তৃক অনুমোদন প্রসঙ্গে।

স্বাস্থ্য অধিদপ্তরের জাতীয় পুষ্টি সেবা (এনএনএস) এর উদ্যোগে **"National Dietary Guidelines For Bangladesh" শীর্ষক** -গাইড লাইনটি পর্যবেক্ষণের জন্য কমিটির ০২/০৭/২০২৫ইং তারিখের সভায় **পর্যালোচনা ও সংশোধন** করে সর্বসম্মত ভাবে অনুমোদন করা হলো। মাঠ পর্যায়ে বাস্তবায়নের মাধ্যমে অভিজ্ঞতার আলোকে পরবর্তীতে উক্ত গাইড লাইনটি সংশোধন, পরিমার্জন ও পরিবর্ধন করা যেতে পারে।

৩০/০৭/২০২৫
(ডাঃ সৈয়দ কামরুল ইসলাম)
পরিচালক
প্রাথমিক স্বাস্থ্য পরিচর্যা
ও
সভাপতি, কারিকুলাম অনুমোদন কমিটি
স্বাস্থ্য অধিদপ্তর, মহাখালী, ঢাকা ।

স্মারক নং- স্বাঃঅধিঃ/পরিঃ/পিএইচসি/ কারিকুলাম/২০১৭/ তারিখ ঃ ৩০/০৭/২০২৫ইং।
অনুলিপি সদয় অবগতি জন্য ঃ

১.মহাপরিচালক, স্বাস্থ্য অধিদপ্তর, মহাখালী, ঢাকা। দৃষ্টি আকর্ষনঃ সহাকারী পরিচালক (সমন্বয়)।
২. অতিরিক্ত মহাপরিচালক (প্রশাসন/পরিকল্পনা ও উন্নয়ন), স্বাস্থ্য অধিদপ্তর, মহাখালী, ঢাকা।
৩. পরিচালক (প্লানিং ও গবেষণা), স্বাস্থ্য অধিদপ্তর, মহাখালী, ঢাকা ।
৪. পরিচালক (অর্থ) স্বাস্থ্য অধিদপ্তর, মহাখালী, ঢাকা।
৫. পরিচালক (হাসপাতাল ও ক্লিনিক সমূহ) স্বাস্থ্য অধিদপ্তর, মহাখালী, ঢাকা।
৬. পরিচালক (সিডিসি), স্বাস্থ্য অধিদপ্তর, মহাখালী,ঢাকা।
৭. পরিচালক (চীফ মনিটরিং এন্ড কো-অর্ডিনেশন সেল), স্বাস্থ্য অধিদপ্তর, মহাখালী, ঢাকা।
৮. উপ-পরিচালক (পিএইচসি), স্বাস্থ্য অধিদপ্তর, মহাখালী, ঢাকা।
৯. সহকারী পরিচালক (পিএইচসি),স্বাস্থ্য অধিদপ্তর,মহাখালী, ঢাকা।
১০.প্রধান, স্বাস্থ্য শিক্ষা ব্যুরো, স্বাস্থ্য শিক্ষা অধিদপ্তর, মহাখালী, ঢাকা ।
১১.মেডিকেল অফিসার (মনিটরিং এন্ড কো-অডিনেশন সেল), স্বাস্থ্য অধিদপ্তর, মহাখালী, ঢাকা।

(ডাঃ সৈয়দ কামরুল ইসলাম)
পরিচালক
প্রাথমিক স্বাস্থ্য পরিচর্যা
ও
সভাপতি, কারিকুলাম অনুমোদন কমিটি
স্বাস্থ্য অধিদপ্তর, মহাখালী, ঢাকা ।

World Health Organization (WHO)

Food and Agriculture Organization of the United Nations (FAO) - Meeting the Undernutrition Challenge (MUCH) funded by the United States Agency for International Development (USAID) and the European Union (EU)


আপনার স্বাস্থ্য আমাদের অঙ্গীকার
HPNSDP
স্বাস্থ্য ও পরিবার কল্যাণ মন্ত্রণালয়


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