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Food and Agriculture Organization of the United Nations

Government of Pakistan
Planning Commission
Nutrition Section

Concerns noted by Dr R Hakeem are noted on each page and are being shared with goodwill to alert the users till the revised/corrected version under prepration, is available.
Concerns are color coded according to estimated impact on Public Health Nutrition

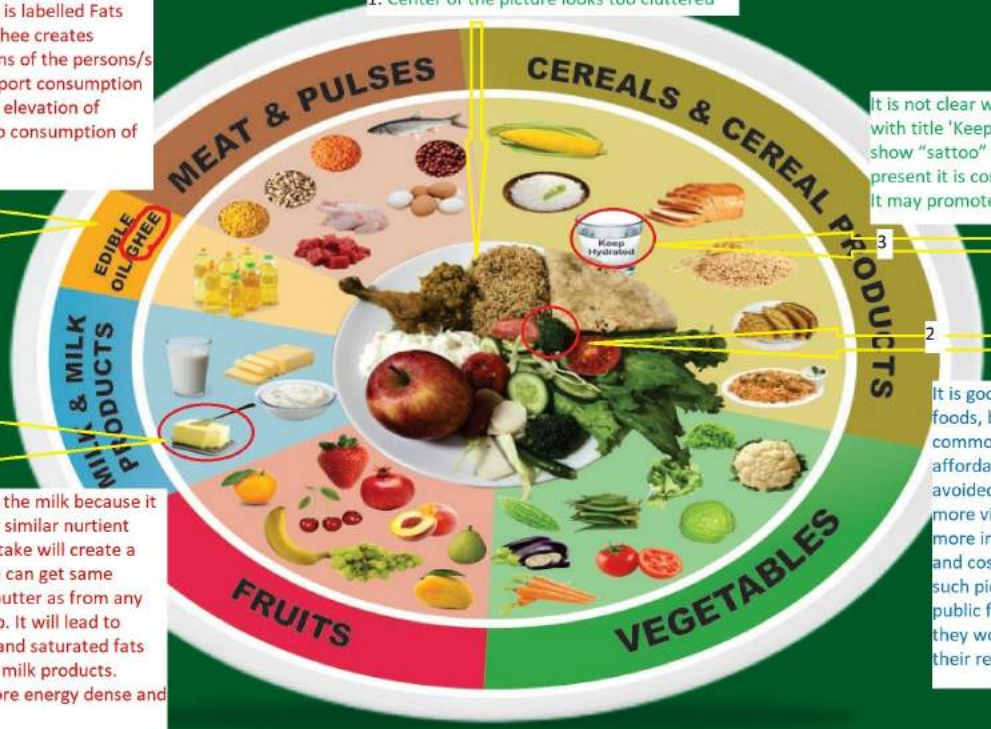
1 Very Harmful and/or Too Inaccurate
2 Very Harmful Or Too Inaccurate
3 Harmful and inaccurate
4 Potentially harmful/misleading
5 Inappropriate/low validity
6 Ambiguous or repetititve
7 Unclear/confusing

for comments /queries, email: rubina.hakeem@gmail.com

PAKISTAN DIETARY GUIDELINES FOR BETTER NUTRITION

My Plate

1. Center of the picture looks too cluttered



In Pakistan most people associate the term ghee with "Vanaspati-ghee" i.e "hydrogenated oils" that is the richest source of trans fats. Use of this term on the title of the guidelines gives a message that Ghee is not harmful. It could be taken as a license to use V-Ghee. As throughout the document this food group is labelled Fats and oils, use of the term ghee creates doubts about the intentions of the persons/s who did this. It would support consumption of Ghee and contribute to elevation of health problems related to consumption of the trans fats.

4

It is not clear what is shown in the glass with title 'Keeps hydrated'. If it is meant to show "sattoo" (cereal based drink). At present it is confusing as it looks like milk. It may promote misinformation. .

3

2

It is good to show a variety of foods, but foods neither commonly used nor available or affordable e.g. broccoli could be avoided. Spinach has 15 times more vitamin A and 3.7 times more iron as compared to broccoli and costs 12 times less. Showing such pictures alienates general public from these guidelines as they would consider it be out of their reach

5

Butter in never included in the milk because it does not have the same or similar nurtient contents as milk. This mistake will create a misconception that people can get same benefits from consuming butter as from any other item from milk group. It will lead to overconsumption of total and saturated fats and lower consumption of milk products. Consequently diets will more energy dense and nutrient poor..

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Pakistan
Dietary Guidelines
for Better Nutrition

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FOREWORD

The Pakistan Dietary Guidelines for Better Nutrition (PDGN) are comprehensive country specific guidelines for the general public to adopt healthy eating practices, and prevent and reduce the risk of infectious and chronic diseases. These guidelines are simple to adopt, provide age and gender appropriate and culturally acceptable options to choose nutritious foods.

The PDGN provide a thorough review of the food security, health and nutrition situation of the population and is cognizant of the fact that about half of the population is deficient in one or more of essential nutrients, reflecting unhealthy dietary practices compounded by poor hygiene and sanitation. Women and young children are more vulnerable to nutritional deficiencies, morbidity and mortality due to their compromised health and nutritional status. The PDGN highlight the predominant consumption of energy dense foods and monotonous diets by majority of the population.

The emphasis of the PDGN is on the consumption of a variety of safe and nutritious foods including milk and milk products, meat and pulses, wholegrain cereals, vegetables and fruits and decreasing consumption of energy dense foods such as deep fried foods, bakery products, processed foods and reducing the amount of fat specifically saturated fat, oil, sugar and salt in cooking, as there is a strong relationship between diet and disease, specially non-communicable diseases such as diabetes, cardiovascular diseases and others that are associated with poor dietary habits. Moreover, physical activity is critical for all population groups to remain physically fit and healthy.

The PDGN are a rich resource for general public, decision and policy makers, planners, researchers, academicians, food and pharmaceutical industries, hospitals, agriculture extension and allied health professionals for integration into their own plan of actions and interventions. These guidelines will benefit communities, clients and consumers in making healthy food choices and well suited to break the vicious cycle of malnutrition when integrated into nutrition sensitive and the social development programmes of the country.

I appreciate the efforts of the contributors and hope that the use of these guidelines, would serve as an effective tool for improving nutrition and well being of the population.

Sartaj Aziz
Deputy Chairman
Planning Commission of Pakistan

28 May, 2018

ACKNOWLEDGEMENTS

The Ministry of Planning Development and Reform, gratefully acknowledges the generous support of the Food and Agriculture Organization of the United Nations and Scaling up Nutrition (SUN) Movement for developing the Pakistan Dietary Guidelines for Better Nutrition (PDGN). Mr. Francisco Gamarro (Late), Ex-Deputy Representative FAO, and Mr. Nasar Hayat, Assistant Representative FAO, deserve appreciation for their continuous support in accomplishing the task of developing PDGN.

The efforts of Dr. Parvez Iqbal Paracha, Nutrition Specialist in preparing the document and great contributions of Dr. Nomeena Anis, Nutritionist and Gender Focal Person, FAO, Islamabad in developing a comprehensive document are highly appreciated. The dedicated efforts, overall coordination and commitment of the Nutrition Section/ SUN Secretariat are commendable. Special thanks to Dr. M. Azeem Khan, Member Food Security and Climate Change, Planning Commission for his overall guidance in finalizing of this document. The Nutrition Section appreciates the valuable contribution of Dr. Mubrik Ali, Ex-Member Food Security and Climate Change, Planning Commission Pakistan.

The Ministry of Planning Development and Reform is highly indebted to distinguished and renowned academicians, researchers, programme managers, policy makers, development partners and other stakeholders for their valuable inputs in formulation of PDGN, which will serve as a source of guidance for planning and implementation of nutrition related programmes aimed at promoting healthy diets and preventing malnutrition and diseases.

M. Aslam Shaheen
Chief Nutrition/SUN Focal Person
Ministry of Planning Development & Reform Pakistan

MESSAGE FROM THE FAO REPRESENTATIVE

Pakistan Dietary Guidelines for Better Nutrition (PDGN) are developed for the general public to support healthy eating, improve overall health and reduce malnutrition in all its form, including preventing disease and premature deaths. It is an opportune time to disseminate the dietary guidelines, when the country is confronted with challenges of diet associated diseases including overweight, obesity, diabetes, hypertension, cardiovascular diseases and cancers.

PDGN are intended for use by public health and nutrition service providers, food and agriculture professionals, programmes managers and policy makers to frame cost-effective, high impact policies and interventions that would help the public in making better food choices that are safe, nutrient rich and healthy.

PDGN provide an affordable and sustainable means of improving nutrition and health wellbeing of the population, which is a pre-requisite for socio-economic development, peace, prosperity and security in the country. The cost of malnutrition and associated diseases outweigh the nominal cost of food therefore food and nutritional wellbeing should be prioritized in household expenditures.

Dissemination and use of dietary guidelines is essential to create and promote nutrition awareness among the population. Strong public and private partnerships and community involvement are critical for successful adoption of these dietary guidelines. I appreciate the efforts and contributions of the technical experts for the timely production of the PDGN, benefitting all segments of the society including the poor and rich as well as urban and rural with adoption of healthy eating practices to enhance the quality of life.

Minà Dowlatchahi
FAO Representative
Pakistan

ACRONYMS

AMDR	Acceptable macronutrient distribution range
BMI	Body mass index
BMR	Basal metabolic rate
CAD	Coronary artery disease
CVDs	Cardiovascular diseases
DALYs	Disability adjusted life years
DNA	Deoxyribonucleic acid
FAO	Food and Agriculture Organization of the United Nations
DGs	Dietary guidelines
FCPs	Food consumption patterns
HDL	High density lipoproteins
IYCF	Infant and young child feeding
Kcals	Kilocalories
LDL	Low density lipoproteins
MDER	Minimum dietary energy requirement
MPDR	Ministry of Planning, Development and Reform
NCDs	Non-communicable diseases
NNS	National Nutrition Survey
NoU	Number of undernourished
NRVs	Nutrient reference values
PBS	Pakistan Bureau of Statistics
PDGN	Pakistan dietary guidelines for better nutrition
PoU	Prevalence of undernourishment
RDAs	Recommended dietary allowances
SoFI	State of food insecurity
WASH	Water, sanitation and hygiene
WHO	World Health Organization

6. DALYs and MDPR not needed; GDP not explained in acronyms

EXECUTIVE SUMMARY

Pakistan Dietary Guidelines for Better Nutrition (PDGN) are dietary recommendations based on scientific knowledge related to nutritional requirements, food consumption patterns and nutrients intake of the population. PDGN are developed taking into account the country's food and nutrition situation and the role of diet in health and disease. Pakistan has been passing through a demographic, economic and nutrition transition characterized by rising population, food accessibility issues, unhealthy eating trends, lack of safe food handling and management practices, and sedentary lifestyles. This has led to an increase in nutritional disorders and diet related diseases such as diabetes, hypertension, cardiovascular diseases, cancers and infectious diseases in children, adolescents and adults, especially women.

First country specific Dietary Guidelines (DGs) were developed in 2005. Since then, new scientific evidence related to the beneficial effects of food and bioactive factors, harmful effects of adulterants, contaminants, pesticides and insecticides, unhealthy food consumption patterns and excessive use of salt, sugars, saturated and trans-fatty acids on health, has been generated. These scientific developments have been considered during the revision of PDGN. Consultative workshops were held, with the active participation of technical experts and relevant stakeholders to develop and finalize the framework of PDGN. An extensive literature search and desk review was undertaken to review the food consumption patterns, nutrients intake and nutritional and health status of the population. National and international recommended dietary allowances (RDAs) and dietary guidelines were reviewed to extract relevant information for the development of PDGN.

Diet is one of the strongest determinants of health and nutritional status. Inappropriate and unhealthy dietary practices are responsible for the increased prevalence of nutritional deficiencies and disorders, infectious diseases, overweight and obesity, non-communicable diseases such as diabetes, hypertension, cardiovascular diseases, cancers and other chronic diseases. Sedentary lifestyles exacerbate the prevalence of nutrition and health problems. Conversely, dietary modifications to select and consume healthy diet have been proven to reduce diet related chronic diseases in the population.

The PDGN recommend exclusive breastfeeding to infants for the first six months of life followed by continuation of breast feeding at least till the age of two years along with appropriate complementary feeding from six months onwards.

The PDGN advise the daily consumption of basic food groups including cereals, meat and pulses, milk and milk products, vegetables and fruits. The guidelines suggest that the consumption of refined cereals should be reduced and substituted by wholegrain cereals while the consumption of fresh fruits, vegetables, pulses, meat and milk should be increased as per body requirements. It is further proposed that the amount of salt, sugar, saturated fatty acids, trans-fatty acids, ghee and cooking oil, sweets, soft drinks and juices containing added sugars, refined and processed foods should be limited.

The food handling and management practices should be safe, and the use of contaminated and untreated industrial wastewater must be prohibited. The pesticides, herbicides, antibiotics and the concentrations of heavy metals like lead, arsenic, mercury and cadmium in foods should be checked to remain within the

permissible range as recommended by the Codex Alimentarius Commission and Pakistan Standard Quality Control Authority, Pakistan.

In addition, regular exercise and physical activity are crucial for the prevention and management of diseases. The essence of PDGN is to provide updated dietary recommendations to general population, promote good nutrition, safe food handling and management practices and adopt healthy lifestyles for improved life quality and economic productivity.

The PDGN will be useful for multi-sectoral professionals and policy makers to formulate appropriate policy, plan and programmes. These guidelines will also facilitate Provincial Food and Drug Authorities to implement food quality standards in their respective provinces for ensuring that foods are safe and of better quality. The PDGN are intended to help in maintaining healthy body weight and reduce the incidence of under-nutrition, over-nutrition, infectious and non-communicable chronic diseases and premature deaths by promoting healthy diets.

INTRODUCTION

Optimal nutrition is essential for the physical and cognitive development of the body, behavioural and scholastic performance, better health and productivity, improved quality of life and socio-economic development of the country. Pakistan is challenged by food insecurity, poverty and by all forms of malnutrition, growing epidemic of non-communicable chronic and infectious diseases that have put an enormous burden on health services, resulting in avoidable disabilities and premature deaths.

A growing body of evidence suggests that unhealthy dietary and lifestyle practices are the key risk factors to the growing disease burden[1-4]. Malnutrition accounts for half of the children's death, costs about 3% of yearly GDP in developing countries and results in losses of more than 10% of lifetime earning potentials in malnourished children[5-6]. Likewise increased and frequent consumption of energy dense nutrient poor foods with high salt, sugar and fats lead to over-weight and obesity and a consequent increase in the prevalence of metabolic syndromes, chronic diseases and premature deaths. It has been estimated that 340,000 cancer cases per year in the United States could be prevented with a healthy diet, combined with physical activity and maintaining a healthy weight[7].

Nutrition transition and lifestyle changes have led to an increased prevalence of overweight and obesity and a pandemic of non-communicable diseases (NCDs) i.e., diabetes, cardiovascular disease, hypertension and cancer. NCDs are the leading causes of premature deaths in both the developed and developing countries accounting for 38 million of the world's 56 million deaths in 2012[8]. Expenditure on the treatment of NCDs amounts to billions of dollars annually adversely affecting the economy of countries, increasing disabilities, high premature deaths and impaired physical productivity and economic outputs. NCDs are responsible for loss of productive life years and cause innumerable sufferings for families and societies.

In Pakistan, an estimated 10-11%of the adult population (aged 25 years and above) is suffering from diabetes and the numbers are expected to increase to 14.5 million by the year 2025[9-11]. In addition, cardiovascular diseases are one of the leading causes of disability and premature deaths in adults worldwide, low income to middle income countries bear the brunt by accounting for over 80% of the global disease burden and overwhelming health expenditures amounting to billions of dollars annually[12-13]. Similarly, CVDs account for 19% of all the deaths occurring in adults aged 30-70 years in the country[14].

A synergistic relationship between nutrition and disease exists and good nutrition is essential for the prevention, control and treatment of diet related disease. Appropriate dietary practices and lifestyle modifications are required to prevent the rising prevalence of malnutrition, chronic diseases and premature deaths. Pakistan Dietary Guidelines for Better Nutrition (PDGN) are evidence-based dietary recommendations for maintaining optimum health and nutrition of the general population, which are derived on scientific knowledge about food consumption, dietary patterns, nutritional requirements, lifestyles and the relationship between diet and diseases.

PDGN provide a framework to guide the disease free normal population in the selection and consumption of a variety of safe and nutritious foods that are easily available, affordable, meet the daily nutritional requirements, boost the immune system against communicable and non-communicable diseases and

7. Line: 22 23. More recent estimates are 26% . **https: //bmjopen.bmj.com/content/8/8/e020961**
8. Line: 35. Looks odd as if others are Abnormal may be replaced by "healthy"

promote healthy lifestyles. Development of dietary guidelines require in depth analysis of population specific food consumption patterns, dietary habits, nutrients intake, nutrition and health status, socio-economic conditions and understanding of diet related public health issues of the population. In PDGN, emphasis has been laid on the consumption of a variety of safe and nutritious foods rather than nutrients, as the former is primarily consumed and easy to recall for dietary assessment and nutrients intake.

Rationale

- First national DGs were developed in 2005 by the Ministry of Health, Government of Pakistan to provide dietary recommendations for infants, children and adults. Lack of dietary diversification, unsatisfactory maternal and child care practices, industrialization and changing lifestyles in addition to natural catastrophes have led to a deteriorating nutrition situation in the country, that made it essential to review the relationship between diet and disease in the local context and revisit the existing food based dietary guidelines to mitigate the risk factors for under and over-nutrition and chronic diseases.

- The revised PDGN have taken into account the local dietary practices, cooking methods, cost of diet, nutrition and health situation of the population, socio-cultural practices, economic and environmental conditions to meet the nutritional requirements of individuals by and large.

- As food consumption and dietary patterns of individuals vary from country to country, so do the dietary guidelines developed to meet the nutritional requirements of the population on the basis of age, gender and physiological status. Similarly with the passage of time, there has been an increase in population growth, rural to urban migration as well as change in dietary habits, socio-economic conditions, lifestyles and prevalence of communicable and non-communicable diseases. Hence, dietary guidelines need to be revised to meet the changing population needs.

- The PDGN provide a list of foods with portion sizes to help the general public make smart and healthy food choices for a healthy, long and active life. Women of childbearing age, preschool children and adolescents are more vulnerable to nutritional deficiencies due to their increased physiological requirements and prevailing dietary and socio-cultural practices. The development and implementation of age specific dietary guidelines thus is vital for maintaining nutritional balance, weight management, prevention of diseases and improving the quality of life of the population particularly the most vulnerable groups.

- PDGN are resource for evidence-based decisions making and better policy choices. They also serve as tool for programme managers and professionals engaged in agriculture, food, nutrition and health related activities to develop cost-effective policies, strategies and nutrition programmes that promote healthy diet, support production, access and utilization of safe and nutritious foods, including interventions to reduce and control diet related diseases.

Goals

The goals for PDGN are to:

- Improve the nutritional wellbeing of the population by adopting and promoting healthy eating practices and lifestyles.
- Reduce the incidence of nutritional deficiencies and chronic diseases in the population.
- Improve the quality of life of the population and contribute to socio-economic development of the country.

Objectives

The objectives for PDGN are to:

- Use scientific evidence on dietary patterns in PDGN to provide basis for formulating relevant policies, strategies and plan of actions.
- Promote healthy dietary practices among the population to reduce and control nutritional deficiencies, diseases and deaths.
- Promote hygiene, safe food handling, proper preparation and improved storage practices to reduce and control food and water-borne diseases.
- Integrate physical activity into dietary interventions to achieve an effective and sustainable weight management programme.

NUTRITION SITUATION

Nutritional status of infants (0-6 months)

Early infancy (0-6 months) is a period of rapid body growth and brain development characterized by increased nutritional requirements that can only be ensured through exclusive breastfeeding. Exclusive breastfeeding is essential for optimum growth and development of infants during the first six months, and lays the foundation for future nutrition and health status of individuals. Mother's feed during the first six months is considered nutritionally complete and sufficient to meet the infant's nutrient and fluid requirements. Exclusive breastfeeding should be initiated within the first hour of birth and continued till six months of age without introducing any other food to the infant. Breast milk is rich in immunoglobulins and other anti-infective factors such as lysozymes, lacto-ferrin, interferon, anti-inflammatory and immune-modulating components that enhance immunity and reduce infant morbidity and mortality[15]. It has been reported that breastfed infants have at least six times greater chances of survival than non-breastfed infants[16].

It has been reported that in Pakistan, only 24% of the women initiate early breastfeeding while exclusive breastfeeding under six months is estimated at 37% which falls under the category of low exclusive breastfeeding countries[17,18].The late initiation of breastfeeding and low prevalence of exclusively breastfeeding make infants more vulnerable to nutritional deficiencies and diseases. Promoting exclusive breastfeeding has a great potential to improve the nutritional and health status of the young children. Mothers and caregivers need to be encouraged to initiate breastfeeding within one hour of birth, exclusively breastfeed their babies for six months and continue breastfeeding along with appropriate complementary foods up to two years or beyond[19]. A longer duration of breastfeeding has been linked to reduced risk of childhood illnesses and obesity and improved cognitive outcomes.

Nutritional status of infants and young children (6-24 months)

Adequate infant and young child feeding is vital for growth and fundamental to the development of child's full human potential and for preventing chronic malnutrition which is manifested by high prevalence of stunting in Pakistan and other less developed countries. It is well recognized that the period between pregnancy and childhood up to two years of age (the first 1000 days of life) is a critical window for promoting optimal growth, health and behavioral development. It provides a window of opportunity to intervene, prevent growth faltering, malnutrition and diseases in children and provide a strong foundation for future physical and mental performance and improved quality of life. Nutrient requirements of infants after six

9. Line: 26. why beyond 2 years?

Line 3 to 28. Contents do not match the title, nutritional status of Pakistani infants not reviewed.
Line 29 to 35 Nutritional status or nutrition related health problems in this age group in Pakistan are not reviewed.

months of age increase which can't be met with breast milk alone, therefore, it must be complemented with good quality and quantity of safe and nutritious complementary foods. Breast feeding along with complementary feeding should be continued for at least two years and the amount of complementary foods should be increased gradually to ensure that foods are in better variety and quantity, sufficient, safe, nutritious and suited to the needs of the growing infant.

In Pakistan, poor IYCF practices are the leading cause of child morbidity and mortality. Poor IYCF in the form of delayed initiation of breastfeeding, less frequent and or inadequate breastfeeding, avoidance of giving colostrum, frequent use of pre-lacteals, use of breast milk substitutes, too early or too late introduction of quality complementary foods, inadequate postnatal care and poor hygienic practices make children vulnerable to nutritional deficiencies, infectious diseases and deaths. It has been reported that only 39% of infants receive complementary foods at the recommended time between 6-8 months[20].

Improved IYCF practices have a great potential to reduce malnutrition, diseases and deaths in children. At least 20% of child deaths could be prevented through improved infant and young child feeding practices, which are safe, non-invasive and cost effective as well[15].Comprehensive, multi-sectoral integrated efforts are needed to protect, promote and support exclusive breastfeeding and complementary feeding practices essential for child survival. There is increasing recognition that optimal complementary feeding depends not only on what is fed, but also on how, when, where, and by whom the child is fed. It is essential to ensure that caregivers are provided with appropriate guidance regarding optimal feeding of infants and young children.

Nutritional status of children (24-36 months)

Growth and development of children in this age group become slower than in the first two years of life along with improved digestive and enzymatic capacity, enhanced neural and hormonal responses which make children less vulnerable to nutritional deficiencies and diseases. Further, children in this age group are able to digest, absorb and utilize family foods and beverages and love to taste and eat family foods with minimum efforts of the parents. Children in this age group on an average gain about 2-2.5kg weight and grow 8-9 cm in height per annum[21].

The slower growth and development of children elicits lower nutrients demand from exogenous sources and should be considered a period of "catch-up growth" to replenish body's nutrient stores and cover the earlier growth deficits. However, due to ignorance and lack of education, poor dietary practices, poor hygiene and sanitation, children in this age group are unable to cover their growth deficits and are increasingly susceptible to nutritional deficiencies and diseases. Rates of stunting, wasting and

Line 1 to 26 Nutritional status or nutrition related health problems in this age group in Pakistan not reviewed.
Line 27 to 38 Nutritional status or nutrition related health problems in this age group in Pakistan not reviewed.

underweight continue to rise in all the developing countries including Pakistan associated with a higher prevalence of diarrhea and acute respiratory infections which are the leading causes of morbidity and mortality in children[22-24].

Nutritional status of children (3-10 years)

Growth and development during 3-10 years of age become relatively slower than the early childhood period but an adequate and well balanced diet is still required not only to cover the earlier age growth deficits but also meet the growth and development of the growing child. Children are relatively less vulnerable to nutritional deficiencies than infants and young children due to their improved digestive, physiological, metabolic, neurological and muscular coordination, slow growth and development and reduced nutritional requirements. Nature provides a better opportunity to children for catching-up on their earlier growth deficits, replenishing their body stores and making them ready for the adolescence growth spurt. During this period, children on an average gain about 2 kg weight and grow 5-6 cm in height per annum[21]. Pakistani children though show improvement in their weight and height with increasing age but fail to recover significantly from early age nutritional deficits and their weight and height remain lower than the corresponding age reference children[22]. Similar results on anthropometric measurements of children were also reported by others[25,26].

Inadequate consumption of milk and milk products along with inadequate consumption of fortified foods in children's diet makes them prone to calcium, phosphorous and vitamin D deficiencies. These deficiencies are responsible for poor bone mass and are an increasing risk factor for rickets in children. Snacks consumption of children is limited to empty energy dense foods such as candies, sweets, toffees, soft drinks, samosas, papars, pakoras and rolls etc. that are unable to meet most of the macro and micronutrients requirements of the body[27]. Similarly a large proportion of children don't regularly eat meat and meat products, fruits and vegetables either due to their unavailability at the household level or personal disliking and inadequate knowledge. Review of data on children dietary practices highlight that children's diets are lacking in nutrients dense foods, which increase the risk of nutritional deficiencies, malnutrition and diseases[28-29]

Line 4. Nutritional status or nutrition related health problems in this age group in Pakistan not reviewed appropriately

10. Line: 27. Non-scientific weird term
11. Line: 28. How can papar pakora can be considered same as candies? Nutritionists never label any food as inherently good or bad it is frequency and mount that determines the quality of diet.
12. Line: 29..30. Meat consumption is low in Pakistan' so why moderate intake is suggested in messages? Either low consumption should be accepted as a positive feature of Pakistani diets of focus needs to be on increasing frequency or quantity of meat consumption
13. Line: 31...33. Reference no 29 is about adults

Nutritional status of adolescents (10-19 years)


© FAO/Nomeena Anis

Adolescence is a period of transition between childhood and adulthood covering the age between 10-19 years[30]. It is marked by a rapid increase in the reproductive, skeletal and physical growth and development of adolescents. The rapid physical and physiological growth provides the foundation for accomplishing present and future responsibilities more efficiently that can only be ensured with adequate and optimal nutrition. Conversely, lack of a balanced, nutritionally optimal diet at this critical juncture puts individuals and their future generations at a greater risk of nutritional deficiencies and makes them more vulnerable to diseases[31].

Adolescence exerts greater nutritional demands to meet an increasing body needs for nutrients and is greatly influenced by poor food choices and unhealthy eating habits. Eating disorders are more common during this crucial transitional stage of growth and can be attributed to a variety of factors such as peer pressure, body image consciousness, lack of self-esteem and other social influences. Adolescents with severe eating disorders suffer from impaired physical and psychological growth and development.

Review of data on Pakistani adolescents nutritional status revealed that about one-third of the adolescents are either stunted or underweight and around 10-30% are overweight and obese, however, the prevalence of under and over-nutrition in adolescents varies from place to place due to differences in dietary patterns, socio-economic conditions and other environmental factors[32,33].

Dietary practices of adolescents show that skipping breakfast is more prevalent in girls than boys and there is no significant difference in the frequencies of skipping breakfast between the different socio-economic groups[27]. Tea with bread and curry are the more commonly consumed breakfast foods of adolescents of lower socio-economic group while milk, juice, fruit, cereals, paratha and eggs were more often consumed in breakfast by higher income group. Candies, samosas, papars, pakoras, rolls, potato chips, grams and beans are largely consumed as snacks by adolescents of lower socio-economic groups while ice cream, fruit chat, burger, French fries and soft drinks are mostly consumed as snacks by the higher income groups[27].

The frequency of dairy, fruits and meat consumption indicates that at least two-thirds of the adolescents don't meet the recommended amounts and are therefore, more likely to be deficient in meeting the recommended daily dietary intakes of iron, zinc, calcium, phosphorus, vitamin D and many other nutrients.

Line 1 Nutritional status or nutrition related health problems in this age group in pakistan not reviewed appropriately

14. Line: 33. this term is not commonly used so should be replaced by dried chickpeas

Nutritional status of adults (19-60 years)

Adults in Pakistan are also confronted with the problems of under and over nutrition with an alarmingly high prevalence of non-communicable diseases. About a quarter or more of adults are deficient in one or more nutrients like iron, vitamin A, calcium, vitamin D, zinc and iodine and are suffering from diabetes, hypertension, cardiovascular diseases and cancer[1]. Cardiovascular diseases (CVDs) are one of the leading causes of disability and premature deaths in adults worldwide. Low to middle income countries bear the brunt by accounting for over 80% of the global disease burden and overwhelming health expenditures amounting to billions of dollars annually[34]. Women in Pakistan are more vulnerable to nutritional deficiencies and non-communicable diseases than men with 18% underweight, 19% overweight, 10% obese, 50% anemic, 42% vitamin A and zinc deficient that are attributed to poor dietary practices, lower access to health care services and heavier workloads with multiple domestic and outside jobs[1,35,36]. It has been reported that women with a mean age of 52 years had a higher prevalence of coronary artery disease i.e., 30% than that of 23.7%for corresponding age men[36].

The National Health Survey (1990-94) report revealed that 1 of 3 individuals aged ≥45 years suffer from hypertension[36]while another study reported that 22% of adult population was suffering from diabetes[35]. The prevalence of diabetes was higher in men i.e.,23.7%as compared to 20.6% for women[35]. Statistics on demographic, economic, social, nutrition and health indicators of Pakistan revealed that though there is improvement in per capita income[37] and household possession of electric goods, transportation and communication facilities, yet no substantial improvement in the nutrition and health indicators of the country. For better health outcomes and improved quality of life, concrete measures are needed to address the nutrition and public health issues.

Nutritional status of elderly (>60 years)

In Pakistan, the older population constitutes 4% of the total population and the proportion is likely to increase over the period of time[38]. In 2018, the elderly population is projected 6% (PBS). The advancement of medical technologies and diagnostic facilities and a surge in per capita income has led to an increase in the life expectancy and the proportion of older population. The elderly because of their waning health and compromised physiological functions i.e., decreased mastication, salivation, gastric secretion, digestive and absorptive capacity combined with decreased physical activity and appetite, loss of lean body mass and skeletal muscle, need special diet and health care to reduce the risk of physical and mental disabilities and control of diseases.

Looking after the health and social needs of older people is becoming a challenge both for the poor families and the government due to less sensitization of the issue, limited commitment and inadequate resource mobilization by the government to provide dietary, health, social and other related services particularly to the poor families in meeting their nutritional requirements. .

It has been estimated that in Pakistan, over 72% of the older people have five or more health problems but there has been hardly any nutrition and health care programme to address their nutrition and health needs[38]. Diabetes, hypertension, coronary artery disease, arthritis and cancer are on the rise, causing an

Line 1 Nutritional status or nutrition related health problems in this age group in pakistan not reviewed appropriately

15. Line: 15. diabetes rates? Earlier said to be 11% (actually these are for >40 yrs old)
16. Line: 24. what does it mean:
17. Line: 30. but diet recommended is same as adults?

increase in the family sufferings due to high medical costs, increased care, leading to overburden on the health care system with losses of billions of rupees and increased early deaths of elderly. Financially sound older people get relatively better nutrition and health care services but older people belonging to poor families are the ones who are under tremendous pressure, stress and are mostly unable to get proper nutrition and health care, which results in increasing burden on both the families and government. In Pakistan, limited or negligible work has been done on the older population to assess their nutrients requirements and intake, however, small cross-sectional studies revealed that the diet of the older people is deficient in almost all the macro and micronutrients[39,40].

The existing food consumption data on older population revealed that their diet is mainly energy dense and less diversified, which make them vulnerable to nutritional deficiencies with impaired immune functions and increased risk to acute and chronic diseases. Comprehensive, holistic, cost-effective dietary and health care interventions including nutritional assessment, counseling, dietary supplementation, and establishment of nursing homes for older people with improved health and social care are needed to enable them to participate in the socio-economic development of the country, reduce their sufferings and improve their quality of lives.

Nutritional status of pregnant women

Pregnant women are more vulnerable to nutritional deficiencies and health problems due to increased nutritional requirements to meet their physiological needs, sustain foetal growth and development. Decreased nutrients intake during pregnancy has been attributed to cultural, social and economic reasons. In Pakistan, early marriages coupled with poor dietary intakes and lack of proper antenatal health care further compromise the nutritional status of pregnant women with an increased prevalence of nutritional deficiencies.

According to NNS 2011, 62% of the pregnant women sought antenatal care (ANC) being greater in urban (81.4%) than rural settings (53.7%)[1]. The low utilization of ANC in rural areas could be due to lack of awareness, unavailability or long distance from home to ANC facilities and socio-cultural reasons that may restrict women mobility. Similarly it had been reported that only a quarter of women received vitamin-iron supplements during pregnancy. The low consumption of supplements by women was attributed to lack of knowledge about the need and importance of supplements and food sources of vitamin-minerals[1].

Poor dietary practices among pregnant women were reflected by the increased prevalence of malnutrition i.e., about 50% of the women were either underweight, overweight or obese, 16% had night blindness, 51% were anaemic, 37% iron deficient, 46% vitamin A deficient, 48% zinc deficient, 69% vitamin D deficient and 59% were calcium deficient[1]. These results were substantiated by others[41]who reported that only 57.3% and 46% of pregnant women increased their food frequency as well as food intakes, respectively, 61% took dietary supplements where as 17.3% made no changes in their dietary intakes. A good proportion of women reported food cravings 78%, aversion 38% and avoidance to certain food 22%.

A dietary intake study on Pakistani-Norwegian (PN) pregnant women revealed that PN women had a significantly lower intake of vitamin D (2.2 vs 3.3 µg/day), calcium (793 vs 1134 mg/day), nutrition

18. Line: 27..28. Multiple micronutrient supplements are not recommended for pregnant women by WHO. The statements given here needs to be more explicit to prevent the misunderstanding that PDGN supports the notion that all women need multiple micronutrient supplements
19. Line: 37. Instead of overseas Pakistanis food habits of local Pakistanis needs to be given

supplements (2.9 vs 7.0 µg/day) and lower serum vitamin D levels (19 nmol/l vs 55 nmol/l) than that of the Norwegian women. In addition, 83% of the PN women were found vitamin D deficient having serum 25-hydroxyvitamin D3 levels below the reference value (< 30 nmol/l)[42].

Similar results on dietary intake of pregnant women were reported by others[43] who observed that regardless of the trimester and nutritional status, pregnant women were consuming low calories (mean 1437 Kcal/day in the first trimester; 1407 Kcal/day in the third trimester). The study further revealed that women were consuming less than the recommended amount of various foods i.e., 56% were consuming less than the recommended servings of bread and cereals, 80% less than the recommended servings of meat, 94% less than the recommended servings of milk, 96% and 94% less than the recommended servings of fruits and vegetables, respectively. In addition, undernourished women had significantly lower body mass indices than those of the well-nourished women both in the first and third trimesters.

The dietary intake and nutritional status of pregnant women were further substantiated by the fact that 22% of women were underweight[44]. Only about 49.61%of the adult non-pregnant and non-lactating women, 46.92% of pregnant women and 32.31% lactating women had recommended caloric intakes[44]. Other studies conducted on Pakistani pregnant women revealed similar results of dietary inadequacy and increased risk of adverse pregnancy outcomes[45-47]. Keeping in view the deplorable nutritional situation of pregnant women, comprehensive integrated nutrition and health care interventions are required to improve the nutritional and health status of pregnant women for desirable pregnancy outcomes and averting tragic consequences in the form of stillbirths, neonatal, infant and maternal mortalities.

Nutritional status of lactating women

Lactating women have increased nutritional requirements due to their body's increased physiological needs for breast feeding the baby. On an average, lactating women in the first six months of lactation produce 750-800 ml of milk per day which provides approximately 525-560 Kcal/day to the infants[48].

It has been agreed that breast milk is best for infants in terms of its ideal composition, qualitatively and quantitatively sufficient for the first six months of infants, confers immunity and reduces the risk of diarrheal diseases by four to fourteen folds and the risk of respiratory infections by five folds[49].There is also general consensus that healthy lactating women from developing countries produce more or less the same amount of breast milk comparable to lactating women of developed countries but maternal nutritional status has varying effects on nutrients composition of breast milk [50,51].

Studies have shown the association between healthy diet and quality of breast milk. Studies revealed that supply of nutrients like vitamin B1, B2, B6, B12, choline, retinol, vitamin A, vitamin D, selenium, iodine and folate to the baby is decreased by maternal nutrients deficiencies while it has no effect on calcium, iron, copper and zinc supply to infants[51]. For adequate milk output and supply to the infant, good maternal nutritional and health status, appropriate management of lactation, avoidance of pre-lacteals and formula feeding is crucial.

Due to ignorance, lactating women pay very little attention to their diet which adversely affects the

20. Line: 20 to 37. No information given about Nutritional status of lactating women in Pakistan

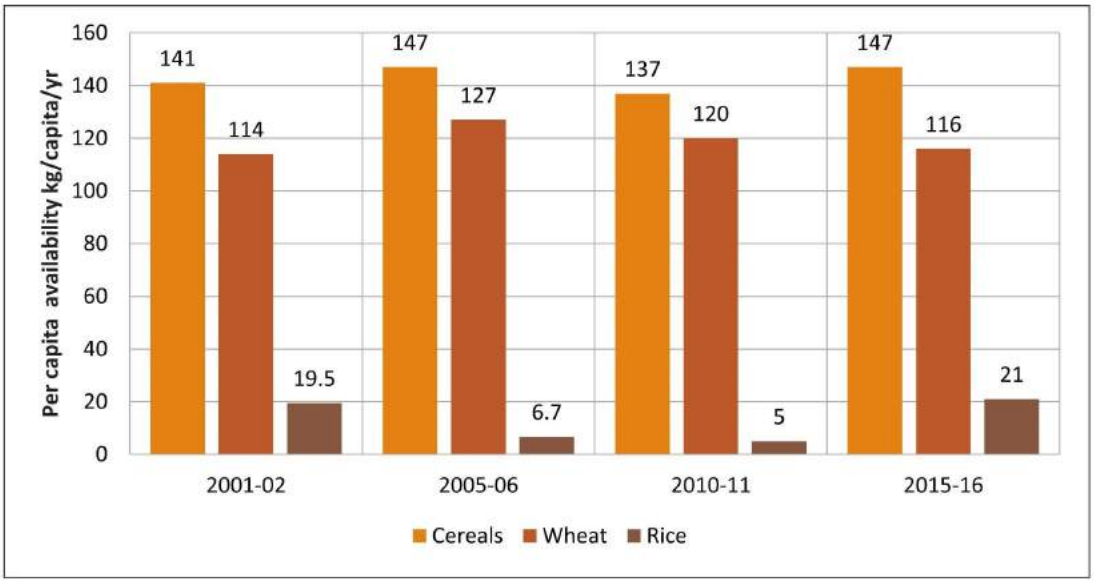
nutritional status of both the women and baby as depicted by the high prevalence of malnutrition in women and children[1,43]. Focused and targeted nutrition interventions to improve lactation management and dietary diversity with emphasis on increased quality and quantity of macro and micronutrients are essential for the proper growth and development of infants and children.

Food availability and consumption in Pakistan

In Pakistan, food availability (kg/capita/year) has remained relatively stable over the last three decades to meet the demand of growing population. The availability of major food items i.e., wheat, rice, maize, fats and oils, meat, milk, vegetables, fruits and pulses which indicates that by and large food availability has improved over the years and as such there had been no shortage or disappearance of food from markets (Figures 1-4)[52,53].

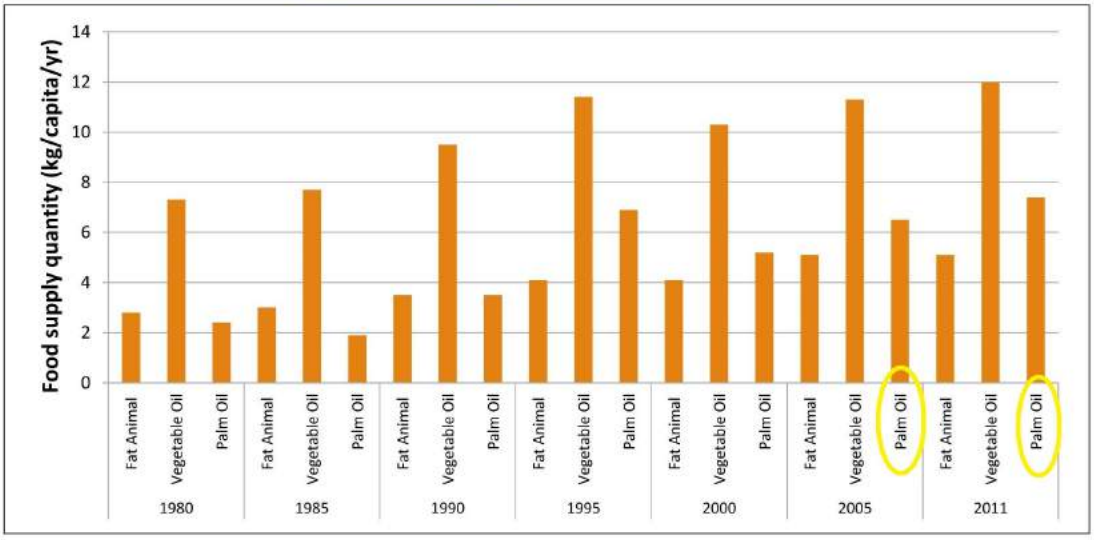
21. Line: 5. Overall it would have been more useful to give per capita/per day availability of foods
22. Line: 7..10. reasons for poor food and nutrient intake in spite of increased production needs to be discussed

Figure 1. Availability of cereals over different time periods



Source: MPDR, 2016

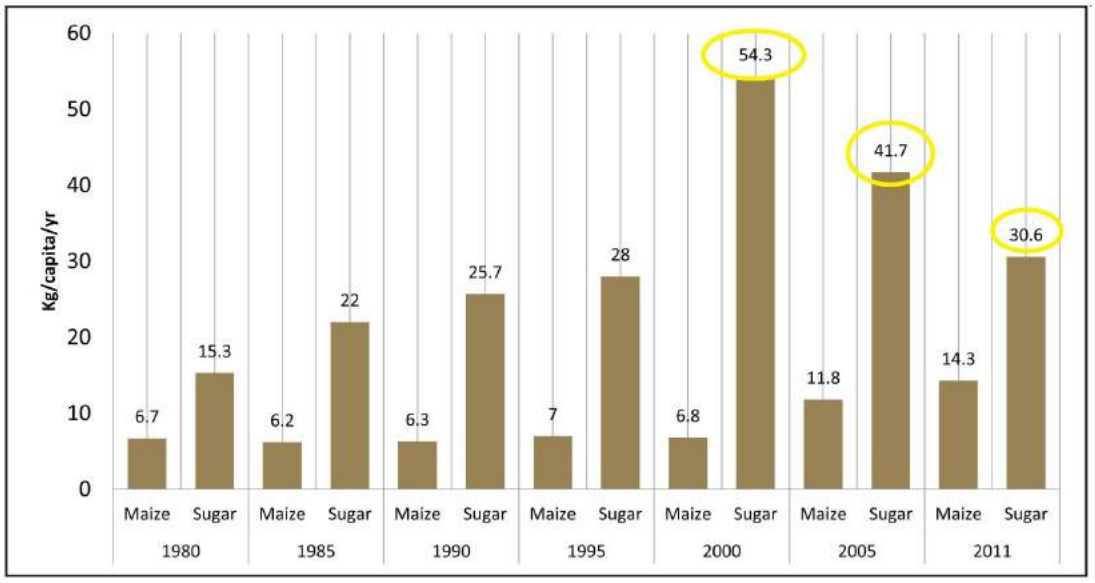
Figure 2. Availability of fats and cooking oils over different time periods



Source: FAO, 2016

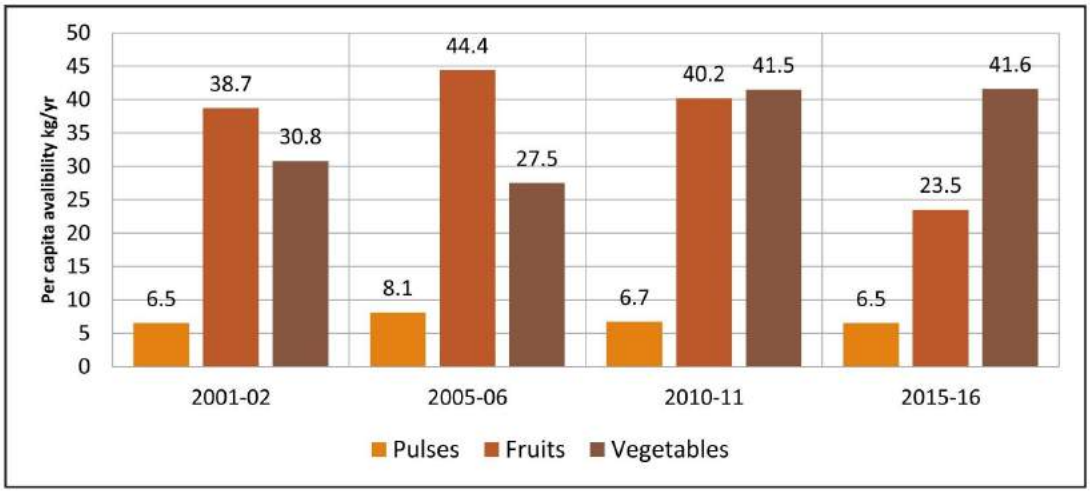
23. Line: 3. when availability of regular palm oil is given here why the authors mentioned red palm oil instead of regular palm oil everywhere else in the document?

Figure 3. Availability of maize and sugar over different time periods



Source: FAO, 2016

Figure 4. Availability of pulses, fruits and vegetables over different time periods



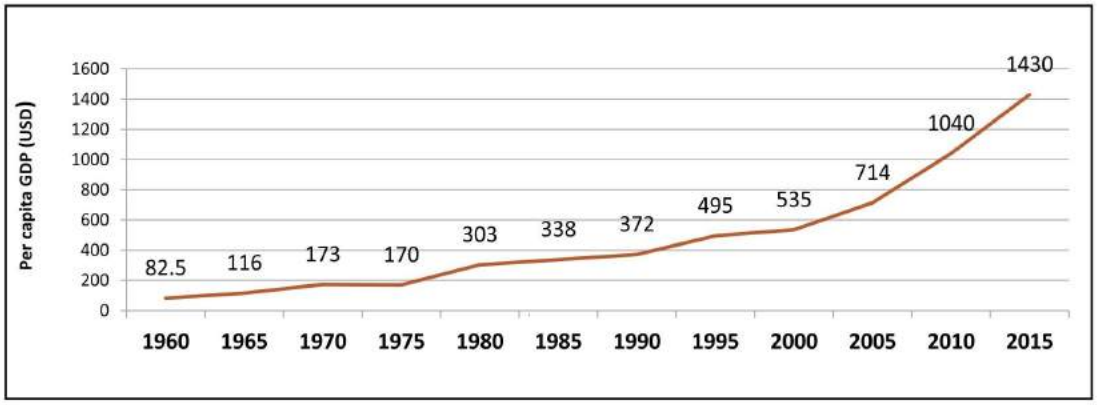
Source: MPDR, 2016

Based on the food availability data, the estimated per capita calories availability were 2470 calories per day[54]. The availability of milk, meat, sugar, fats and oil has markedly increased over the years. The food availability data demonstrate that Pakistan does not fall under the category of food deficit countries and

24. Line: 1. According to figure given the availability of sugar has decreased considerably from year 2007 to 2011. This observation and its impact on consumption and health is not discussed in text.
25. Line: 6. Availability of meat and milk not given and statement contradicts with figure 3 in relation to sugar
26. Line: 7. In spite of not being deficit in food why malnutrition exists, it needs to be discussed.

local production is sufficient to meet the food requirements of the population with an exception of a few food items which are imported to bridge the demand. At the same time, an appreciable amount of rice, wheat, sugar, fruits and marine foods are exported to earn foreign exchange. The country, however, is lagging behind in the export of value added foods and there is lot of potential for value addition and export of food commodities. Although the income generated has increased over the years yet is insufficient for the common man to purchase the diversified foods and meet the recommended nutrients requirement of the body (Figure 5)[37].

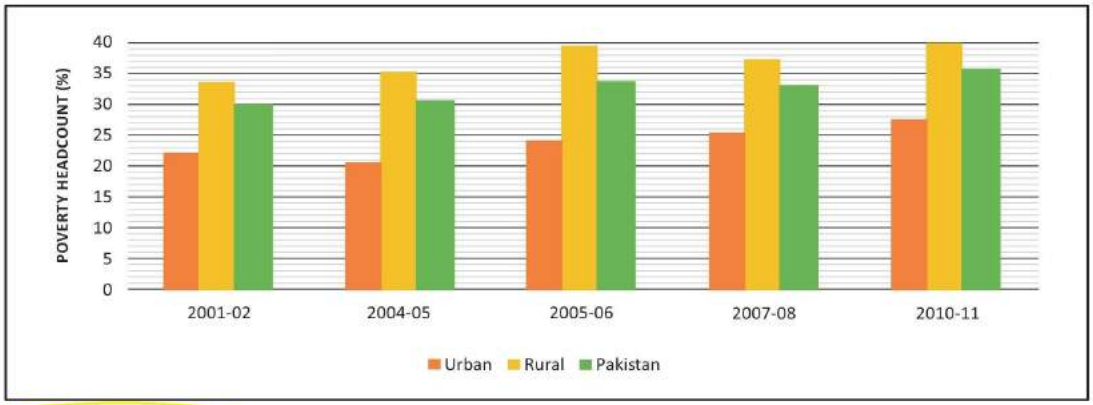
Figure 5. Per capita GDP from 1960-2015



Source: World Bank, 2016

Household income has been a major constraint for purchasing and consuming quality foods for majority of the population. It has been estimated that using cost for basic needs method, 29.5% of the population live below the poverty line[55] while caloric based poverty assessment revealed that 35% of the population is unable to purchase foods sufficient enough to meet the nutritional requirements of the body[56] (Figure 6).

Figure 6. Poverty based on low calories consumption over the years



Source: Nazli et al., 2014

27. Line: 4. why focus on food export?
28. Line: 15. slides used as reference, same slides as in reference 63

Imbalance between body's nutrient requirements and dietary intake results in malnutrition, which is affecting a large segment of the population impeding their work potential and earnings. A significant proportion of Pakistani population has a deficiency of both macro and micronutrients on the basis of an established notion that a diet deficient in meeting the energy needs of individuals would also be deficient in supplying the recommended nutrients intakes for all essential nutrients[57]. In other words, energy could be used as a marker of individual nutrients intake i.e., reduced energy intake would result in a deficient supply of all other nutrients.

FAO has produced estimates of the Prevalence of Undernourishment (PoU) and of the Number of Undernourished (NoU) since 1974. In addition, the country level estimates of the PoU and NoU, in addition to regional and global aggregates are published in the State of Food Insecurity report (SoFI). The methodology for estimating the PoU is based on the comparison of a probability distribution of habitual daily Dietary Energy Consumption and a threshold level, called the Minimum Dietary Energy Requirement (MDER)[58].In Pakistan, proportion of undernourished in total population is 22% as per State of Food Insecurity report 2015[59].

Relationship between diet and disease

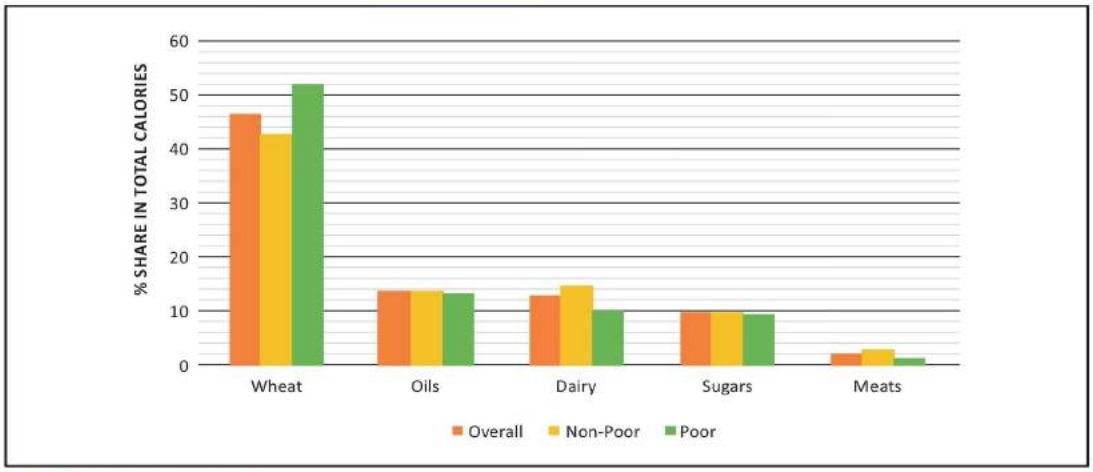
Diet has been recognized as one of the strongest predictors of health and disease but its role and importance has largely been underestimated due to unawareness, lack of knowledge, preference for traditional monotonous diets driven by economic and cultural reasons. Studies conducted around the world revealed that unhealthy dietary habits and physical inactivity are the major determinants of overweight, obesity and chronic diseases and are responsible for decreased productivity and increased mortality[60].

Excess salt intake has been linked to 1.7 million deaths from cardiovascular diseases and it has been reported that a small reduction in salt intake was associated with more than 7% reduction in deaths from strokes and heart attacks[61]. Similarly, it has been estimated that at least one third of cancer cases can be prevented by adopting healthy dietary practices and improved lifestyles[62]. Changes in dietary habits and lifestyles can make a substantial reduction in diet related chronic diseases and improvements in nutritional and health status of the population.

Data on food consumption patterns revealed that diet of both poor and non-poor households is predominantly comprised of energy dense foods with little diversity and therefore micronutrient deficiencies are more likely to be prevalent in the population unless foods are fortified (Figure 7)[63]. The figure indicates that wheat is the main staple providing 46 to 52% of the total daily caloric intake, oils 14 to 13%, dairy 13-10%, sugars 10% and meat 3 to 2% of the total calories for the non-poor to poor groups of population, respectively.

29. Line: 2 to 5. reference for low energy intake by Pakistanis?
30. Line: 5 to 7. It is not necessary that low energy intake will lead to lower intake of all the nutrients. If it is true then what do we mean by nutrient-density? And how can we suggest lower energy intake to overweight adults?
31. Line: 15. Is this section about relationship between diet and disease in Pakistan? e.g No mention of food allergies in Pakistan
32. Line: 31. The ref 63, on slide 33 recommends seven strategies for improving diet diversity e.g. nutrition awareness, kitchen garden etc. and food fortification is second last in the list. So why only food fortification is mentioned here as the only strategy?

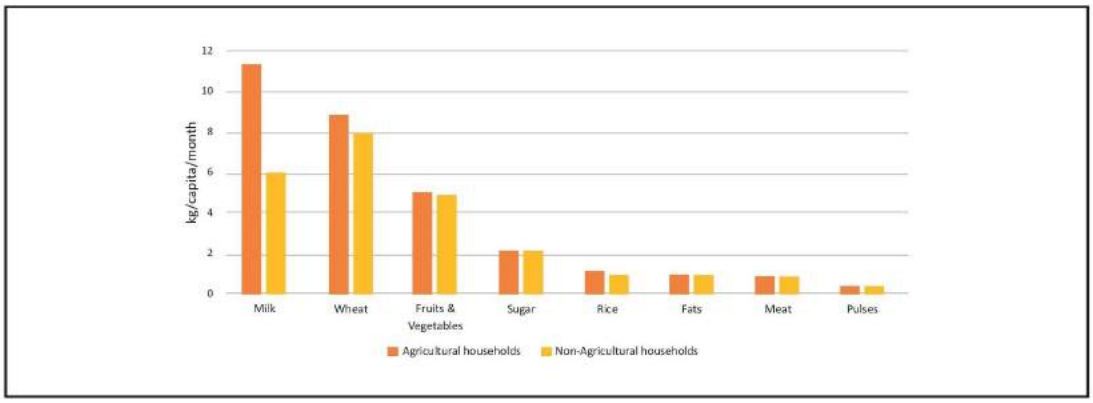
Figure 7. Calories contribution of different foods in poor and non-poor diets



Source: Malik et al., 2015

Figures 8-9 reveal that the dietary patterns of the rural population remained almost similar to that of the urban populations except that the former had a higher consumption of milk than the later which could be attributed to greater accessibility of the rural population to milk from buffaloes, cows, goats and sheep that are mostly reared in the rural areas. The figures also showed that diet of the population was less diversified and therefore, less likely to meet all the nutrients requirement of the body

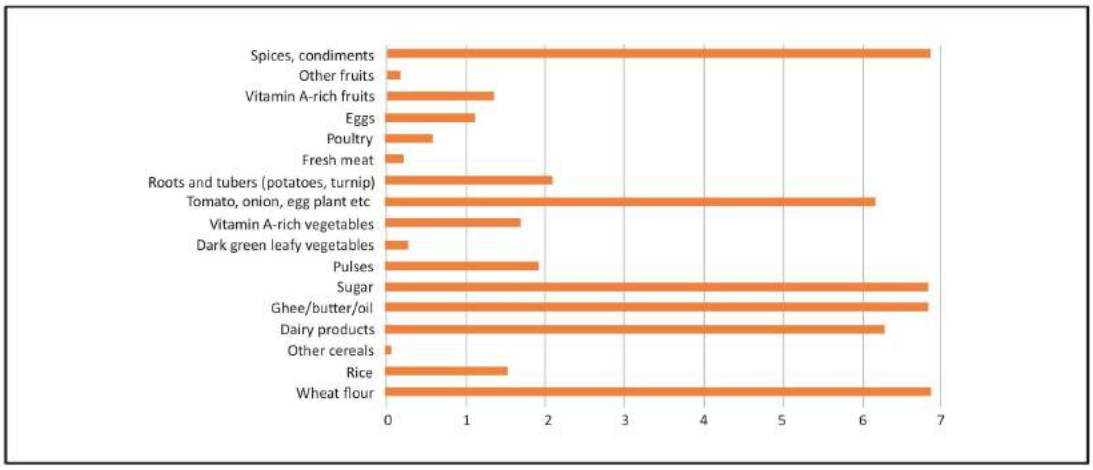
Figure 8. Food consumption patterns of households.



Source: Malik et al., 2015

33. Line: 1. Only 85 % of kcal sources covered. Energy form fruit vegetable not given
34. Line: 2 & 9. slides used as reference, same slides as in reference 56

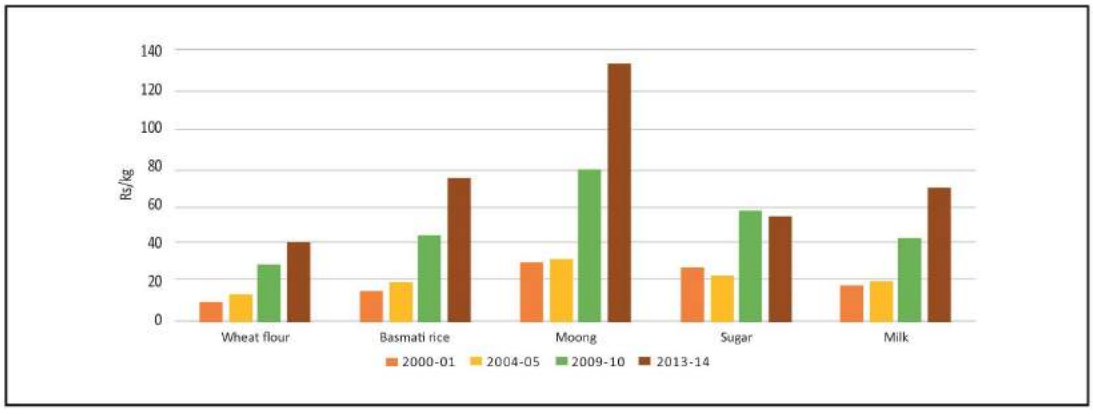
Figure 9. Frequency of food consumption based on 7 days dietary recall



Source: Nazli et al., 2014

Accurate assessment of food consumption, nutrients intake and requirement by the population is crucial to formulate food based dietary guidelines to prevent the incidence of malnutrition and chronic diseases in the population. However, it is important that food should be available, accessible and affordable at all times so that a variety of foods can be purchased to supply adequate amounts of nutrients to the body. The estimate suggests that households with low income spend over 59% of their income on energy dense foods and hardly any amount is left for education and health care of the family[63]. Besides, there has been a trend of increasing food prices which limit the purchasing power of the common man to purchase and consume nutrient dense foods that exacerbate food insecurity and malnutrition (Figure10).

Figure 10 . Trends in food prices over the years



Source: Malik et al., 2015

35. Line: 1. slides used as reference, same slides as in reference 63
36. Line: 2. Units not given

It is well established that unhealthy dietary practices and physical inactivity are risk factors for overweight and obesity and are associated with impaired metabolic functions, inflammation and increased prevalence of non-communicable disease. Food consumption patterns (FCPs) in Pakistan reveal that majority of the population consume refined cereals, hydrogenated and un-hydrogenated oils with high consumption of salt and sugars which are far above the recommended nutrients intake and dietary recommendations of World Health Organization[64] .The FCPs also show that consumption of vegetables, fruits, milk and milk products, meat and meat products is much lower than the recommended intake. Increased urbanization, economic and nutrition transitions have led to increased consumption of fast and processed foods, sweets and soft drinks with high energy, fat, salt and sugar content resulting in increased risks of malnutrition and chronic diseases in the country. Lack of appropriate policies and non-enforcement of food safety regulations have multiplied the number of street food vendors who sell low quality foods in schools, markets, canteens and other public places, increasing the prevalence of food borne diseases, malnutrition and mortality.

FCPs demand that dietary modifications may be encouraged transforming from energy dense foods to nutrients dense diversified foods that encompass a variety of food groups to meet all the essential nutrients to combat the double burden of malnutrition and chronic diseases. It requires multidimensional interventions and approaches to facilitate the dietary transition from energy dense to nutrients dense foods to control and reduce nutritional deficiencies and associated diseases. Furthermore, increased investments in social sectors are required to provide safe water, food and health care services as well as create more job opportunities for marginalized population to improve their quality of life.

Traditional and fast foods

In Pakistan, fast foods may be defined ready to eat food available in public places, food streets, food corners and restaurants. They may include burgers, shami kababs, pizzas, sandwiches, chat, cholay, samosas, pakoras, haleem, french fries, ice creams, doughnuts and all other traditional and non-traditional foods that are dispensed quickly. They are classified as energy dense foods because they provide high amounts of sodium, sugar, cholesterol and fat but are low in vitamins and minerals and dietary fibre content. Despite of their low nutritional value, fast foods have become a symbol of modern culture and their taste appeal more to children and youth.

Likewise other countries, consumption of fast food in Pakistan is also flourishing. According to various reports, fast food industry is the 2nd largest industry in Pakistan; accounting to 27% of its value-added production and 16% of the total employment in the manufacturing sector with an estimated 169 million consumers, Pakistan holds the world's eighth largest market when it comes to fast food and food related business. More than 1000 large-scale food processing enterprises in Pakistan are in operation[65].

Traditional foods are slowly losing their appeal, as fast foods are alluring to the population due to their convenience and easy availability. Home cooking hours have been comparatively minimized and people prefer eating outside in food streets and fast food restaurants. Along with Pakistani foods, Chinese, Western, Italian and Continental cuisines have also gained a lot of liking and are becoming a part of the Pakistani menu.

37. Line: 3. Source of FCP not given
38. Line: 4. reference 64 gives RDIs no references given for the claim about food consumption pattern of Pakistani population
39. Line: 23. Many of the foods listed above are not "low nutritive value" and are suggested as healthy food later in the document and included in sample menus e.g. Shami Kabab
40. Line: 26. energy density has nothing to do with amount of sodium or cholesterol, neither with simultaneous/inclusive presence of fat or sugar
42. Line: 35. no reference given for the claim that does not appears to be true

The impact of fast foods on health is quite staggering when consumed on a regular basis. By replacing fresh wholesome food with processed additive-laden food, it has been noted that blood pressure rises, cholesterol level increases, metabolic rate altered and the immune system is weakened.

Glycemic index of foods

It is the ability of carbohydrate containing foods to raise the body's blood glucose levels after their consumption. Foods by virtue of variations in the quality and quantity of carbohydrate contents yield different glycemic indices upon their consumption. In general, refined cereals/grains (white bread, white rice, spaghetti and processed foods) have a higher glycemic index than whole cereals/grains (whole wheat bread, brown rice). Foods are classified as having high (GI 70 or more), medium (GI 56-69) and low (GI 55 or less) glycemic indices[66]. Glycemic load is a multiple of carbohydrate quality and quantity that tends to measure the effect of food on postprandial blood glucose level. Foods with high glycemic indices put greater stress on the body to secrete greater amount of insulin to maintain the rising blood glucose level to a normal blood glucose level. In addition, higher carbohydrates intake adversely affects glucose and lipid metabolism leading to an increasing risk of cardiovascular diseases[67]. Conversely, low glycemic index diets have been associated to improving the overall blood glucose control in people with diabetes[68].A list of foods containing different glycemic indices is given as Annexure-I.

Food allergy

The abnormal response or reaction triggered by the body's immune system to certain foods is called food allergy. Foods that cause allergy are called allergen. The allergic reaction may be of varying intensity from mild to severe, may affect any part of the body and could be for a shorter or longer time period. Skin, gastrointestinal tract, cardiovascular system and respiratory tract are more commonly affected. Food allergy affects about 4-6% of children and adults[69].

The common symptoms include skin irritation and rash, itchy sensation in mouth, swelling of the lips, tongue or throat, shortness of breath, trouble breathing, flushing, wheezing, stomach pain, vomiting and diarrhoea etc. The reactions are mediated by immunoglobulin E and other antibodies. Foods that often trigger allergic reactions are milk, eggs, peanuts, nuts, fish, soya, wheat and shellfish (shrimp)[70].

Unprocessed and processed foods

Pakistan is a small but growing market for imported consumer food products and the small modern retail sector is growing slowly. Rising incomes, urbanization, and a young populace are combining to slowly shift traditional consumption patterns away from bulk and raw foods towards packaged and processed foods, including ready-to-eat meals and frozen foods.

A typical Pakistani household makes regular purchases of staple foods (i.e., wheat flour, pulses, edible oils, fruits, vegetables, milk, and meat) several times per month from neighborhood stores due to convenience, perceived freshness, and limited storage space in home.Young Pakistani professionals (men and women)

Line 17 to 27: no information re food allergies in Pakistan

43. Line: 4...16. no information given about Glycemic Index of Pakistani diets
44. Line: 28...35. No information given about use of processed foods in Pakistan

are making monthly food purchases from modern retail stores due to greater variety of available products, access to restaurant/food corners and prepared foods all under one roof. For urban dwellers with a sufficient income, one-stop grocery shopping is catching on as a family outing.

Affluent Pakistani families are attracted to modern retail stores due to their affordability, strategic locations, variety, and access to imported processed foods. The demand for specialty and high value foods such as dates, cereals, beverages, chocolates, almonds, cakes, fruits and fruit juices reaches its peak during the Islamic festive season, especially at Ramadan and Eid. These festivals revolve around the year depending on the lunar calendar. Fresh foods, fruit juices, fruit concentrate based beverages, organic foods, sugar-free confectionaries, packaged food with higher fiber content, dairy products, and vitamin and calcium fortified packaged foods and beverages are all gaining acceptance among high income consumers.

Traditional and modern snack foods, such as confectionaries, pastries, cakes, biscuits, ice cream, or sweet and savory snacks are very popular among Pakistanis. Frozen foods and instant noodles, which are easy to prepare for children, are popular among working mothers. Local flavors are preferred and local food manufacturers are exploring opportunities to produce new products using a combination of local and imported flavors. The rise of the urban middle class has increased the acceptance of packaged and ready-to-eat food products. Many Pakistanis are quite willing to try new foods while eating out, but often return to traditional foods at home. Chinese, Italian, Thai, Moroccan, and Lebanese foods are among the fastest growing new cuisines in Pakistan.

Multinational companies have also been successful in capturing the local food markets in Pakistan, which are encouraging youth to go for processed foods. Frequent consumption of processed foods is injurious to health due to the excessive use of salt, free sugars and other additives to increase the shelf life of the products. While Pakistan is slowly switching to processed foods, a reverse trend is being noticed in the Western world with many countries promoting a greater use of organic and homegrown natural foods. More and more consumers are buying fresh produce from the many farmers' markets that have sprung up in the urban areas.

To fight the epidemic of obesity, consumers are constantly reminded to reach out for fresh fruits and vegetables while avoiding sugary drinks and fried items. Making healthy food choices is vital to control this growing epidemic. Processed foods are treated with multiple chemicals to give them colour, taste, longevity and freshness and thus are exposed to energy-intensive processing. In addition to this, cardboard packaging often contains chemicals called diisopropyl-naphthalenes (DIPNs), which can migrate into the food contents rendering it unhealthy for consumption[71].

Nutrition labeling

Nutrition labeling is the information printed on the packages by food manufacturers to inform consumers about the name and total amount of food, list of ingredients, its nutrients contents, the percentage of daily nutrients reference values per 100 g, per 100 ml or package of the food. In developed countries it is mandatory for the food industry to label all pre-packaged foods with their nutrients composition that are marketed for human consumption. Nutrition labeling assists consumers in selection of foods according to their taste, liking and nutritional needs. It enables consumers to make wise choices and take informed

45. Line 4 to 16: stressing consumption of less processed food but message about using fresh home cooked food is omitted?
Line: 33. No information given about quality and use of food labels in Pakistan

dietary decisions. It provides information on the amount of nutrients such as sugar, salt, saturated fatty acids, cholesterol, cis and trans fatty acids, the increased levels of which are considered harmful to health. The information on nutrition labeling varies from country to country determined by the respective food regulatory bodies.

Overweight and obesity

Energy intake greater than body requirements leads to an increased risk of overweight and obesity, which are strongly linked with increased incidence of diabetes, hypertension, coronary artery disease, cancers and many other chronic non-communicable diseases. In Pakistan, consumption of energy dense foods (sweets, bakery products, fried foods, fast foods and overuse of oils and ghee in cooking) in combination with sedentary life styles are the main causes of overweight and obesity. It has been estimated that about 1/3rd of the adult population is overweight and obese[1]. Weight management through diet and lifestyle modifications is most effective in preventing and treating overweight and obesity.

Body Mass Index (BMI) is a measure of body's nutritional status assessed by taking weight of adults in kilograms divided by height in meters square. WHO has proposed the following classification to categorize adults into underweight, normal (weight), overweight and obese[72].

Group	BMI
Severely thin	<16.0
Moderately thin	16.0-16.9
Mildly thin	17.0-18.4
Underweight	Less than 18.5
Normal	18.5-24.9
Overweight	>25
Pre-obese	25.0-29.9
Obese Class I	30.0-34.9
Obese Class II	35.0-39.9
Obese Class III	≥ 40.0

Measurement of waist circumference is another useful indicator of assessing abdominal obesity. Excess abdominal fat is an independent risk factor for chronic diseases. Men having a waist circumference greater than 94 centimeters and women having a waist circumference greater than 80 centimeters are at a greater risk of metabolic syndromes, diabetes, hypertension and cardiovascular diseases[73].

Caloric reduction and increase in physical activity are two well-established and successful interventions to reduce and control overweight and obesity. Reducing caloric intake without affecting and compromising other nutrients intake would be a useful strategy for weight management. An individual's nutritional assessment is required for prescribing any dietary regimen; however, for prevention of overweight and obesity, it is important that an individual should follow PDGN on a regular basis. For treatment of

46. Line: 1. Figure not found at source and not clear and how was the results obtained in the absence of annual food consumption surveys? Needs to be explained in text.
47. Line: 15. Asian cutoffs points needs to be added; reference given is old
48. Line: 20. For Waist Circumference Asian cut offs are used but not for BMI Why?

effective in reducing biomarkers of inflammation and better management of cancers, diabetes and cardiovascular diseases[74].

Physical activity and lifestyle behaviour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Physical activity is vital for weight management, bone and muscle strength, optimal physiological functions, emotional wellbeing and good health. Sedentary lifestyles promote overweight and obesity, impair metabolic functions and increase the risk of chronic diseases. Physical inactivity is the fourth leading risk factors for global mortality and has been associated with non-communicable diseases, metabolic disorders, and mental diseases[75]. Evidence shows that engagement in optimum levels of physical activity improves cardio-respiratory and muscular fitness, bone health, metabolic functions and mental health. Weight reduction reduces health risks and helps in better management of chronic diseases[76].

Regular physical activity is one of the major contributors to wellness, quality of life and disease prevention. Moderate physical activity can lower the risk of heart disease, stroke, diabetes, osteoporosis, dementia, and numerous cancers. Though there are immediate benefits of physical activity, the majority of prevention and health benefits are achieved when it is practiced lifelong[77].

Economic and nutrition transition in both developed and less developed countries have caused substantial changes in dietary patterns and lifestyles of the people from complex unrefined foods to more refined and processed foods, manual physical work has been replaced by mechanical work and outdoor games are replaced by indoor sedentary computer games. These changes have been responsible for the pandemic of metabolic syndromes and chronic diseases affecting millions of people around the world with impaired physical and cognitive functions, increased morbidity, heavy burden on the health care systems and

The development of healthy eating behaviour and physical activity patterns helps to optimize health status and promote mental and physical wellbeing. Unfortunately, the population by and large is actively engaged in unhealthy eating behaviours such as frequent dieting, meal skipping and frequent consumption of foods high in total and saturated fats, sodium and sugar[27, 79]. Physical inactivity is also very common particularly among adolescents.

In order to meet the challenge of improving physical activity and promoting healthy dietary habits, integrated efforts of parents, educators, health care providers, schools, communities, the food industry, policymakers and the people themselves need to be strengthened, all working together to create more opportunities for healthful eating and healthy lifestyles[75].

Promotion of healthy lifestyles in children focuses predominantly on proper nutrition and physical activity,

49. Line: 1. not continued form pg 21 . Something missing
50. Line: 3. No info given about Physical activity level of Pakistani population

elements now widely recognized as essential for a healthy life. Systematic reviews have shown that healthy lifestyle such as increased levels of physical activity, a healthy diet, reduced stress and better sleep enhance general well-being[80].

There is scant data on physical activity in the Pakistani population. Moreover, the tools for assessing physical activity have not been validated in the Pakistani setting; it is important for future epidemiological surveys that such tools be developed, standardized and validated. Physical activity offers additional advantages for risk reduction in the Pakistani population since the highly prevalent risk factors amongst this population such as low HDL, central obesity and insulin resistance respond better to exercise. Stepping up physical activity in a population necessitates bringing a cultural change. This has two-fold implications; the first involving modification of lifestyles and the second necessitating the creation of a physical and social environment conducive to physical activity.

Smoking and smokeless tobacco use

Smoking has long been implicated as a risk factor for many chronic diseases, including cardiovascular, respiratory and gastrointestinal diseases and a variety of cancers. Tobacco smoke contains many oxidants and free radicals that can cause damage to lipids, proteins, DNA, carbohydrates and other bio-molecules. The annual death toll attributable to tobacco use is about 6 million while more than 600,000 are non-smokers being exposed to second-hand smoke[81]. In addition it has been estimated that 80% of 1 billion smokers worldwide live in low to middle income countries, the devastation caused by tobacco goes much beyond this picture with implications for individuals, societies and the health systems in general. In Pakistan, it has been reported that 45% of men and 6% of women smoke some type of tobacco[82] which are lower than previously reported studies that indicated 54% men and 20% women using tobacco in one form or the other; prevalence of smoking increased with age among both men and women. Men in the age range of 25-44 years had the highest prevalence of smoking (cigarettes and beedis) whereas with respect to women, prevalence was highest between the ages of 45-64 years[9]. It was also reported that smoking was more prevalent in rural than urban areas and illiterate than literate populations[82].

Cigarette consumption constitutes the single most important modifiable risk factor for coronary artery disease (CAD) and is the leading preventable cause of early deaths. Smoking has a particularly staggering impact in the less developed countries, almost half a billion individuals worldwide will eventually die of smoking-related complications9. Even among non-smokers, it has been recognized that inhaled smoke, whether from passive exposure or from cigar or pipe consumption greatly increase the risk of CAD.

Smoking alone is responsible for 10% of cardiovascular diseases[83] and those who consume 20 or more cigarettes daily have a two to three fold higher risk of CAD[9]. Moreover, these effects depend on the dose; consumption of as few as one to four cigarettes daily increases the risk of CAD. Smoking acts synergistically with oral contraceptive agents, placing younger women at an even higher relative risk. In addition to myocardial infarction, cigarette consumption directly relates to increased rates of sudden death, aortic aneurysm formation, symptomatic peripheral vascular disease and ischemic stroke. As for coronary artery disease, the risk of stroke is directly increased with the number of cigarettes consumed.

51. Line: 12. Nutrition implications of Cigarette smoking should be included

Food safety and hygiene practices

Food safety is an important pillar of food security. It ensures the availability of food that is safe, free from infectious agents and fit for human consumption. Access to safe foods and safe drinking water is essential for preventing infectious and chronic diseases. Microbiological and chemical contamination is a major cause of food and water borne diseases. Unsafe food contains harmful bacteria, viruses, parasites and chemical substances causing more than 200 diseases ranging from diarrhea to cancers[84]. It has been reported that contaminated food and water affects millions of people around the world resulting in 4 million deaths in which developing countries take a major share[85,86].

Food hygiene is not given due importance neither at the household level nor at the commercial (restaurant, food streets and other outdoor eating places) level. Personal and food hygiene (equipment, utensils, food handling and kitchen surfaces) practices before, during and after cooking are far below the desired quality standards. Vegetables, fruits, meats and other raw foods are not properly washed, cleaned and stored. Water used for cooking is not clean and safe. Poor food storage systems in homes and restaurants increase people's vulnerability to frequent food-borne diseases and increase mortality. In addition, at the national level there are no food safety policies, strategies and work plans to implement and protect public health from consumption of adulterated and contaminated foods.

Hygienic food management

Promoting good personal and food hygiene practices at all levels of food handling starting from farm to table i.e., production, transportation, processing, storage and marketing are not only crucial for ensuring food security but also for human safety and survival. All food industries, cafeterias, restaurants, food streets and food vendors should be bound to follow good hygiene and food safety practices during food handling, cooking and servings to the public. Food safety rules and regulations pertaining to prohibition of exposing foods and beverages in the open air and sun and not properly covering or protecting them, shall be included and implemented strictly at all levels of food and beverages production and marketing. Rigorous monitoring and implementation of food safety laws at all levels of food chain, are fundamentally important for ensuring a regular supply of safe foods and clean drinking water to the public.

Sensitization and capacity building of officials from the ministries and departments related to agriculture, food, health, education and industry, food vendors and workers involved in food industry are essential for promoting good hygiene practices and providing safe food to the public. Food industry shall also be bound to label all foods and beverages produced in the country and a stringent policy of collecting and analyzing food and water samples for pathogens, adulterants and contaminants shall be adopted at all levels of production and marketing. Public awareness to adopt and promote good hygiene practices through electronic, print and social media would be useful and effective means of educating people to adopt good hygiene practices. Good personal and food hygiene guidelines have been proposed in Annexure-II.

Water, sanitation and hygiene

Water is a basic necessity of life, which must be clean and safe for human consumption. It should be free from pollutants, industrial wastes, physical, chemical and microbial contaminants that are injurious to

52. Line: 1, 17, 36. Recommendations or situation analysis? Evidence about Situation in Pakistan could be added. Impact of poor hygiene on nutritional status needs to be highlighted here

human health. Consumption of water that is contaminated with animal and human excreta is a major source of pathogenic bacteria, viruses, protozoa and helminthes and results in epidemics of waterborne diseases. The organisms most commonly found in water contaminated with sewage are Escherichia coli and the coliform group as a whole[86].

It has been reported that in Pakistan 20 to 40% beds in hospitals are occupied by patients suffering from water related diseases especially during the summer months[87]. Unfortunately, most of the water sources are contaminated and there is no proper system to ensure the supply of clean drinking water to the marginalized populations. Estimates also suggest that in Pakistan a quarter of all the people visiting hospitals are suffering from water-related diseases as a result of poor sanitation and lack of safe drinking water facilities[88].

Countries providing clean water and sanitation have greatly reduced child morbidity and mortality. The environmental pollution in Pakistan has exacerbated the prevalence of chronic diseases and increased mortality[89].Improper waste disposal system, lack of safe drinking water, and lack of awareness about health and nutrition are the major concerns. The use of contaminated water and exposure to a polluted environment increase the risk of diseases such as diarrhea, dysentery, malaria, respiratory infections, influenza, and hepatitis. It is estimated that 45% of the total population in Pakistan does not have access to health services, 40% are deprived of safe drinking water and 53% are living without sanitation facilities[89]. Drinking water is considered safe when it is free from microorganisms as well as from toxic chemicals of industrial wastes and heavy metals that are injurious to health. Avoid drinking untreated, surface and ground water that may be contaminated with industrial wastes, chemicals and microorganisms. Water at the point of origin may be treated by antimicrobial and anti-contaminant agents. At home drinking water can be made safe by boiling or chlorination or installing membrane filters or by thermal treatment. Chlorination at a concentration between 0.2-0-5 mg/L from normal to high risks circumstances is recommended[90].

The maximum allowable concentration of lead, selenium, arsenic, chromium and cyanide in drinking water are 0.1 mg/L, 0.05 mg/L, 0.2 mg/L, 0.05 mg/L and 0.01 mg/L respectively, drinking water containing metal concentrations above these limits shall be considered unfit for human consumption[86].

METHODOLOGY

Under the Scaling up Nutrition (SUN) initiative, the Nutrition Section, Ministry of Planning, Development and Reform (MPDR)/ Planning Commission and Food and Agriculture Organization of the United Nations (FAO) joined hands in formulation of Pakistan Dietary Guidelines for Better Nutrition (PDGN). A brainstorming workshop was held in which renowned experts from the Ministries, universities, research institutions, Health & Planning and Development Departments and representatives from UN and international and national non-government organizations participated to review the previous DGs, identify gaps and suggest how new DGs should be developed for the country. In the light of participants' suggestions, a framework for PDGN was developed. A consultative workshop was convened to review and refine the framework of the PDGN. Extensive literature search on food consumption patterns, nutrients intake, physical activity, lifestyle, recommended dietary allowances, diet and disease, nutrition and health problems was carried out along with critical evaluation of literature to fully understand the existing situation of dietary intake, the relationship between diet and disease, nutritional and health status of the population. The literature provided necessary inputs and up-to-date snapshot of the nutrition and dietary practices of the population and the difficulties and challenges that could arise during the development of PDGN.

On the basis of existing dietary patterns, nutrient intakes, dietary recommendations, prevalence of malnutrition and diseases in the country, the dietary guidelines were formulated while keeping in view the dietary recommendations and guidelines of WHO/FAO[91] to promote healthy dietary practices and to prevent the rising incidence of overweight and obesity, diabetes, hypertension, cardiovascular diseases, cancers, rickets, arthritis, osteoporosis and other diet related diseases.

A consensus building workshop was conducted to which technical experts, planners and policy makers from universities, research institutions, Ministries of PD&R, Health, Provincial Departments, Azad Jammu and Kashmir and Gilgit-Baltistan were invited. A comprehensive presentation on dietary guidelines was given and working groups were constituted for deliberation and eliciting their inputs. Dietary guidelines were critically reviewed and modified to incorporate the relevant recommendations.

PAKISTAN DIETARY GUIDELINES FOR BETTER NUTRITION (PDGN)

PDGN are a set of dietary recommendations based on scientific and epidemiological evidence to meet the nutrients requirement of population through improved dietary practices and healthy lifestyles. PDGN aims to improve the nutritional status of the population by ensuring that sufficient amounts of nutrients are provided to the body by intelligent and informed food choices and adoption of healthy lifestyles and behavioural practices. Food based interventions are safe risk free, non-invasive, cost effective, sustainable, culturally acceptable and far less expensive as compared to therapeutic treatments. The data suggest that dietary patterns of the Pakistani population in general are inappropriate, unhealthy and inadequate both in terms of quality and quantity to meet the body needs. Nutrients intake data also reveal that diets are unable to provide adequate amount of essential macro and micronutrients to the body as reflected by the higher prevalence of underweight, wasting, and stunting combined with widespread nutritional deficiencies in

53.
Line 9: no quality assurance measures given
Line 10: lack of food consumption data nowhere mentioned, extensive search not reflected in document
Line 12 not evident from number and type of references reviewed and cited
Line 34 no reference given for this claim

women and children[1]. These deficiencies fall under the category of public health problems that need to be reversed through integrated, comprehensive dietary interventions (development and dissemination of food-based dietary guidelines, nutrition education, dietary counseling and behavioural change communication).

Health status indicators also highlight that there has been surge in communicable and non-communicable diseases affecting almost all age groups of the population. Women and children are more vulnerable to nutritional and health problems owing to their increased requirements and decreased intakes and less access to health care facilities, poverty and unawareness. Prevalence of overweight and obesity, hepatitis, malaria, tuberculosis, diabetes, hypertension, cardiovascular diseases and cancer is multiplying with the passage of time that tend to have far reaching social, psychological and economic consequences on the society and the country.

Food and food groups

Food is essential for providing nutrients like carbohydrates, proteins, fats, vitamins, minerals and other beneficial substances vital for human survival. None of the foods is capable of providing all the nutrients in an adequate amount to meet the body's requirements. Eating a variety of foods in adequate amount is the only way of nourishing the body. On the basis of nutritional attributes, food may be divided into six groups that include cereals, vegetables, fruits, milk and milk products, meat and pulses, fats and oils.

Each food group has a unique nutrients composition that is different in quality and quantity from other food groups. Fats and oils are included in the food group because they are rich source of energy and essential fatty acids for the body.

Cereals

Cereals include wheat, oats, rice, rye, barley, millet and corn. These grains can be cooked and eaten whole, ground into flour to make a variety of cereal foods like bread, chapatti, nan, pasta and noodles, or made into ready-to-eat breakfast cereals. Wheat, rice and maize are the most commonly consumed cereals in Pakistan. They are the main source of energy, carbohydrates, dietary fibre, protein, vitamins and minerals. Cereals provide over 50% of total energy and protein per day to human body in Pakistan[54].

Energy balance is important to prevent both under-nutrition and over-nutrition and maintaining healthy body weight. Dietary fibre is essential to maintain body cholesterol level, reduce faecal transit time with

54. Line: 1. NNS 2011 does not give accurate food consumption info e.g. average iron intake is 61 mg per day
55. Line: 17. why fat and ghee on title page when title Fat and oil inside the document?
56. Line: 37. reference needed for rapid excretion of all toxic substances by dietary fiber

rapid excretion of toxic substances and prevent the incidence of colorectal cancer. Cereals and cereal-based food products are energy dense and thus inadequate or excess intakes are harmful to health.

Vegetables

Vegetables include leafy and non-leafy vegetables with different colours (green, yellow and red) and properties. The leafy vegetables include dark green vegetables (broccoli, spinach, lettuce), red and orange vegetables(tomatoes, carrots, and squash), beans and peas (black beans, split peas, and soybeans). The non-leafy vegetables and tubers include potato, carrots, turnips, reddish, garlic, ginger, onion etc. Vegetables are rich in vitamins, minerals, dietary fibre, water and phyto-chemicals that protect body from oxidative damage and infectious and chronic diseases. Vegetables are classified as protective foods as they protect body from infections and chronic diseases.

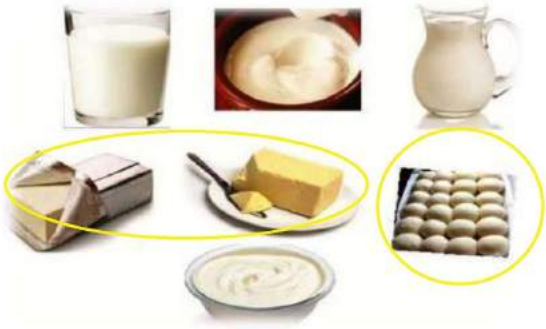
Fruits

Fruits in this group include fresh, frozen, canned and dried fruits. They are a good source of energy, dietary fibre, potassium, vitamins and minerals. They also contain phyto-chemicals and protect the body from oxidative damage and reduce the risk of cancers and other chronic diseases. Fruits are also classified as protective foods as they protect body from infections and chronic diseases.

58. Line: 6. Potato is often included in starchy foods and not vegetables and was in FBDG-2005 . Rationale for the change should be given to avoid misunderstandings and misinterpretations. URL of Ref.: https: //www.nhs.uk/live-well/eat-well/5-a-day-faqs/
59. Line: 6 to 10. Beans carrots etc are not leafy vegetables https: //en.wikipedia.org/wiki/List_of_leaf_vegetables

Milk and milk products

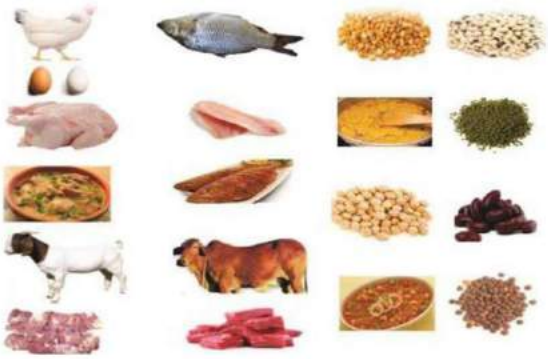
Milk and milk products include milk, yogurt, cheese, ice cream, custard and other milk based foods. They are good sources of protein, calcium, phosphorous, magnesium, vitamins and minerals.



Adequate amount of milk and milk products are recommended to prevent incidence of rickets, osteomalacia and osteoporosis later in life which occur due to deficiency/low intake of vitamin D, calcium and phosphorous.

Meat and pulses

Meat and pulses include all kinds of meat and organs, fish, eggs and pulses (chick pea, red beans, lentil, mash, mung beans) that are rich in protein and are considered body-building foods. Besides protein, they also provide vitamins and minerals. Adequate amount of meat, fish, eggs and pulses should be taken to reduce and control kwashiorkor, stunting, anaemia and zinc deficiencies.



Fats and oils

Fats and edible oils are an essential part of the Pakistani diet. Fats and oils are major sources of energy, essential for the absorption of fat soluble vitamins and providing essential fatty acids. They are composed of fatty acids and classified into saturated and unsaturated fatty acids. Saturated fatty acids are predominantly present in animal fats (butter and ghee), hydrogenated fat (ghee) and vegetables oils (coconuts and red palm oil). High intake of saturated fatty acids results in synthesis of bad fat i.e., low density lipoprotein(LDL) in the body which has been identified as a risk factor for cardiovascular diseases. Vegetable oils (soybean, sunflower, corn, olive, rapeseed, and sesame seed) are high in unsaturated fatty acids and considered superior over saturated fatty acids as the former promotes the synthesis of good fat i.e., high density lipoprotein (HDL) in the body.

60. Line: 1. Egg and butter do not belong here URL of Ref.: https: //www.choosemyplate.gov/dairy
61. Line: 27 to 30. why red palm oil, all palm oil has high SFA.
62. Line: 30...36. Instead of treating all PUFAs as one group it could be more beneficial to public if we focus on getting more N3 FA from diet. We need to maintain a triene: tetraene ratio below 0.2 for health Diets usually provide enough n6 FA

URL of Ref.: https: //www.ahajournals.org/doi/abs/10.1161/CIR.0000000000000510

Fats and oils are also divided into essential and non-essential fatty acids. Linolenic and linoleic acids are essential fatty acids not synthesized by the body and must be supplied through the dietary sources as they are vital for performing a variety of physiological functions i.e., cell membrane, development and functioning of the brain and nervous systems. They play an important role in suppressing inflammation and prevent degenerative changes in the body. The composition of fatty acids determines the quality of fats and oils. Fatty acids are also divided into cis and trans fatty acids, the former promotes synthesis of good fat (high density lipoprotein) and the later leads to bad fat (low density lipoprotein) production in the body. Trans fatty acids are produced when oil is transformed into solid fat by industrial processing or when oil and fat are overheated or fatty meat is cooked and eaten. Deep fried foods, bakery products, processed foods and fast foods are potential sources of trans fatty acids which increase low density lipoproteins, modify other lipoproteins and are associated with increased risk of cardiovascular diseases.

Fatty acids are also classified into omega-3, omega-6 and omega-9 on the basis of the location of double bonds in the fatty acid chain. Alpha-linolenic fatty acid is omega-3 essential fatty acid that is converted into docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) in the human body that are essential for brain and nervous system functions. Linoleic acid is omega-6 fatty acid found in vegetables oils, grains and nuts while oleic, stearic and erucic fatty acids are omega-9 non-essential fatty acids. The acceptable macronutrient distribution range (AMDR) from fat in the form of total calories is 20-40% for different age groups[92]. A list of foods rich in omega-3, omega-6 and omega-9 fatty acid are given as Annexure-III.

Recommended dietary allowances

Recommended dietary allowances (RDAs) refer to the average daily intake level of a particular nutrient that is likely to meet the nutrient requirements of 97-98% of healthy individuals in a particular life stage or gender group. They are derived from epidemiological studies, which are based on determining mean nutrients intake of the reference population i.e., large nationally representative sample of population to which two standards deviations are added to balance an individual difference and set the nutrients requirement for the general population with an exception to energy requirements which are set equivalent to average mean energy expenditure of a healthy reference population.

Knowledge of nutrients requirement by different age groups is essential for transforming nutrients into portions of foods required by each age group. Nutrients requirement by different age groups are described below to facilitate the understanding of developing PDGN. Recommended dietary allowances for Pakistani population as given in the Food Composition Table for Pakistan[93] are reproduced as Annexure-IV.

Infants (0-6 months)

Early infancy covers the period from birth to 6 months, characterized by rapid body growth and development. During this period, infants on an average gain about 4-5 kg weight and 15-16 cm length[71].Exclusive breastfeeding is recommended due to its unique nutrients composition best suited for the baby. Nutrients supplied by mother's milk are considered adequate for the optimal growth and development of infants. For a particular nutrient, the average intake of full-term infants born to healthy and

63. Line: 9. trans fats are not produced by overheating or cooking
URL of Ref.: https: //www.ncbi.nlm.nih.gov/pubmed/24575785, https: //www-tandfonline-com.proxy.lib.wayne.edu/doi/full/10.1080/09637480701580645?src=recsys
64. Line: 16. Stearic acid is SFA and not Omega 9
URL of Ref.: http: //www.fao.org/docrep/V4700E/V4700E07.htmURL of Ref.: Fatty%20acids
65. Line: 28. unusual usage
66. Line: 32. Why PK RDA is given as it seems to have unusual RDA for iron for boys and girls

well-nourished mothers and are exclusively breastfed has been adopted as the primary basis for deriving the Adequate Intake (AI) for most nutrients during the first 6 months of life. Energy is required for basal metabolism, growth and physical activity which are highest during the first six months starting from 113 kcal/kg/day at birth to 81kcal/kg/day at 6 months for boys and 107 kcal/kg/day at birth to 82 kcal/kg/day at 6 months for girls[57]. Similarly, protein and other nutrients demand per kg body weight are highest during this period to meet the physiological needs and growth of the body.

Infants and young children (6-24 months)

During the second half of infancy and onwards, growth velocity becomes relatively slower with increasing age. Children during this period on an average gain about 4 kg body weight and 20 cm height, therefore require adequate amounts of breast milk and complementary foods to meet the body needs for optimal growth and development[21]. Energy requirements during this age group are estimated between 80-82 kcal/kg/day for girls and boys, respectively[57]. Protein requirements during the first and second years of life have been estimated at 1.69 g, 1.25 g / kg /day, respectively[94]. WHO recommends that complementary foods should be introduced at 6 months of age in addition to breast milk, initially 2-3 times a day for infants from 6-8 months, increasing to 3-4 times daily for infants 9-11 months and 3-4 times complementary foods plus additional nutritious snacks 1-2 times/day for 12-24 month-old children[95]. In terms of energy requirements from complementary feeding during different time periods, it is recommended that complementary foods should provide 200 Kcal/day to 6-8 month-old infants, 300 kcal/day to 9-11month-old infants and 550 kcal/day to 12-23 month-old children[96]. The IYCF recommendations proposed by UNICEF/WHO[15,18] are given as Annexure-V. For further details, Pakistan Infant and Young Child Strategy, 2016-20 can be consulted[97].

Children (24-36 months)

Children at this age group grow, learn and acquire skills, enjoy greater mental and motor skills, and are actively engaged in eating and playing. It is a period of learning, talking, communicating, feelings and emotional development. Children by this age begin to explore life independently. It is a time when children learn, develop and display variations in eating behavior, skills, knowledge and attitude relating to food. Energy requirements for children at this age group are about 80 kcal/kg/day[57]while protein requirements are estimated at 1.1g/kg/day with an acceptable macronutrient distribution range for protein between 5-20% of total energy[98]. Depending on age, size, sex and physical activity total energy requirements of children in this age group range between 1000-1400 kcal/day[99].

/Nomeena Anis

68. Line: 8. Any rationale or reference for age brackets used in this book. Is there any separate RDA for one year age bracket?
69. Line: 14. Why laymen's web ref 99 used w? 1000-1400 kcal not found there.
70. Line: 22. IYCF mentioned but recommendations not followed re BF till 2 years
71. Line: 35. Why MEAD JOHNSON REF USED are

Children (3-10 years)

Growth and development of children 3-10 years continue at a moderate pace but there is a continuous demand of nutrients to meet the body needs. In general, children gain about 2-2.5 kg body weight/year and 5-6cm height/year[94]. Mean body weight and length of boys is generally greater than their corresponding age girls. Energy requirements for boys and girls are estimated at 80 kcal/kg/day and 77 kcal/kg/day at age 3 but decreased to 67 kcal/kg/day and 61 kcal/kg/day at age 10 for boys and girls, respectively[57]. Recommended protein requirements for children 3-10 years are estimated at 1.2 g/kg/day[94].

Adolescents (10-19 years)

Adolescence period is accompanied by increased physiological and psychological changes with rapid physical growth and development that require increased amounts of nutrients to fulfill the body requirements. At puberty and at peak weight and height accretion, adolescents gain about 3-5 kg/year weight and 6-7 cm/year height, respectively[100]. After the age of 17 years, weight and height gain of adolescents reduces substantially to 1.5-2 kg/year and 0.5-1 cm/year, respectively. Adolescents by and large attain 50% of adult weight and 25% of adult height for which optimal nutrition is essential[31]. Energy requirements for adolescent boys and girls are estimated at 55-65 kcal/kg/day and 45-60 kcal/kg/day, respectively. Recommended protein requirements for adolescents are 1.1-1.2 g/kg/day[94].

Adults (19-60 years)

In adults (age 19 and above), physical growth and development almost comes to an end except skeletal growth that continues with increase in bone mass till the age of 30-35 years. Beyond this period, bone resorption dominates over bone formation process and thus there is a loss of calcium hydroxyapatite from bones and teeth with an increased risk of bone related diseases and fractures. Mean energy expenditure decreases and so does the nutritional requirements. For adults with 60 kg body weight a basal metabolic rate (BMR) of 1515 and sedentary, moderate to heavy or vigorous levels of physical activity, the estimated energy requirements are 2318, 2727 and 3485 kcal/day while for women with 55 kg body weight a BMR of 1241 and sedentary, moderate to heavy or vigorous levels of physical activity, the estimated energy requirements are 1899, 2234 and 2854 kcal/day. Recommended protein requirements for adults are 1 g/kg/day[94].

Elderly (>60 years)

Nutritional requirements of the elderly vary due to their varying health status. An age related decline in physiological functions combined with the prevalence of chronic diseases and limited health care make the elderly more vulnerable to nutritional deficiencies. More individualized attention is required at this stage to provide the elderly with adequate dietary and nutritional supplements to improve their nutritional well-being.

72. Line: 13..14. not found in reference 31 and meaning of the sentence not understood.

Pregnancy

Additional nutrients requirements for pregnancy are based on the amount of tissue deposits, fat accumulation and increase in blood volume. Based on the growth and development of the fetus, nutrient requirements vary in three trimesters, minimum additional nutrients requirements during the first trimester, moderate in the second trimester and highest in the third trimester. The total cost of energy during pregnancy is estimated at around 80,000 kcal, which comes to 300 kcal per day[101]. The RDAs for additional energy and protein intakes during the second and third trimesters are 300 kcal/day, 7 g/day and 23 g/day,respectively[101].Optimum weight gain during pregnancy is marker of birth weight; both under and over weight gains during pregnancy are associated with pregnancy complications and adverse pregnancy outcomes. For overweight and obese women- lesser gestational weight gain (<12 kg), for normal- moderate weight gain (12 kg) and for underweight- greater weight gain (12-14 kg) is recommended[94].

Lactation

Lactation imposes additional nutrients demand on women to meet the requirements of breastfeeding. It has generally been agreed that the nutrients cost incurred on breast feeding shall be met through dietary sources so that nutritional well-being of women and children could be protected to reduce the risk of malnutrition, morbidity and mortality in both groups. Additional energy recommendations for lactating women are 500kcal/day, while 19 g and 13 g additional protein intakes are recommended during the first and second six months of lactations[94].

73. Line: 10..11. Confusing statement re weight gain, references e.g. weight gain recommendation not found in ref 94 NIN RDA

MY PLATE

There is no single food that provides all the essential nutrients to the body in adequate amounts for growth and development of infants beyond six months of age. On the basis of quality and characteristics, foods are divided into six groups: (i) Cereals; (ii) Meat and pulses (meats/eggs/pulses); (iii) Dairy (milk and milk products); (iv) Vegetables; (v) Fruits and (vi) Fats and oils. Fats and oils are included in the plate, as they constitute an integral component of Pakistani diet. These groups are presented in My plate form to reinforce that the diet must contain all food groups to satisfy the nutritional requirements of the body.

Cereals group is essential for providing carbohydrates, protein, vitamin B1, vitamin E and minerals. It is the main staple providing over 50% of energy, protein, vitamins and mineral requirements of the body. The acceptable macronutrient distribution range (AMDR) from carbohydrates in the form of total calories is 45-65% for different age groups[92].

Meat and pulses group includes mutton, beef, poultry, fish, liver, eggs and pulses that are rich sources of proteins and minerals. The AMDR from meat and pulses group in the form of total calories is 5-35% for different age groups[92].

Dairy group includes milk and milk products essential for skeletal growth and development, neurological and muscular functions. It is a rich source of calcium, phosphorous, protein, lactose, energy and vitamins. Vegetables are essential for providing antioxidants, dietary fibre, vitamins and minerals that protect body

Line: 9	"...cereal do not always provide 50% of protein vitamin or minerals .."
Line: 13..14	AMDR cannot be used for food . It is only for macronutrients. not found in cited reference

against chronic diseases. Increase consumption of vegetables is recommended to meet the nutritional requirements, maintain desirable body weight, metabolic functions and prevent the incidence of chronic diseases.

Fruits are essential not only for providing vitamins and minerals but also for supplying phyto-chemicals and dietary fibre for optimal metabolic functions, growth and development. Fat, oil, salt and sugar may be used moderately to reduce the risk of overweight and obesity, hypertension, cardiovascular diseases and diabetes.

Portion sizes and frequency of servings

Since nutritional requirement varies by age and gender, emphasis is laid on the development of PDGN by various age groups and gender. For the purpose of PDGN, the population is divided into following age groups:

- Infants (0-6 months)
- Infant and young children (6-24 months)
- Children (24-36 months)
- Children (3-10 years)
- Adolescents (10-19 years)
- Adults (19-60 years)
- Elderly (>60 years)
- Pregnant women
- Lactating mothers

Infants (0-6 months)

It has been well established that breast milk is a complete food for the first six months of life and provides all the essential nutrients in balanced amounts to the baby for meeting its physiological, optimal growth and development requirements. Mothers shall be encouraged, educated and facilitated to adopt exclusive breastfeeding during the first six months.

Infants and young children (6-24 months)

The period between 6-24 months is crucial for laying a strong nutrition base to meet the demands of accelerated growth and development, and to prevent growth faltering, children morbidity and mortality. Exclusive breastfeeding is unable to meet the nutritional requirements of infants beyond six months of age. To complement the baby's nutrients requirements, introduction of soft nutrients dense foods (thick cereals porridge, banana, potato), soups (corn, vegetables, meat) and fresh fruit or fruit juice in small amounts with a gradual increase, along with breastfeeding is vital for child's growth and development. It shall be continued till two years of age after which a gradual shift to the family food is advised.

76. Line: 8. strange usage . URL of Ref.: https: //www.eatright.org/food/nutrition/nutrition-facts-and-food-labels/serving-size-vs-portion-size-is-there-a-difference

It is also important that complementary foods must be safe, age-appropriate and consist of a variety of foods to provide adequate amounts of nutrients to the body. The consistency of complementary foods should change from semi-solid to solid as the infants grow. Fortified complementary foods may be given when availability of local diversified foods becomes an issue.

It has been recommended that infants aged 6-8 months should receive complementary foods 2-3 times/day, infants aged 9-11 months should receive complementary foods 3-4 times/day and additional nutritious snacks 1-2 times/day for children older than 1 year[95].The estimated energy requirements of complementary foods for infants between 6-8 months are 200 kcal/day; 300 kcal/day for 9-11 months and 550 kcal/day for 12-24 month-old children[96].

Dietary recommendations for infants and young children (6-24months)

- *Exclusive breast feeding from 0 to 6 months.*
- *Continue breast feeding along with complementary foods adequate in quality and quantity (2-4 times/day) from a variety of soft foods starting from liquid to semi-solid and solid foods gradually suitable for young children under 2 years of age.*
- *Salt and sugar should not be added to complementary foods[102].*
- *Provide nutrients dense snacks from fresh foods (1-2 times/day) as per child's appetite and requirement.*

Some of the commonly consumed complementary foods given in the Food Composition Table for Pakistan[93] are reproduced as Annexure-VI.

77. Line: 3. why & how general population will get fortified supplementary foods.
78. Line: 19. why these recipes are given? Almost all have calculation errors.

Children (24-36 months)

Children in this age group require a well-balanced, nutrient dense diet to meet the nutritional requirements of the body needed for the maintenance of basal metabolic rate, optimal physical and mental growth and development, and increased levels of physical activity. The parents and caregiver must help children in establishing healthy dietary habits, good hygiene practices, and healthy behavior and lifestyle attitudes for an improved and productive life. The basic principle of meal planning should be that diet must be inclusive of the basic five food groups and quantitatively and qualitatively sufficient to meet the growth and development demands of the body.

Food and portion sizes for children (24-36 months)

Food Group	No. of Servings /day	Portion size and description
Milk and milk products	2	1 serving=1cup of milk or 1 cup of yogurt or 1 slice of cheese or 1 cup of kheer or feerni or other milk-based products equivalent to nutrients supplied by 1 cup of milk. 1 cup of whole milk will provide 15g carbohydrates, 6 g protein, 8 g fat and 150 calories.
Cereals	1-2	1 serving= 2 slice of bread (toast) or 1 chapatti or 1 cup of cooked rice or 1 cup of cereals equivalent to nutrients supplied by 2 slice of bread. One serving of cereals bread=(2 toast x 28 g=56 g) shall provide 30 g carbohydrates, 6 g protein, 0-2 g fat and 160 Kcal.
Vegetables	1-2	1 serving= ½ cup of cooked non-starchy vegetables or ½ cup of vegetables juice/soup or 1 cup of fresh vegetables/salad. One serving of vegetables will provide 5 g carbohydrates, 2 g protein and 25 calories. One serving of starchy vegetables (1 potato (100 g) or maize (1/2 cup) or peas green ½ cup) will provide 15 g carbohydrates, 3 g protein, 0-1 g fat and 80 calories.
Fruits	1-2	1 serving=1 medium size banana or 1 apple or 1 peach or 2-3 plums or 3-4 apricots. Each serving will provide 20 g carbohydrates and 80 calories.
Meat and pulses	1-2	1 serving of meat (28 g lean meat=2-3 small pieces of meat or 1-2 pieces of fish or 1 egg, or ½ cup of cooked pulses). One serving of lean meat will provide 7 g protein, 3 g fat and 55 calories. One serving of meat with medium fat will provide 7 g protein, 5 g fat and 75 calories. One serving of meat with high fat will provide 7 g protein, 8 g fat and 100 calories.

Salt, Sugar and Oil

- Use minimum amount of salt, sugars and oils in cooking use less than 5 g salt/day, less than 10% calories from free sugars and less than 10% of total fat calories from saturated fat.
- Avoid junk and refined foods, sweets, soft drinks, french fries, samosa and other deep fried foods.
- Use clean water for washing vegetables and fruits and protect foods from flies, pathogens, dirt, and cover and refrigerate them at 5°C or below for a day only.

79. Line: 9. Instead of using same serving sizes children serving sizes could be more useful.
80. Line: 9. weight may also be given for all foods due to wide variations in sizes and density.
81. Line: 9. why so much details of macro-nutrients are given here?.
82. Line: 11. Sliced (or any) cheese neither available nor affordable to 99.9% of Pakistanis.
83. Line: 11. "other milk-based products equivalent to nutrients supplied by 1cup of milk" how those food will match macronutrient 1 cup of kheer is not same as 1 cup of milk.
84. Line: 13. "½ cup of vegetables juice/soup" juice and soup are not nutritional equivalents.
85. Line: 13. balance of starchy and non-starchy veg should be specified.
86. Line: 17. reference needed re suitability of these adult recommendations for kids <8% is RDI for children for SFA . URL of Ref.: http: //www.fao.org/3/a-i1953e.pdf https: //www.nhs.uk/common-health-questions/childrens-health/how-much-salt-do-babies-and-children-need/ http: //www.worldactiononsalt.com/salthealth/children/URL of Ref.:
87. Line: 18. reference needed re suitability of these adult recommendations for kids Much Less than 5 g depending on total intake of energy. . ref. as above

Children (3-10 years)

Growth and development in children between 3-10 years of age, gets slower than infancy and is considered a period of catch-up growth to cover the nutritional deficit gaps and build up the deficient body nutritional stores. It is an opportune time to improve nutritional status and to boost body's immune system for fighting against infections and diseases. Children at this age develop better taste acuity, improved digestive and absorptive capacities, enhanced enzymes and hormonal secretion, coordination and control to digest, absorb and utilize family foods. This period is also important for learning and acquiring skills and developing habits for eating (adult type) family foods. At this stage a child picks and imitates what their peers and older people eat and drink. Encouraging children to adopt healthy eating practices pay dividends to rest of their life.

Introducing a variety of nutrients dense foods that comprise of milk and milk products, meat and meat products, vegetables and fruits, cereals and pulses with legumes and increasing meal frequencies will enable children not only to meet their daily nutritional requirements but also to replete the nutrient stores of the body.

Food and portion sizes for children (3-10 years)

Food Group	No. of Servings /day	Portion size and description
Milk and milk products	2-3	1 serving=1cup of milk or 1 cup of yogurt or 1 slice of cheese or 1 cup of kheer or feerni or other milk-based products equivalent to nutrients supplied by 1 cup of milk. 1 cup of whole milk will provide 15 g carbohydrates, 6 g protein, 8 g fat and 150 calories.
Cereals	2-4	1 serving= 2 slice of bread (toast) or 1 chapatti or 1 cup of cooked rice or 1 cup of cereals equivalent to nutrients supplied by 2 slice of bread. One serving of cereals bread=(2 toast x 28 g=56 g) shall provide 30 g carbohydrates, 6 g protein, 0-2 g fat and 160 Kcal.
Vegetables	1-2	1 serving= ½ cup of cooked non-starchy vegetables or ½ cup of vegetables juice/soup or 1 cup of fresh vegetables/salad. One serving of vegetables will provide 5 g carbohydrates, 2 g protein and 25 calories. One serving of starchy vegetables (1 potato (100 g) or maize (1/2 cup) or peas green ½ cup) will provide 15 g carbohydrates, 3 g protein, 0-1 g fat and 80 calories.
Fruits	1-2	1 serving=1 medium size banana or 1 apple or 1 peach or 2-3 plums or 3-4 apricots. Each serving will provide 20 g carbohydrates and 80 calories.
Meat and pulses	1-2	1 serving of meat (28 g lean meat=2-3 small pieces of meat or 1-2 pieces of fish or 1 egg, or ½ cup of cooked pulses). One serving of lean meat will provide 7 g protein, 3 g fat and 55 calories. One serving of meat with medium fat will provide 7 g protein, 5 g fat and 75 calories. One serving of meat with high fat will provide 7 g protein, 8 g fat and 100 calories.

Salt, Sugar and Oil

- Use minimum amount of salt, sugars and oils in cooking use less than 5 g salt/day, less than

89. Line: 3. what does it mean?.
90. Line: 13. why we assume depletion before adolescence?.
91. Line: 15. According to these guidelines even at the maximum intake only 1610 calories could be provided while energy requirements could be much higher for a ten year old boy or girl. Given later in this document as >2000 for 10 year old.
92. Line: 23. exactly same as for all so may have been given at one place.

10% calories from free sugars and less than 10% of total fat calories from saturated fat.

- Avoid junk and refined foods, sweets, soft drinks, french fries, samosa and other deep fried foods.
- Use clean water for washing vegetables and fruits and protect foods from flies, pathogens, dirt, and cover and refrigerate them at 5°C or below for a day only.

Adolescents (10-19 years)

Adolescence is a period of rapid growth and development marked by rapid changes in body size, shape, and composition that require adequate nutrition for attaining optimum weight, height, replenish nutrient stores to reach full genetic potential in physical, mental and scholastic performance. The rapid growth is accompanied by physiological changes that include increased hormonal secretions and reproductive development with secondary characteristics, cell proliferation and increased blood volume, which increases the nutrient requirements. At the peak of the adolescent growth spurt, the nutritional requirements may be twice as high as those of the remaining period of adolescence[103].

During adolescence, weight and height increases by about 50% and 20% of adult weight and height respectively, that puts greater demand of nutrients which could be only met through consumption of nutrients dense diversified foods[31]. However, girls' marriage during adolescence followed by subsequent pregnancies and lactation results in additional nutritional stress on women making them vulnerable to nutritional deficiencies with increased risk of morbidity, neonatal and maternal mortalities.

Good and adequate nutrition during adolescence are pre-requisite for health, productivity and economic outputs. Adolescent girls need special attention with regard to nutritional well-being because of their multi-dimensional responsibilities at home and outdoors including bringing water, collecting fire wood, and helping mothers in home in domestic chores and rearing animals. Failing to cope with increasing nutrient's demand, many adolescents remain underweight and stunted which has been attributed to obstetric complications and adverse pregnancy outcomes[104].

The vicious cycle of malnutrition perpetuates from generation to generation with increased prevalence of diseases, overburden on health systems and substantial social and economic losses for the country. Nutrition during all stages of life but particularly during adolescence period is crucial and cost effective as the amount spent on foods is negligible to costs incurred on treatments and sufferings caused by diseases, disabilities, loss of work and premature deaths in later life.

93. Line: 13..15. not found in ref 31, similar info given on page 32- Line: 13..14.
94. Line: 22 23. paper does not say exactly the same, it means adolescent remain underweight due to obstetric complications whereas the paper says that malnutrition may be a cause of obstetric complications.. URL of Ref.: https: //en.oxforddictionaries.com/definition/attribute

Food and portion sizes for adolescents (10-19 years)

Food Group	No. of Servings /day	Portion size and description
Milk and milk products	3-4	1 serving=1cup of milk or 1 cup of yogurt or 1 slice of cheese or 1 cup of kheer or feerni or other milk-based products equivalent to nutrients supplied by 1 cup of milk. 1 cup of whole milk will provide 15 g carbohydrates, 6 g protein, 8 g fat and 150 calories.
Cereals	5-6	1 serving= 2 slice of bread (toast) or 1 chapatti or 1 cup of cooked rice or 1 cup of cereals equivalent to nutrients supplied by 2 slice of bread. One serving of cereal bread=(2 toast x 28 g=56 g) shall provide 30 g carbohydrates, 6 g protein, 0-2 g fat and 160 Kcal.
Vegetables	2-3	1 serving= ½ cup of cooked non-starchy vegetables or ½ cup of vegetables juice/soup or 1 cup of fresh vegetables/salad. One serving of vegetables will provide 5 g carbohydrates, 2 g protein and 25 calories. One serving of starchy vegetables (1 potato (100 g) or maize (1/2 cup) or peas green ½cup) will provide 15 g carbohydrates, 3 g protein, 0-1 g fat and 80 calories.
Fruits	2-3	1 serving=1 medium size banana or 1 apple or 1 peach or 2-3 plums or 3-4 apricots. Each serving will provide 20 g carbohydrates and 80 calories.
Meat and pulses	2-3	1 serving of meat (28 g lean meat=2-3 small pieces of meat or 1-2 pieces of fish or 1 egg, or ½ cup of cooked pulses). One serving of lean meat will provide 7 g protein, 3 g fat and 55 calories. One serving of meat with medium fat will provide 7 g protein, 5 g fat and 75 calories. One serving of meat with high fat will provide 7 g protein, 8 g fat and 100 calories.

Salt, Sugar and Oil

- Use minimum amount of salt, sugars and oils in cooking, use less than 5 g salt/day, less than 10% calories from free sugars and less than 10% of total fat calories from saturated fat.
- Avoid junk, refined foods, sweets, soft drinks, french fries, samosa and other deep fried foods.
- Use clean water for washing vegetables and fruits and protect foods from flies, pathogens, dirt, cover and refrigerate them at 5 °C or below for a day only.

Adult (19-60 years)

Adulthood is a period where growth and development to a large extent cease, however, skeletal development and deposition of calcium, phosphorus and magnesium in bones continues till the age of 30-35 years. Beyond this age, bone resorption predominates over bone formation and the time taken to deplete skeletal mineral deposits is proportional to the amount of mineral deposits, the higher are the mineral deposits during skeletal growth and development, the greater would be the time required to erode mineral deposits from bones.

95. Line: 1. According to these guidelines even at the maximum intake only 2240 calories could be provided while energy requirement could be much higher for a adolescents - given later in this document as >2800 for 10-17 y old boy.
96. Line: 9 to 14. "salt sugar and oil" exactly same as for all so may have been given at one place.

Good and adequate nutrition in combination with regular aerobic exercise and physical activities are essential throughout adulthood period to maintain optimum nutritional status, prevent nutritional deficiencies, overweight and obesity which are the leading causes of non-communicable diseases including diabetes, hypertension, cardiovascular diseases and cancers. In recent years, prevalence of overweight and obesity in adults has been increasing in an unprecedented manner resulting in increased morbidity and mortality. Dietary modifications including reduction of sugars, salt, saturated fats, trans-fatty acids, increased physical activity and healthy lifestyles are cost effective interventions essential to reduce and control adulthood morbidities and mortalities.

Food and portion sizes for adults (19-60 years)

Food Group	No. of Servings /day	Portion size and description
Milk and milk products	2-3	1 serving=1cup of milk or 1 cup of yogurt or 1 slice of cheese or 1 cup of kheer or feerni or other milk-based products equivalent to nutrients supplied by 1 cup of milk). 1 cup of whole milk will provide 15 g carbohydrates, 6 g protein, 8 g fat and 150 calories.
Cereals	4-5	1 serving= 2 slice of bread (toast) or 1 chapatti or 1 cup of cooked rice or 1 cup of cereals equivalent to nutrients supplied by 2 slice of bread. One serving of cereal bread=(2 toast x 28 g=56 g) or equivalent amount of other cereals shall provide 30 g carbohydrates, 6 g protein, 0-2 g fat and 160 Kcal.
Vegetables	2-3	1 serving= ½ cup of cooked non-starchy vegetables or ½ cup of vegetables juice/soup or 1 cup of fresh vegetables/salad). One serving of vegetables will provide 5 g carbohydrates, 2 g protein and 25 calories. One serving of starchy vegetables (1 potato (100 g) or maize (1/2 cup) or peas green ½cup) will provide 15 g carbohydrates, 3 g protein, 0-1 g fat and 80 calories.
Fruits	2-3	1 serving=1 medium size banana or 1 apple or 1 peach or 2-3 plums or 3-4 apricots. Each serving will provide 20 g carbohydrates and 80 calories.
Meat and pulses	2-3	1 serving of meat (28 g lean meat=2-3 small pieces of meat or 1-2 pieces of fish or 1 egg, or ½ cup of cooked pulses). One serving of lean meat will provide 7 g protein, 3 g fat and 55 calories. One serving of meat with medium fat will provide 7 g protein, 5 g fat and 75 calories. One serving of meat with high fat will provide 7 g protein, 8 g fat and 100 calories.

Salt, Sugar and Oil

- Use minimum amount of salt, sugars and oils in cooking, use less than 5 g salt/day, less than 10% calories from free sugars and less than 10% of total fat calories from saturated fat.
- Avoid junk, refined foods, sweets, soft drinks, french fries, samosa and other deep fried foods.
- Use clean water for washing vegetables and fruits and protect foods from flies, pathogens, dirt, cover and refrigerate them at 5°C or below for a day only.

97. Line: 9. According to these guidelines even at the maximum intake only 2010 calories could be provided while energy requirements could be much higher for younger adults.

Elderly (>60 years)

Older people have special dietary and health care needs to meet the body nutrients requirements, boost their immune systems and maintain optimum level of physical activity to prevent the advancement of diseases and complications that may increase the risk of falling, bone fractures and immobility. Diet adequate both in quality and quantity is vital for nutrition wellbeing and prevent the incidence and severity of diseases.

Elderly need to enhance dietary and health care to ward off non-communicable and degenerative diseases owing to age and compromised nutrition and health status. Impaired taste acuity, gastrointestinal, enzymatic, hormonal and metabolic functions in older persons make them more vulnerable to malnutrition and diseases. Qualitative and quantitative dietary modification is essential to provide adequate amount of dietary fibre, proteins, vitamins, minerals, water and fluid to prevent constipation and other age related diseases.

Food and portion sizes for elderly (>60 years)

Food Group	No. of Servings /day	Portion size and description
Milk and milk products	2-3	1 serving=1cup of milk or 1 cup of yogurt or 1 slice of cheese or 1 cup of kheer or feerni or other milk-based products equivalent to nutrients supplied by 1 cup of milk. 1 cup of whole milk will provide 15 g carbohydrates, 6 g protein, 8 g fat and 150 calories.
Cereals	4-5	1 serving= 2 slice of bread (toast) or 1 chapatti or 1 cup of cooked rice or 1 cup of cereals equivalent to nutrients supplied by 2 slice of bread. One serving of cereal bread =(2 toast x 28 g=56 g) shall provide 30 g carbohydrates, 6 g protein, 0-2 g fat and 160 Kcal.
Vegetables	2-3	1 serving= ½ cup of cooked non-starchy vegetables or ½ cup of vegetables juice/soup or 1 cup of fresh vegetables/salad). One serving of vegetables will provide 5 g carbohydrates, 2 g protein and 25 calories. One serving of starchy vegetables (1 potato (100 g) or maize (1/2 cup) or peas green ½cup) will provide 15 g carbohydrates, 3 g protein, 0-1 g fat and 80 calories.
Fruits	2-3	1 serving=1 medium size banana or 1 apple or 1 peach or 2-3 plums or 3-4 apricots. Each serving will provide 20 g carbohydrates and 80 calories.
Meat and pulses	2-3	1 serving of meat (28 g lean meat=2-3 small pieces of meat or 1-2 pieces of fish or 1 egg, or ½ cup of cooked pulses). One serving of lean meat will provide 7 g protein, 3 g fat and 55 calories. One serving of meat with medium fat will provide 7 g protein, 5 g fat and 75 calories. One serving of meat with high fat will provide 7 g protein, 8g fat and 100 calories.

Salt, Sugar and Oil

- Use minimum amount of salt, sugars and oils in cooking, use less than 5 g salt/day, less than

98. Line: 14. can't find any difference as compared to adult up to 60 years?? .

10% calories from free sugars and less than 10% of total fat calories from saturated fat.

- Avoid junk, refined foods, sweets, soft drinks, french fries, samosa and other deep fried foods.
- Use clean water for washing vegetables and fruits and protect foods from flies, pathogens, dirt, cover and refrigerate them at 5 °C or below for a day only.

Pregnant women

Good nutrition during pregnancy is not only essential for maintaining maternal nutritional and health status but also for growth and development of fetus. Adequate and better quality diet during pregnancy is vital for meeting the physiological requirements of expanding maternal tissues and blood volume as well as growth and development of fetus to avoid unfavorable pregnancy outcomes.

Poor nutritional status during pregnancy leads to poor intrauterine growth and development with increased risk of small for gestational age babies, low birth weight babies with impaired physiological functions, increased morbidity and neonatal mortality.

Improving maternal nutrition through improved dietary diversification and nutritional supplements appears to be one of the most profitable investments in paying long term dividends by reducing health problems, medical costs and increasing productivity and economic outputs. Nutritional requirements of pregnant women depend on the pre-pregnancy nutritional status, the poor the nutritional status prior to conception the higher are the recommended nutrients intakes and weight gain during pregnancy. Pre-pregnancy weight and weight gain during pregnancy has been associated with birth weight of the baby. Both low and high weight gains result in adverse pregnancy outcomes[94]. Since first trimester is limited mostly to embryonic and cell differentiation with nominal weight gain (1-2 kg), additional calories intake is recommended from second trimester onwards to avoid undesirable maternal weight gain and pregnancy complications. Twelve to sixteen kilograms weight gain is recommended for women with normal body mass index at conception and higher weight gain for women with lower body mass index and lower weight gain for overweight and obese women is recommended. Due to increased growth and development, additional 300 kilocalories, 10 g protein, 15 mg iron, 220 µgfolate, 400 mg calcium, 400 mg phosphorus per day is recommended for pregnant women[101].

99. Line: 22. on page 33, 12-14 kg weight gain is recommended for underweight???.

Food and portion sizes for pregnant women

Food Group	No. of Servings /day	Portion size and description
Milk and milk products	2-3	1 serving=1cup of milk or 1 cup of yogurt or 1 slice of cheese or 1 cup of kheer or feerni or other milk-based products equivalent to nutrients supplied by 1 cup of milk). 1 cup of whole milk will provide 15 g carbohydrates, 6 g protein, 8 g fat and 150 calories.
Cereals	5-6	1 serving= 2 slice of bread (toast) or 1 chapatti or 1 cup of cooked rice or 1 cup of cereals equivalent to nutrients supplied by 2 slice of bread). One serving of cereal bread=(2 toast x 28 g=56 g) shall provide 30 g carbohydrates, 6 g protein, 0-2 g fat and 160 Kcal.
Vegetables	2-3	1 serving= ½ cup of cooked non-starchy vegetables or ½ cup of vegetables juice/soup or 1 cup of fresh vegetables/salad). One serving of vegetables will provide 5 g carbohydrates, 2 g protein and 25 calories. One serving of starchy vegetables (1 potato (100 g) or maize (1/2 cup) or peas green ½cup) will provide 15 g carbohydrates, 3 g protein, 0-1 g fat and 80 calories.
Fruits	2-3	1 serving=1 medium size banana or 1 apple or 1 peach or 2-3 plums or 3-4 apricots. Each serving will provide 20 g carbohydrates and 80 calories.
Meat and pulses	2-3	1 serving of meat (28 g lean meat=2-3 small pieces of meat or 1-2 pieces of fish or 1 egg, or ½ cup of cooked pulses). One serving of lean meat will provide 7 g protein, 3 g fat and 55 calories. One serving of meat with medium fat will provide 7 g protein, 5 g fat and 75 calories. One serving of meat with high fat will provide 7 g protein, 8 g fat and 100 calories.

Salt, Sugar and Oil

- Use minimum amount of salt, sugars and oils in cooking, use less than 5 g salt/day, less than 10% calories from free sugars and less than 10% of total fat calories from saturated fat.
- Avoid junk, refined foods, sweets, soft drinks, french fries, samosa and other deep fried foods.
- Use clean water for washing vegetables and fruits and protect foods from flies, pathogens, dirt, cover and refrigerate them at 5 °C or below for a day only.

Lactating women

Lactation is a period where nutritional requirements of women are increased due to breast feeding of the new born baby. It has been estimated that mothers during the first six months secrete 750 ml milk/day, which drops to 600 ml milk/day in the second six months of the postnatal period providing about 525 kcal/day and 420kcal/day,respectively[48]. To compensate the energy and micronutrients transferred from the mother to infant through breast feeding and also to enhance the quality of milk and supply, additional 500 kcal, 12-15 g protein, along with optimal amount of micronutrients (vitamin A, vitamin C, vitamin B1, vitamin B2, niacin, vitamin B6, vitamin B12, calcium, vitamin D, phosphorus, zinc, iodine and

100 Line: 1. Pregnant According to these guidelines even at the maximum intake only 2190 calories could be provided while energy requirements could be much higher for younger/active pregnant women. No concern shown for maternal depletion. URL of Ref.: https: //extranet.who.int/rhl/topics/preconception-pregnancy-childbirth-and-postpartum-care/medical-problems-during-pregnancy/who-recommendation-against-salt-restriction-prevention-pre-eclampsia

selenium) per day are recommended[48]. The lactating women need special attention also to rest well in addition consuming healthy diet, which can help in maintaining good supply of milk as well.

Food and portion sizes for lactating women

Food Group	No. of Servings /day	Portion size and description
Milk and milk products	3-4	1 serving=1cup of milk or 1 cup of yogurt or 1 slice of cheese or 1 cup of kheer or feerni or other milk-based products equivalent to nutrients supplied by 1 cup of milk). 1 cup of whole milk will provide 15 g carbohydrates, 6 g protein, 8 g fat and 150 calories.
Cereals	6-7	1 serving= 2 slice of bread (toast) or 1 chapatti or 1 cup of cooked rice or 1 cup of cereals equivalent to nutrients supplied by 2 slice of bread. One serving of cereal bread =(2 toast x 28 g=56 g) shall provide 30 g carbohydrates, 6 g protein, 0-2 g fat and 160 Kcal.
Vegetables	2-3	1 serving= ½ cup of cooked non-starchy vegetables or ½ cup of vegetables juice/soup or 1 cup of fresh vegetables/salad). One serving of vegetables will provide 5 g carbohydrates, 2 g protein, 0 g fat and 25 calories. One serving of starchy vegetables (1 potato (100 g) or maize (1/2 cup) or peas green ½cup) will provide 15 g carbohydrates, 3 g protein, 0-1 g fat and 80 calories.
Fruits	2-3	1 serving=1 medium size banana or 1 apple or 1 peach or 2-3 plums or 3-4 apricots. Each serving will provide 20 g carbohydrates and 80 calories.
Meat and pulses	2-3	1 serving of meat (28 g lean meat=2-3 small pieces of meat or 1-2 pieces of fish or 1 egg, or ½ cup of cooked pulses). One serving of lean meat will provide 7 g protein, 3 g fat and 55 calories. One serving of meat with medium fat will provide 7 g protein, 5 g fat and 75 calories. One serving of meat with high fat will provide 7 g protein, 8 g fat and 100 calories.

Salt, Sugar and Oil

- Use minimum amount of salt, sugars and oils in cooking use less than 5 g salt/day, less than 10% calories from free sugars and less than 10% of total fat calories from saturated fat.
- Avoid junk, refined foods, sweets, soft drinks, french fries, samosa and other deep fried foods.
- Use clean water for washing vegetables and fruits and protect foods from flies, pathogens, dirt, cover and refrigerate them at 5 °C or below for a day only.

An inclusive table indicating number of servings of five food groups for different age and physiological groups is attached as Annexure VII.

101. Line: 3. Lactating According to these guidelines even at the maximum intake only 2520 calories could be provided while energy requirements could be much higher for younger/active lactating women.
102. Line: 4 to 15. same general issues as in other food portion suggestions.
103. Line: 17. That table could be given here and all others removed. It is just repetition..

SAMPLE MENUS BY AGE AND PHYSIOLOGICAL STATUS

Sample menu for children (3-10 years)

Time	Food	Portion Size	Calories (Kcal)	Protein (g)
Breakfast	Chapatti/paratha/toast/cereals*	1-2 toast or ½-1 chapatti or ¼-½ paratha or ½-1 cup cereals	80-160	3-6
	Egg fried‡	1 medium	90	6
	Milk†	½ cup	75	3
Snack	Banana or any other seasonal fruit ¶	One medium	80	-------
	Shami kabab‡	1	90	6
Lunch	Dal§	½-1 plate	70-140	4-8
	Roti*	½-1 chapatti	80-160	3-6
	Yogurt†	½ cup	75	3
	Salad§	½-1 bowl	13-25	---------
Snack	Apple or any other seasonal fruit	1	80	---------
	Peanuts**	1 serving	160	7
Dinner	Chicken curry‡	1 plate	200	6
	Roti	½- 1 chapatti	80-160	3-6
	Salad§	½-1 bowl	13-25	-----
	Apple or any other seasonal fruit¶	1	80	-----
	Milk/Kheer†	½ cup	75	3
		Total	1341-1675 Kcal	47-60 g

*Chapatti or paratha or toast or fortified cereals providing a similar amount of calories and proteins;

‡ Egg fried or meat, chicken, fish or lentil or chickpea or red beans or shami kabab or any other meat based protein and pulses providing a similar amount of calories and proteins;

¶Banana or apple or any other seasonal fruit providing a similar amount of calories;

§Chicken curry or dal or meat curry or beans providing a similar amount of calories and proteins;

† ½ cup kheer or ½ cup milk or ½ cup yogurt or ½ ice cream or ½ slice cheese or any other milk-based product providing a similar amount of calories and proteins;

** Peanuts or any other nuts providing a similar amount of calories and proteins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Note: 1 Cup =250 ml; 1 plate pulao or dal or vegetables (100 g cooked food); 1 bowl fresh salad= (100 g);

1 serving peanuts=1 ounce peanuts

105. Line: 7. 1/2 cup kheer has approx.. 150 kcal.
106. Line: 9. How do we expect general public to estimate this.
107. Line: 8 to 21. repetition.
108. Line: 22. 1 plate pulao is not 100 g.

Sample menu for adolescents (10-19 years)

Time	Food	Portion Size	Calories (Kcal)	Protein (g)
Breakfast	Milk†	1 cup	150	6
	Egg fried‡	1 medium	90	6
	Roti/toast/cereals*	½-1 chapatti	80-160	8
Snack	Apple or any other seasonal fruit¶	1 medium	80	----------
	Potato cutlet§	1-2	49-98	1-2
Lunch	Lentil‡	½ plate	70	4
	Roti	1-2 chapatti	160-320	6-12
	Yogurt†	½ cup	75	3
	Salad§	½-1 bowl	13-25	-----
Snack	Banana¶ or any other seasonal fruit	1 medium	80	----
	Peanuts**	1 serving	160	7
Dinner	Aloo ghost‡	1 plate	174	6-8
	Roti	1-2 chapatti	160-320	6-12
	Salad§	½-1 bowl	13-25	-----
	Raita†	½-1 cup	75-150	3-6
	Guava or any other seasonal fruit¶	1 medium	80	----------
Snack	Carrot halwa†	1 cup	250	6
		Total	1758-2307 Kcal	57-78 g

† 1 cup milk or 1 cup kheer or 1 cup yogurt or 1 cup ice cream or 1 slice cheese or any other milk-based product providing a similar amount of calories and proteins;

‡ Egg fried or meat, chicken, fish or lentil or chickpea or red beans or shami kabab or any other meat based curry providing a similar amount of calories and proteins;

*1-2 toast or ½-1 chapatti or ½-1 cup cereals or ¼-½ paratha or any other cereal providing a similar amount of calories and proteins;

¶ Banana or any other seasonal fruit providing a similar amount of calories; §Potato cutlet or starchy vegetables providing a similar amount of calories and proteins;

‡Aloo ghost or chicken curry or any other curry or pulses providing a similar amount of calories and proteins;

†Carrot-halwa or pumpkin halwa or any other milk-based dessert providing a similar amount of calories and proteins;

** Peanuts or any other nuts providing a similar amount of calories and proteins

Note: 1 Cup =250 ml; 1 plate pulao or dal or vegetables (100 g cooked food); 1 bowl fresh salad= (100 g);

1 serving peanuts=1 ounce peanuts

109. Line: 7. one cup it too much to be eaten at night.
110. Line: 8 to 21. Repetition.

Sample menu for adults (19-60 years)

Time	Food	Portion Size	Calories (Kcal)	Protein (g)
Breakfast	Roti/toast/cereals*	1-2 chapatti	160-320	6-12
	Egg fried‡	1 medium	90	6
	Apple or any other seasonal fruit¶	1 medium	80	----------
	Milk†	1 cup	150	6
Snack	Shami sandwich‡‡	1	180	8
Lunch	Spinach and potato curry§	1 plate	109	3
	Roti	2 chapatti	320	6-12
	Yogurt†	½ cup	75	3
	Salad§	1 bowl	25	---------
Snack	Banana or any other seasonal fruit	1 medium	80	---------
Dinner	Pulao**	1 plate	250	8
	Fish ‡	1-2	127-254	10-20
	Salad§	½-1 bowl	13-25	--------
	Raita†	½-1 cup	75-150	3-6
	Apple ¶	1 medium	80	--------
Snack	Peanuts***	1 serving	160	7
	Kheer†	1 cup	150	6
		Total	2124-2498 Kcal	72-97 g

*1 roti or 2 toast or ½ paratha or 1 cup fortified cereals providing a similar amount of calories and proteins;

‡ Egg fried or meat, chicken, fish or lentil or chickpea or red beans or shami kabab;

† 1 cup milk or 1 cup kheer or 1 cup yogurt or 1 cup ice cream or 1 slice cheese or any other milk-based product providing a similar amount of calories and proteins;

¶ Banana or apple or any other seasonal fruit providing a similar amount of calories;

‡‡ Shami sandwich or egg sandwich, or chicken sandwich or any other meat or pulses based food providing the similar amount of calories and proteins;

§Spinach and potato curry or any other vegetable curry providing a similar amount of calories and proteins


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** Pulao or dal-roti or vegetable roti providing a similar amount of calories and proteins;

*** Peanuts or any other nuts providing a similar amount of calories and proteins

Note: 1 Cup = 250 ml; 1 plate pulao or dal or vegetables (100 g cooked food); 1 bowl fresh salad= (100 g);

1 serving peanuts = 1 ounce peanuts

111. Line: 3. two slices have 160 Kcal so how come one sandwich has 20 Kcal.
112. Line: 4. one plate spinach and potato curry would have much more Kcal..
113. Line: 6. earlier (pg 37 line 15) it is mentioned that 2 pc soft fish have 55 to 100 Kcal.

Sample menu for elderly (> 60)

Time	Food	Portion size	Calories (Kcal)	Protein (g)
Breakfast	Cereals/chapatti/toast*	1 cup/1 chapatti/2 toast	160	6
	Milk†	1 cup	150	6
	Egg fried‡	1 medium	90	6
	Banana or any seasonal fruit or juice¶	1 medium/1 cup	80	-------
Snack	Egg sandwich/ chicken sandwich/ or shami sandwich‡†	1	180	8
Lunch	Spinach curry§	1 plate	109	3
	Roti	2 chapatti	320	12
	Salad±	1 bowl	25	---------
	Yogurt†	1 cup	150	6
Snack	Shami kabab#	1	90	6
	Banana or any other seasonal fruit¶	1 medium/1 cup	80	----------
Dinner	Vegetable rice***	1 plate	187	4
	Dal**	1 plate	140	8
	Salad±	1 /2 bowl	13	----
	Raita/yogurt†	1 cup	150	6
	Milk/Kheer/dessert†	1 cup	150	6
		Total	2074 Kcal	77 g

*1 cup fortified cereals or 1 roti or 2 toast or ½ paratha providing a similar amount of calories and proteins;

†1 cup milk or 1 cup yogurt or 1 cup kheer or 1 ice cream or any other milk-based product providing a similar amount of calories and proteins;

‡ Egg fried or matar keema or meat, chicken, fish or lentil or chickpea or red beans or any other pulses providing a similar amount of calories and proteins;

¶ Banana or any other seasonal fruit providing a similar amount of calories;

‡‡Egg sandwich or chicken sandwich or shami sandwich or boiled chickpea or red beans or slice of pizza providing a similar amount of calories and proteins;

§Spinach curry or any other vegetable providing a similar amount of calories and protein;

Shami kabab or red beans or boiled gram or meat based snack providing a similar amount of calories and proteins;

** Dal or meat curry providing a similar amount of calories and protein;

± Salad or any other leafy vegetables providing a similar amount of calories;

*** Vegetable rice or bread with salad providing a similar amount of calories and protein;

Note: 1 Cup =250 ml; 1 plate pulao or dal or vegetables (100 g cooked food); 1 bowl fresh salad= (100 g)

114. Line: 4. Regular shami kabab has much more calories (avg. 150), if it is specially prepared it needs to be mentioned.
115. Line: 7. Regular kheer and most desserts have much more calories, if it is specially prepared it needs to be mentioned.

Sample menu for pregnant women

Time	Food	Portion Size	Calories (Kcal)	Protein (g)
Breakfast	Roti/toast/cereals*	1 chapatti	160	6
	Egg fried‡	1 medium	90	6
	Milk¶	1 cup	150	6
Snack	Beans or gram boiled†‡	1 cup	220	10
	Guava¶	1 medium	80	------
Lunch	Meat ball or kofta curry‡‡‡	1 plate	268	8
	Roti*	2 chapatti	320	12
	Yogurt†	½ cup	75	3
	Salad§	1 bowl	25	----------
Snack	Shami sandwich‡‡	1-2	180-360	8-16
Dinner	Vegetable rice**	1 plate	187	4
	Dal chana‡	1 plate	140	8
	Salad§	1 bowl	25	----------
	Apple ¶	1 medium	80	----------
Snack	Peanuts***	1 serving	160	7
	Carrot halwa****	1 cup	250	6
	Milk†	1 cup	150	6
		Total	2560-2740 Kcal	90-98 g

*1 roti or 2 toast or ½ paratha or 1 cup fortified cereals providing a similar amount of calories and proteins;

‡ Egg fried or matar keema or meat, chicken, fish or lentil or chickpea or red beans or any other pulses providing a similar amount of calories and proteins;

† 1 cup milk or 1 cup yogurt or 1 cup kheer or 1 ice cream or any other milk-based product providing a similar amount of calories and proteins;

¶Any seasonal fruit providing a similar amount of calories;

‡‡ Chicken sandwich or shami sandwich or egg sandwich or boiled chickpea or red beans or slice of pizza or peanut butter sandwich providing a similar amount of calories and proteins;

‡‡‡ Meat or kofta curry or pulses providing a similar amount of calories and protein;

** Vegetable rice or bread with salad providing a similar amount of calories and protein;

§Mix vegetable curry or salad or any other vegetable providing a similar amount of calories and protein;

*** Peanuts or any other nuts providing a similar amount of calories and proteins

**** Carrot-halwa or pumpkin halwa or any other milk-based dessert providing a similar amount of calories and proteins

Note: 1 Cup =250 ml; 1 plate pulao or dal or vegetables (100 g cooked food); 1 bowl fresh salad= (100 g);

1 serving peanuts=1 ounce peanuts

116. Line: 5. For most people one sandwich means two slices of bread with one shami kabab that makes about 300 calories for one sandwich..
117. Line: 6. Regular one plate of pulao has much more calories, if it is specially prepared it needs to be mentioned.

Sample menu for lactating women

Time	Food	Portion Size	Calories (Kcal)	Protein (g)
Breakfast	Roti/toast/cereals*	1 chapatti	160	6
	Egg fried‡	1 medium	90	6
	Milk†	1 cup	150	6
Snack	Chicken sandwich‡‡	1	180	8
	Apple or any other seasonal fruit ¶	1 medium	80	----------
Lunch	Aloo qeema‡	1 plate	222	11
	Roti *	2 chapatti	320	12
	Yogurt†	1 cup	150	6
	Salad§	1 bowl	25	----------
Snack	Shami kabab#	1-2	90-180	6-12
Dinner	Vegetable rice**	1 plate	187	4
	Dal masoor	1 plate	140	8
	Salad §	1 bowl	25	----------
	Raita	1 cup	150	6
	Banana¶	1 medium	80	----------
Snack	Peanuts §§	1 serving	160	7
	Carrot halwa***	1 cup	250	6
	Milk†	1 cup	150	6
		Total	2609-2699 Kcal	98-104 g

*1 roti or 2 toast or ½ paratha or 1 cup fortified cereals providing a similar amount of calories and proteins; ‡ Egg fried or meat, chicken, fish or lentil or chickpea or red beans or any other pulses providing a similar amount of calories and proteins;

† 1 cup milk or 1 cup yogurt or 1 cup kheer or 1 ice cream or any other milk-based product providing a similar amount of calories and proteins;

¶Apple or banana or any other seasonal fruit providing a similar amount of calories;

‡‡ Chicken sandwich or shami sandwich or egg sandwich or boiled chickpea or red beans or slice of pizza or peanut butter sandwich providing a similar amount of calories and proteins;

Shami kabab or red beans or boiled gram or meat based snack providing a similar amount of calories and proteins;

‡ Aloo qeema or mater qeema or beef curry or any other meat-based curry or beans or any other pulses providing a similar amount of calories and proteins;

**Vegetable rice or bread with salad providing a similar amount of calories and protein;

*** Carrot-halwa or pumpkin halwa or any other milk-based dessert providing a similar amount of calories and proteins;

§Salad or mix vegetable or any other vegetable providing a similar amount of calories;

§§Peanuts or any other nuts providing a similar amount of calories and proteins; 8-10 glasses of water/liquid should be ensured for successful lactation

Note: 1 Cup = 250 ml; 1 plate pulao or dal or vegetables (100 g cooked food); 1 bowl fresh salad= (100 g);
1 serving peanuts=1 ounce peanuts

118. Line: 6. one cup raita has less calories than one cup milk.

Cost of healthy diets

The estimated cost based on the retail market price of food items of sample menus given above varies from Pak. Rupees (Rs.) 100-150 ($1-1.50) for the whole menu per day. It is a fact that quality nutrient dense foods and diets will cost more than the monotonous unhealthy diets. However, consuming nutrient balanced diets including the recommended servings of milk and milk products, meat and pulses, cereals, vegetables and fruits, result in long-term benefits to consumers in terms of higher earnings and savings, improved health, improved physical productivity, reduced incidence of diseases and decreased medical costs.

Individuals with low income need to prioritize their household budgets to allocate a decent amount of money for food and re-appropriate expenditure towards purchase of healthy nutrient rich diets. The government may strengthen its social safety net programmes by providing food support in the form of food vouchers/coupons through an appropriate food distribution system, agriculture inputs support to the small-holders men and women farmers and link the farmers with markets and food distribution system.

Food may also be provided at subsidized rates to individuals living below the poverty line. Dietary guidelines can be used as an effective tool to promote nutrition literacy among individuals. Nutrition education and awareness plays a significant role in enabling individuals in general, and women in particular to make healthy, wise and appropriate food choices for themselves and their families.

119. Line: 3. The cost at minimal rates is about Rs 180-200 i.e 1000 per day or Rs 30000 per month for a family of 5 adults. After adding housing, clothes, medical, education and other costs, this document should also suggest minimum salary to meet the nutrition needs. .

DIETARY MESSAGES

Dietary messages have been developed in the light of scientific knowledge and epidemiological evidence to address nutritional and public health problems and to reduce and control the incidence of diseases and premature deaths. Efforts are made to make the dietary messages simple, easy, specific, comprehendible, meaningful, sensitive and culturally appropriate.

Maintain normal body weight by consuming all food groups and performing regular physical activity

Maintaining a normal (healthy) bodyweight through healthy dietary practices and regular exercise is vital for longevity and wellbeing, as both underweight and overweight are associated with increased prevalence of morbidity and mortality. Dietary diversification with regular exercise can minimize the adverse effects of obesity and overweight on health. Individuals who maintain normal body weight and are physically active have the lowest incidence of chronic disease and mortality.

Half of your daily cereals intake should include wholegrains

Whole grain cereals and pulses are good sources of providing energy, dietary fibre, proteins, carbohydrates, vitamins, minerals and antioxidants to the human body. They have been associated with reducing the risk of developing hypertension, metabolic syndrome, coronary heart disease, diabetes, cancers and other diseases.

Consumption of refined wheat and wheat products (pasta, noodles, white bread and other bakery products), rice and other cereals with low or negligible levels of dietary fibre have been linked to increased risk of digestive problems and colorectal cancers. About 45-65% of total calories shall come from carbohydrate containing foods[92].

Eat five servings of fresh vegetables and fruits a day

Leafy green, deep yellow and red vegetables and fruits are rich sources of vitamin A, C, folic acid, iron, dietary fibre, potassium and antioxidants. They are free of fat and cholesterol, low in calories and contain many other beneficial compounds that prevent from overweight, obesity and incidence of chronic diseases and cancers. Five servings of vegetables and fruits per day are recommended for optimum health.

Take two to three servings of milk and milk products in a day

Milk and milk products are rich sources of calcium, phosphorous, magnesium, vitamin D, lactose, protein and fat, which are essential for skeletal growth and development. Adequate consumption of dairy products has been associated with strong bones and increased cognitive and physical outputs. For individuals who are overweight and obese or having cardiovascular diseases, skim milk is a preferred choice. Inadequate consumption of dairy products and lack of exposure to sunlight leads to rickets, osteomalacia and osteoporosis later in life. Two to three servings of milk and milk products per day are recommended to meet calcium and other essential nutrient requirements of the body.

121. Line: 14. pulses are not cereals so should not be included here, in description of the message.
122. Line: 29. Is it for adults? Not needed and not affordable.
123. Line: 20 21. this statement about CHOs is not relevant here.
124. Line: 20 to 21. Not clear, It includes all foods of plant kingdom plus milk and several of its products.
125. Line: 26 27. focusing only on NCDs and problems of adults gives an impression that fruit and veg are not important for other age groups.
126. Line: 6 to 12. No chart or table is provided for the public that can help the public in knowing whether their weight is normal or not. No guidance is provided for dietary management of under or overweight or from where to get help if needed. It needs to be clarified that bodyweight is a strong predictor of health but is not an exclusive assurance of health. .

Consume meat and meat products, fish and eggs in moderation

Meat and meat products, fish and eggs are rich in proteins, iron, zinc, vitamin A, vitamin B12 and integral component of hormones, enzymes and body immune system. Meat without fat (lean meat) is recommended over fatty meat (non-lean meat). Fish is recommended at least once in a week to supply protein and essential fatty acids to the body for growth and brain development. Excess amount of beef, sheep and goat meats shall be avoided to prevent high intake of saturated fat and cholesterol. Consumption of non-lean meat has been associated with increased cardiovascular diseases, breast and prostate cancers. Two to three servings of meat and meat products, chicken, fish and eggs per day are recommended to fulfill protein and other essential nutrient requirements of the body.

Encourage consumption of pulses to attain healthy growth

Pulses are rich in protein, dietary fibre, vitamins, minerals and essential amino acids particularly lysine, which complement the nutrients profile of wheat, rice and other cereals when consumed together. The protein content of pulses are almost equivalent to meat protein and therefore, could be used as a substitute where there is a shortage of meat or expensive to afford. They could be used as a preventive and therapeutic diets, as they tend to lower the risk of chronic non-communicable diseases i.e., hyperlipidemia, heart diseases, hypertension, diabetes and cancers.

Consume fortified flour, grains and their products

Fortified wheat flour and cereals are good sources of energy, proteins, vitamins and minerals. Use of fortified foods should be preferred over non-fortified foods to complement nutrients intake and combat macro and micronutrients deficiencies, improve health status and reduce risk of diseases. Micronutrient fortification has led to significant improvements in micronutrient status of women and children and reduction in prevalence of goiter, neural tube defects and other associated defects.

Limit consumption of edible oil and fat in cooking

Non-communicable diseases including diabetes, hypertension, cardiovascular diseases and cancers are reaching an epidemic proportion in Pakistan. These are responsible for the increasing burden on the health care system, human sufferings and premature deaths adversely affecting productivity and socio-economic development of the country. Consumption of saturated fat and trans-fatty acids increases low density lipoproteins (LDL) and cholesterol (bad fat) that increase the risk of hypertension and cardiovascular diseases. Evidence suggests that replacement of saturated fat and trans-fatty acids, with unsaturated cooking oil reduces bad fat (LDL & cholesterol) and increases good fat (high density lipoprotein) that decreases the risk of CVDs.

Reduce sugar intake, and limit intake of soft drinks, confectionaries, bakery products and commercial fruit drinks

Sugar sweetened drinks and foods with high sugar should be limited. Soft drinks, confectionaries, bakery products and commercial fruit drinks are energy dense foods and mostly provide empty calories increasing

127. Line: 6. It is reported earlier that meat consumption is low in Pak so why the impression is given here that it needs to be decreased.
128. Line: 17. Fortified flour is not easily available e.g. 0% flour is being fortified in Baluchistan & KPK and 6% in Sindh. URL of Ref.: https://www.ffp-pakistan.org/
129. Line: 23. "consumption or addition?" why limit fats in cooking only? Is it ok to add after cooking?.
130. Line: 23. Need for enough fats to provide EFA should be mentioned here. .
131. Line: 24 to 32. already repeated many times in the doc.

the risk of overweight and obesity. These foods also contain large amount of sugar. Consumption of soft drinks and commercial sweet carbonated beverages has been strongly associated with increased weight gain, diabetes and pancreatic cancer. Consumption of complex carbohydrates is preferred over simple sugars. Reduction in sugar intake, soft drinks, confectionaries, bakery products, sweets and commercial sweetened fruit drinks is recommended.

Limit salt in cooking and always use iodized salt

In Pakistan, salt is more frequently used in diets, pickles and processed foods, and a potential risk factor for hypertension and other cardiovascular diseases. A positive association has been found between salt intake, hypertension, strokes and premature deaths. Salty foods are high in sodium. Sodium is one of the main dietary contributors to hypertension (high blood pressure). Even a small (1 g per person per day) reduction in salt intake will reduce deaths from strokes and heart attacks by more than 7% in each country. Avoid sprinkling of salt on fruits (oranges, lemons, grape fruits, guava, peaches, plums etc.) and beverages (soft drinks and orange, grape, peach, plum juices). Reduction in salt intake (< 5 g/day) is recommended for optimum health.

Limit consumption of fatty foods and highly processed foods

To improve health and nutritional status, substitution of junk (empty calories) and deep fried foods with healthy foods is essential. It is well established that consumption of junk and deep fried foods promote overweight and obesity that predispose children and adults to increased occurrence of diseases, resulting in impaired productivity and economic outputs. Highly processed foods, especially packaged, ready-made foods, are often high in fat, sugar and or salt and should be avoided. Instead eating raw vegetables and fruits and choosing fresh foods instead of packaged foods will contribute to maintain healthy diet.

Change sedentary lifestyle to physically active lifestyle

Physical activity is essential for skeletal growth and development, weight management, prevention of non-communicable diseases, increased productivity and better quality of life. At least half hour or more moderate exercise (e.g. walking) per day is recommended for physical fitness/health.

Exclusively breastfeed the baby in the first six months and continue breastfeeding along with complementary feeding at least for two years

Breast milk is a complete food for the first six months of life. It provides all the essential nutrients required by the baby for growth and development and therefore, no other liquid or food is required till the age of six months. After the age of six months, breastfeeding shall be complemented by nutrient dense and better varieties of safely prepared foods according to the infant and child's age. In order to allow child skin to form vitamin D, children over the age of six months should be exposed to sunlight in the early morning or late afternoon for few minutes a day or twice a week.

132. Line: 5. what is the difference between the two.
133. Line: 7. Exemptions in case of children and adults suffering from dehydration, laborer /farmers /housewives working in very hot climate could be included, .
134. Line: 15. fat related messages could be grouped as one.
135. Line: 27. why at least 2 years? Else as long as liked?.

Women should increase intake of all the food groups daily, especially foods that are rich in iron and take extra care during pregnancy and lactation

Pregnancy and lactation impose extra demands of macro and micronutrients on women to support foetal growth and development, breastfeed the baby after birth and meet the nutritional requirements by eating varieties of safe and nutritious foods, especially foods that are rich in iron and other micronutrients.

Drink plenty of water each day

Drinking at least 8 glasses of clean and safe water per day is recommended for proper body functions. For a reference person of 65 kg, minimum required amount of drinking water is 2 liters (8 glasses) including all fluids. The requirement may vary according to the conditions (age, weather, work/activities, physiological status etc.).

Read nutrition labeling on packaged food products

Reading nutrition labels on packaged foods provide important information on the nutrients and food additives present in foods. Nutrition labeling facilitates the consumer to select the right and healthy food and enables to compare the nutrients composition of different brands of food products for the better selection.

136. Line: 15. Local Nutrition labels are often unclear and misleading and not controlled by law. Do we need to caution about that ?.

ANNEXURE-I: Glycemic index and glycemic load of foods*

Food	Glycemic Index	Carbohydrates	Glycemic Load
Cereals			
White bread	71	30 g	10
White rice	89	150 g	43
Brown rice	50	150 g	16
Barley (2/3 cup cooked)	22	19 g	4
Sweet corn (2/3 cup cooked)	47	20 g	9
Pasta (2/3 cup cooked)	41	17 g	7
Spaghetti white	58	180 g	26
Pulses			
Chana Dal (1/2 cup cooked)	22	19 g	4
Lentils (1/2 cup cooked)	21	15 g	3
Beans (1/2 cup cooked)	30	15 g	5
Split Peas (1/2 cup cooked)	25	13 g	3
Dairy Products			
Milk (1 cup)	32	12 g	4
Yogurt (1 cup)	19	14 g	3
Ice cream (1 cup)	38	18 g	7
Vegetables			
Green peas	51	80 g	4
Potato Boiled	82	150 g	21
Fresh Fruits			
Bananas (1 medium)	42	24 g	10
Apples (1 medium)	37	21 g	8
Plums (2 whole)	24	14 g	3
Peaches (1 large)	28	14 g	4
Apricots (5 whole)	34	15 g	5
Oranges (1 medium)	40	13 g	5
Dried Fruits			
Apples (5 slices)	29	15 g	4
Plum (3 pieces)	29	15 g	4
Apricot (7 pieces)	31	16 g	5
Peach (2 pieces)	35	14 g	5
Pears (2 halves)	29	24 g	7

*Low glycemic foods. http://optimalfoods.org/

137. Line: 0. How and by whom this list to be used?.
138. Line: 36. Reference document is prepared by one person.

ANNEXURE-II: Personal hygiene and food safety guidelines*

- Keep yourself and kitchen surfaces neat and clean.
- Wash your hands, knives, equipment and cooking utensils before handling and use.
- Protect raw and cooked foods from flies, mosquitoes, insects and pests.
- Keep vegetables and fruits separate from raw meats and meat products.
- Use separate knives and chopping boards for vegetables, fruits and meat.
- Wash fruits and vegetables well, especially if eating raw.
- Use safe and clean water for cooking and drinking.
- Use fresh vegetable oil for cooking and frying.
- Avoid use of leftover vegetable oil for cooking and frying.
- Always purchase good quality packed and sealed vegetable oil from the market and avoid purchasing of unpacked oil from vendors.
- Cook food thoroughly, especially meat, eggs and fish, and store leftover foods in a safe place and at optimum temperatures.
- Refrigerate and freeze the food according to the recommended food safety guidelines.
- Reheat leftover foods thoroughly, until it is hot throughout before serving.
- Don't overcook vegetables to retain essential nutrients in the food.
- Use fresh food, don't use food that is old and spoiled.
- Keep food wastes in a container with cover to avoid contact of flies, mosquitoes, insects and pests and dispose it off quickly.
- Ban on use of pollutants, toxic chemicals, contaminated water and other industrial wastes in food processing and packing.
- Enhance the capacity of food inspectors, monitors and public health analysts to collect and analyze foods and beverages for pesticides, lead, arsenic and other toxic substances injurious to human health.
- Avoid meat exposure to open air and dust and take appropriate measures for its protection by installing wire gauze and cloth around the meat.

*http://www.who.int/mediacentre/factsheets/fs399/en/

139. Line: 18 19 20. These points do not relate to public? .
140. Line: 21. Reference not available now; probably updated in 2017

ANNEXURE-III: Foods rich in omega fatty acids*

Foods rich in omega-3 fatty acids (Alpha-linolenic acids)	Foods rich in omega-6 fatty acids (Linoleic acid)	Foods rich in omega-9 fatty acids (Oleic, Stearic acids and Erucic acids)
Salmon	Grains	Olives
Sardine	Nuts	Hazelnuts
Trout	Olive oil	Pecans
Tuna	Sunflower oil	Cashews
Mackerel	Safflower oil	Pistachios
Grains, Walnuts		

Oil and fats with different fatty acids composition

Fats high in unsaturated fatty acids	Fats high in saturated fatty acids	Fats high in trans fatty acids
Corn	Coconuts	Margarine and vegetable ghee
Cotton seed	Red palm oil	Lard/cooking fat
Peanut	Butter	Deep fried foods
Soybean	Hydrogenated oil	Bakery products
Sunflower	Whole milk	
Olive	Fat from beef, mutton, chicken	
Sesame seed	Ghee	
Linseed	Lard	
Rapeseed		

Dietary Recommendations

- Energy intake from fat should range between 20-40% of total caloric intake.
- Energy intake from saturated fatty acids should not exceed 10% of the total energy intake.
- The concentration of trans fatty acids in the daily diet should not exceed 1% of the total energy intake from oils.
- Avoid or reduce consumption of deep-fried foods and fast foods.
- Avoid or reduce consumption of bakery products.
- Avoid or reduce consumption of Kababs prepared in lard and ghee.
- Avoid or reduce consumption of beef, mutton and chicken prepared in lard and ghee.
- Avoid or reduce the consumption of lard and ghee in daily cooking.
- Remove extra fat from meat and remove the skin from chicken.

*http://www.livestrong.com/article/26035-list-omega-foods/

141. Line: 2. Stearic acid is not an omega 9 fatty acid.
142. Line: 3. why only name of one FA is mentioned for omega 3 and 6 and more for omega .
143. Line: 13. corn and coconut are not fats, .
144. Line: 14. Cotton seed is not fat, why only red palm oil, what is meant by cooking fat, why Lard (pig's fat) it may be replaced by Tallow/suet?.
145. Line: 14. Deep fried foods are not fats and will not have trans fats if fried in oils.
146. Line: 15. Peanut is food not fat, .
147. Line: 16. soya bean is food , bakery products are food not fats and are no essentially rich in trans fats.
148. Line: 17. sunflower and milk are not fats.
149. Line: 32. substandard reference.
150. Line: 18 19 20 21. olive, sesame seed, linseed, rapseed are not fats.
151. Line: 23 to 31. mostly repetition of suggestions already made earlier.

ANNEXURE-IV: Recommended daily allowances for Pakistani population for selected major nutrients*

Age (years)	Weight (kg)	Energy (kcal)	Protein (g)	Vitamin A (RE)	Vitamin D (ug)	Iron (mg)	Iodine (ug)	Zinc (mg)
Children (boys and girls)								
0-1	7.3	820	12	350	10	15	50	15
1-3	11.9	1250	23	400	10	20	90	15
3-5	15.9	1510	26	400	8.3	20	90	15
5-7	19.6	1710	30	400	4.2	20	90	15
7-10	25.9	1880	38	400	2.5	25	120	15
Children (boys)								
10-12	34.0	2170	50	500	2.5	35	120	15
12-14	43.2	2360	64	600	2.5	35	150	15
14-16	54.5	2620	75	600	2.5	30	150	15
16-19	63.6	2820	84	600	2.5	30	150	15
Children (girls)								
10-12	35.4	1925	52	500	2.5	30	120	15
12-14	44.2	2040	62	600	2.5	30	150	15
14-16	51.5	2135	69	550	2.5	20	150	15
16-19	54.6	2150	66	500	2.5	20	150	15
Men moderately active – average 25 years	55	2550	0.57 g/kg	750	2.5	20	150	15
Women moderately active – childbearing age	46	2160	0.52 g/kg	750	2.5	30	150	20
Pregnant	--------	+350	+10	750	10	40	200	20
Lactating	---------	+350	+26	1200	10	30	200	25

*Food Composition Table for Pakistan, Department of Agricultural Chemistry, University of Agriculture, Peshawar[93]

152. Line: 1. Need to be updated or removed. RDA is very different form that given in text and contrary to other RDAs higher iron intake recommend for young boys .

ANNEXURE-V: Recommendations for infant and young child feeding*

- Initiate breast feeding within 1 hour of birth.
- Exclusive breast feeding for the first six months.
- Continue breast feeding until 2 years of age and beyond.
- Introduce complementary feeding at six months with small amounts of food and increase gradually as the child gets older.
- Gradually increase food consistency and variety.
- Be responsive to infant and child needs i.e., feed infant directly and assist older children.
- Feed child slowly and patiently and encourage them to eat but don't force.
- Practice good hygiene by washing hands frequently with soap particularly before preparing and eating foods and after using the toilet, use clean utensils and ensure proper food handling.
- Prepare complementary foods from locally available foods.
- Feed infants (aged 6-8 months) 2-3 times daily with soft foods which are easily digested by infants (banana, mashed potato, thick porridge, kheer, vegetable soup, kitchri) in addition to breast milk.
- Feed infant (aged 9-11 months) 3-4 times daily with soft foods which are easily digested by infants (banana, mashed potato, bread, thick porridge, kheer, egg, vegetable soup) in addition to breast milk .
- Feed child (aged 12-23 months) 3-4 times daily with homemade foods which are nutritious and digestible plus 1-2 additional snacks (bread, vegetables, egg, sandwich, banana, kheer, apple or any other fruit, egg, fish, chicken etc.) in addition to breast milk.
- Avoid giving sweets, candies, bakery products and beverages to children, and replace them with healthy foods such as fruits and vegetables, beans and pulses, nuts and dairy products.
- Serve child with fortified** cereals or vitamin-mineral supplements as needed.
- Increase fluid intake including more breast feeding and offer soft food to infants and children during illness.

*http://www.who.int/mediacentre/factsheets/fs342/en/

**GoP/WFP/NFA. Pakistan National Food Fortification Strategy 2017[105]

153. Line: 0. mostly repetition of suggestions already made earlier.
154. Line: 4. why beyond 2 years and how much beyond? It is not in line with the strategy developed for Pakistan.
155. Line: 6. reference needed for late shifting to family food i.e. at 2 years instead of one. It is not in line with recommendation given in strategy. URL of Ref.: https: //extranet.who.int/nutrition/gina/sites/default/files/PAK-Infant%20and%20Young%20Child%20Feeding%20Strategy_%202015%20Final.pdf
156. Line: 14. why beverages (e.g juice/ milk)are to be avoided? Does it mean that only solid foods should be given.
157. Line: 15. Why? Fortified cereals are not available to most. is the use of FBDG is we recommend using supplements and how many can afford it..

ANNEXURE-VI: Complementary foods for infants > 6 months

RICE KHEER

Ingredients	Amount(g)
Rice	60
Milk	30
Nutritional Information per 100 g of edible portion	
Energy (Kcal)	200
Protein (g)	11.4
Fat/Oil (g)	3.0
Calcium (mg)	150
Phosphorus (mg)	180
Iron (mg)	3

Preparation

Clean and wash rice and soak for ½ hr. Add ½ cup of water and rice in a deep saucepan. Cook on medium flame for 20-25 minutes till rice becomes soft. Mash rice with spoon or electric blender. Mix milk to it and again cook on medium flame for 10 minutes till it becomes soft and creamy in consistency and serve warm.

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158. Line: 0. Not needed.
159. Line: 7. 60 g raw rice has 216, 30 g milk has 20 kcal so how does total of the two has 200 kcal?.
160. Line: 9. Oil is not a nutrient.
161. Line: 10. 60 g raw rice has 5mg, 30 g milk has 40 mg Calcium so how does total of the two has 150 mg Calcium?.
162. Line: 12. 60 g raw rice has .48mg iron, 30 g milk has 0 .15 mg iron so how does total of the two has 3 mg of iron?.

KITCHRI

Ingredients	Amount(g)
Rice	60
Dal Mung	30
Fat/Oil (g)	5
Nutritional Information per 100 g of edible portion	
Energy (Kcal)	300
Protein (g)	11.4
Fat/Oil (g)	5.2
Calcium (mg)	120
Phosphorus (mg)	500
Iron (mg)	6

Preparation

Clean and wash rice and dal mung. Soak for ½ hour. Take one cup of water, rice, dal mung and rice in a deep saucepan. Cook on medium flame for 20-25 minutes till rice and dal mung become soft. Mash these and add one teaspoon of hot oil/fat, remove from the flame and serve warm.

SUJI KHEER

Ingredients	Amount(g)
Suji	20
Milk	120
Nutritional Information per 100 g of edible portion	
Energy (Kcal)	180
Protein (g)	5.2
Fat/Oil (g)	3.0
Calcium (mg)	150
Phosphorus (mg)	250
Iron (mg)	3

Preparation

Fry suji without oil in a deep saucepan till it becomes brown. Add milk to it and cook on medium flame for 10-15 minutes till it becomes soft and creamy in consistency. Turn off the flame and serve warm.

163. Line: 9. Oil is not a nutrient.
164. Line: 12. rice has 0.80 mg iron /100 g and mung ahs 6.74 mg iron /100 gma so this khichri can have only 2.5mg iron (not 6 mg).
165. Line: 27. milk has 0.12 mg iron /100 g and suji has 5.3 mg iron /100 gm so this suji kheer can have only 0.44 mg iron (not 3 mg).

WHEAT DALIA

Ingredients	Amount (g)
Dalia (shredded wheat)	20
Milk	120
Water	200
Nutritional Information per 100 g of edible portion	
Energy (Kcal)	380
Protein (g)	8.4
Fat/Oil (g)	6.0
Calcium (mg)	300
Phosphorus (mg)	380
Iron (mg)	2

Preparation

Thoroughly clean dalia and soak for ½ hr. Add 1 cup of water and dalia in a deep saucepan. Cook on low flame for 15-20 minutes till it becomes tender. Turn off the flame. Add milk and serve warm.

BANANA KHEER

Ingredients	Amount (g)
Banana	80
Milk	120
Nutritional Information per 100 g of edible portion	
Energy (Kcal)	180
Protein (g)	3.0
Fat/Oil (g)	2.8
Calcium (mg)	160
Phosphorus (mg)	140
Iron (mg)	1.5

Preparation

Peel and mash banana with spoon. Add boiled milk. Mix to creamy consistency.

*Food Composition Table for Pakistan, Department of Agricultural Chemistry, University of Agriculture, Peshawar[93]. The amount of sugar and salt are removed from the recipes as per WHO recommendations[102].

166. Line: 12. milk has 0.12 mg iron /100 g and banana has 0.26 mg iron /100 gm so this suji kheer can have only 0.352 mg iron (not 1.5 mg).
167. Line: 26. milk has 0.12 mg iron /100 g and wheat has 1.5 mg iron /100 gm so this suji kheer can have only 1.2 mg iron (not 2 mg).

168. Line: 1. All the info has been given earlier . Only this table was enough..

ANNEXURE-VII: Food and portion sizes for different age groups

Food Group	No. of Servings/day							Portion size/Exchanges
	24-36 months	3-10 years	10-19 years	19-60 years	>60 years	Pregnant women	Lactating women	
Milk and milk products (Each Serving = 15 g carbohydrate, 6 g protein, 8 g fat, 150 calories	2	2-3	3-4	2-3	2-3	2-3	3-4	Whole Milk= 1cup Yogurt = 1 cup Cheese= 1 slice Kheer or Feerni= 1 cup Other milk-based products equivalent to nutrients supplied by 1 cup of milk
Cereals Each Serving = 30g carbohydrate, 6 g protein, 0-2 g fat, 160 calories	1-2	2-4	5-6	4-5	4-5	5-6	6-7	Bread (toast)= 2 slices Chapatti = 1 Cooked rice = 1 cup Cereals equivalent to nutrients supplied by 2 slices of bread
Vegetables Each serving = 5 g carbohydrates, 2 g protein and 25 calories **Starchy Vegetables:** Each serving =15 g carbohydrates, 3 g protein, 0-1 g Fat and 80calories	1-2	1-2	2-3	2-3	2-3	2-3	2-3	Cooked non-starchy vegetables=½ cup; Vegetables juice/soup= ½ cup Fresh vegetables/salad= 1cup ***Starchy Vegetables*** Potato= 1(100 g) Maize = ½ cup Peas green= ½ cup
Fruits Each serving=20 g carbohydrates and 80 calories	1-2	1-2	2-3	2-3	2-3	2-3	2-3	Banana=1(medium size) or Apple= 1 or Peach=1 or Plums=2-3 or Apricots=3-4
Meat and pulses • One serving of ***lean meat*** = 7 g protein, 3 g fat and 55 calories • One serving of ***meat with medium fat*** = 7 g protein, 5 g fat and 75 calories • One serving of ***meat with high fat*** =7 g protein, 8 g fat and 100 calories	1-2	1-2	2-3	2-3	2-3	*2-3*	2-3	Lean meat=28 g(2-3 small pieces) or Fish= 1-2 pieces or Egg=1 or Cooked pulses=½ cup

ANNEXURE-VIII: Daily recommended intakes for energy and nutrients*

Sex/Age	Body weight	Energy	Protein	Iron	Zinc	Vit. A	Vit. C	Folate
Years	Kg	kcal	g	mg	mg	RE (µg) mg		µg
Both sexes								
0-6 months	6.0	524	11.6	0**	1.1	375	25	80
6-11 months	8.9	708	14.1	9	0.8	400	30	80
1-3	12.1	1022	14.0	6	8.4	400	30	160
4-6	18.2	1352	22.2	6	10.3	450	30	200
7-9	25.2	1698	25.2	9	11.3	500	35	300
GIRLS								
10-17	46.7	2326	42.6	14	15.5	600	40	400
Boys								
10-17	49.7	2824	47.8	17	19.2	600	40	400
Women	55							
18-59		2408	41.0	29	9.8	500	45	400
Pregnant		+278	+6.0	High***	15	800	55	600
Breastfeeding		+450	+17.5	15	16.3	850	70	500
60 and over		2142	41.0	11	9.8	600	45	400
Men	65							
18-59		3091	49.0	14	14	600	45	400
60 and over		2496	49.0	14	14	600	45	400

*FAO[106]. Family Nutrition Guide, Food and Agriculture Organization of the United Nations, Rome, 2004

**. Full term babies are born with sufficient iron stores for first six months

*** Needs are so high that iron supplements are usually recommended for pregnant women

169. Line: 1. Purpose of this annexure is not given. It has different age brackets than used in the PDGN and different RDIs that given elsewhere in the document..

ANNEXURE-IX: Food as a source of nutrients

Food	Constituents	Nutrients
Cereals	Carbohydrates (starch, dietary fibre)	Energy, protein, vitamins (thiamine, riboflavin, niacin, vitamin E, folate), minerals (iron, zinc, phosphorous, magnesium) and fibre to reduce cholesterol, prevent constipation and diseases
Milk and milk products	Carbohydrates (lactose), proteins, fat, vitamins and minerals	Energy, proteins, vitamins (vitamin A , vitamin B12) minerals (calcium, phosphorous, magnesium) essential for bones, teeth, muscles and nerves conduction
Meat and pulses	Proteins, fat, vitamins and minerals	Proteins (amino acids), vitamins (Vitamin B12) and minerals (iron, zinc)
Vegetables	Vitamins, minerals, antioxidants, dietary fibre	Vitamins (B-carotene, B6, vitamin C, folic acid) minerals (iron, zinc, potassium) prevent constipation and diseases
Fruits	Vitamins, minerals, antioxidants, dietary fibre	Vitamins (B-carotene, B6, vitamin C, folic acid) minerals (iron, zinc, potassium) prevent constipation and diseases
Oil and fat	Essential and non-essential fatty acids	Energy, cholesterol and fatty acids

171. Line: 2. What is meant by constituents in this table? How they are different form nutrients?.
172. Line: 3. Does it mean dietary fiber also provides energy?.
173. Line: 3. How does CHO has proteins? "How do PDGN defines nutrients food and food groups?.
174. Line: 7. Why we need to add amino acids here?.
175. Line: 11. Does it mean all fatty acids provide cholesterol?.

ANNEXURE-X: Nutrients rich foods

Energy rich foods

- Oil, fat and sugar based foods (all desserts and halwa, confectionaries, bakery products)
- Fried and deep fried foods (Pakora, samosa, papar, fish, kabab, karhitikka)
- Fruits (Banana, apple, strawberry, melons, mangoes, sugar cane, pears, peaches, oranges, guava, honey and sugar
- Starchy vegetables (potatoes)
- Cereals (wheat, maize, rice)
- Pulses (Chick pea roasted, boiled and cooked)
- Dried fruits and nuts (Apricots, figs, peaches, peanuts, walnuts, almonds)

Protein rich foods

- Beef, mutton, chicken, fish, liver, brain, milk
- Pulses (chick pea, red beans, lentil, mash and moong beans)
- Nuts (peanuts, almond, walnuts)
- Eggs
- Wheat, rice, maize

Iron rich foods

- Liver, beef, mutton
- Pulses
- Cereals
- Spinach and other dark green leafy vegetables
- Apple
- Fortified cereals

Zinc rich foods

- Beef, mutton, fish
- Pulses
- Cereals
- Fortified cereals

177. Line: 2. How is energy rich defined here? Food having less than 100 to more than 500 kcal per serving are included in this list.
178. Line: 21. 100 gm apple has 0.07 mg of iron so how is it an iron rich food, many other fruit has more than this amount. Pulses and cereals do have iron but are usually not labelled as iron-rich food..

Calcium rich foods

- Milk and milk products
- Cabbage, broccoli and other dark green leafy vegetables
- Fortified cereals

Phosphorus rich foods

- Milk, yogurt, cheese
- Beef, mutton, chicken, salmon
- Pulses
- Nuts

Vitamin A rich foods

- Liver
- Colostrum and breast milk
- Dark green, yellow and red vegetables (spinach, pumpkin, carrots)
- Dark yellow and red fruits (water melon, mangoes, strawberries)
- Milk, yogurt, cheese
- Egg yolk

Folate rich foods

- Liver and kidney
- Dark green leafy vegetables
- Fortified cereals
- Egg yolk

Vitamin C rich foods

- Orange, lime, guava
- Dark green leafy vegetables
- Fresh milk

Sodium rich foods

- Table salt, baking powder
- Pickles, canned vegetables
- Canned processed foods, fast foods
- French fries, snacks, roasted and salted popcorns
- Roasted and salted nuts
- Salted cheese, instant soups
- Sauces and salad dressings

179. Line: 3. Cabbage has only 40mg calcium per 100 g Not all green leafy vegetables are calcium rich.
180. Line: 13. All red vegetables (e.g. beets) are not rich in vitamin A.
181. Line: 14. All red fruits are not rich in vitamin A (e.g pomegranate).
182. Line: 27. Milk is not a vitamin C rich food fresh or whatever (1.5mg/100g).

Potassium rich foods

- Banana, avocados.
- Potatoes, beans, spinach, mushrooms
- Dried fruits (apricots, peaches, raisins)
- Fish and yogurt

Trans rich foods

- Fried foods
- Bakery products
- Frosting in bakery products
- Margarine & industrially processed fats
- Processed foods

Sugar rich foods

- Bakery products
- Soft drinks and sugar added beverages
- Sugar cane juice and refined starchy foods

Salt rich foods

- Pickles
- Processed canned foods
- French fries and packaged snacks
- Salted nuts

183. Line: 2. why many fruits like mango, pomegranate excluded.
184. Line: 6. What is trans rich foods? And how come food fried in fats not having trans fats can have trans fats? It is not essential that all frostings, bakery goods and processed food have trans fats..
185. Line: 7. why milk is excluded (151mg/100g) and yogurt (141mg/100g) included in potassium rich foods.
186. Line: 18. canned food may be low in sodium. URL of Ref.: https://www.uhn.ca/Transplant/PatientsFamilies/Liver_Transplant_Program/Pre_Transplant/Documents/Sodium_Food_List.pdf

ANNEXURE-XI: Healthy snacks

- All seasonal fruits
- Milk and milk products
- Fresh salad and green, yellow and red vegetables
- Pluses and red beans
- Potato cutlets
- Shami kabab
- Shami sandwich with fresh salad
- Chicken sandwich with fresh salad
- Potato cutlet sandwich with fresh salad
- Cheese sandwich with fresh salad
- Egg sandwich with fresh salad
- Fruit chat
- Chana chat
- Dahibaray

187. Line: 1. Not needed.
188. Line: 3. how can all milk products labelled healthy.
189. Line: 5. why only red beans.
190. Line: 7. Shami kabab is earlier said to be food with no nutrients.
191. Line: 7 ..12. why so much focus on sandwiches.

ANNEXURE-XII: Recommendations on physical activity for different age groups*

Children and youth aged 5–17 years: Moderate-to-vigorous-intensity physical activity at least 60 minutes daily. The daily physical activity should preferably be aerobic and vigorous-intensity activities including muscle and bone strengthening exercises should be undertaken at least 3 times per week.

Adults aged 18-64 years: Moderate intensity physical activity (brisk walking, cycling, gardening, playing games, washing and cleaning clothes, car washing etc.) of 30 minutes at least five days a week or 15 minutes of vigorous intensity physical activity (weight lifting, running, bicycling, playing games, jumping ropes, heavy gardening etc.) at least five days a week or a combination of both if possible. Aerobic activity should be performed in bouts of at least 10 minutes duration. For additional health benefits, adults should increase their moderate-intensity aerobic physical activity to 300 minutes per week, or engage in 150 minutes of vigorous-intensity aerobic physical activity per week, or an equivalent combination of moderate- and vigorous-intensity activity. Muscle-strengthening activities should be done involving major muscle groups on 2 or more days a week.

Older adults: At least 30 minutes of moderate intensity aerobic physical activity daily or 15 minutes vigorous intensity aerobic physical activity daily or an equivalent combination of moderate to vigorous intensity activity are recommended. Older adults with poor mobility should perform physical activity to enhance their balance and prevents falls on 3 or more days per week. Muscle strengthening activities involving major muscles should also be done on 2 or more days a week. Older adults unable to perform moderate or vigorous intensity physical activity due to poor health, they should be as physically active as their abilities and conditions permits

*http://www.who.int/mediacentre/factsheets/fs385/en/.

192. Line: 1. Some repetition it would be better have all physical activity matter at one place.

ANNEXURE-XIII. Committees for Pakistan Dietary Guidelines for Better Nutrition

1. Steering/Core Committee

1.	Dr. Mubarak Ali Ex-Member Food Security & Climate Change, Planning Commission	Chair
2.	Mr. Patrick T Evans, Ex-FAO Representative, Pakistan	Co-Chair
3.	Mr. M. Aslam Shaheen, Chief Nutrition, MPDR	Member
4.	Dr. Baseer Achakzi, Director Nutrition, MNHSRC	Member
5.	Dr. Shakil Ahmed Khan, Food Security Commissioner-II MFSR	Member
6.	Dr. M. Azeem Khan, Director General, NARC, Islamabad	Member
7.	Dr. Nomeena Anis, Nutritionist and Gender Focal Person FAO	Member
8.	Prof. Jehangir, K. Khalil, Ex-Dean, Agri. University, Peshawar	Member
9.	Dr. M. Sadiq Butt Dean NIFST University of Agriculture Faisalabad	Member
10.	Dr. Rezzan Khan, Consultant Clinical Dietitian Shifa Int. Hospital	Member
11.	Representative from WFP	Member
12.	Representative from UNICEF	Member
13.	Representative from WHO	Member

2. Technical Committee

1.	Mr. M. Aslam Shaheen, Chief Nutrition, MPDR	Member
2.	Dr. Baseer Achakzai, Director Nutrition, MNHSRC	Member
3.	Dr. Rezzan Khan, Consultant Clinical Dietitian Shifa Int. Hospital	Member
4.	Dr. Nomeena Anis, Nutritionist and Gender Focal Person FAO	Member
5.	Prof. Ghazala Pervez Zaman, College of Home Economics, Lahore	Member
6.	Prof. Dr. Tahir Zahoor, NIFS&T, University of Agri. Faisalabad	Member
7.	Dr. Hajra Ahmad, Dept. of Home and Health Sci. AIOU, Islamabad	Member
8.	Dr. Mohammad Nasir, UVAS, Lahore	Member
9.	Dr. Nilofer Fatmi, Dow University of Health Sciences, Karachi	Member
10.	Dr. Romaina Iqbal, Aga Khan University, Karachi	Member
11.	Mr. Syed Saeed Qadir, Nutrition Officer, UNICEF, Islamabad	Member

3. Author

Dr. Parvez Iqbal Paracha, Consultant Pakistan Dietary Guidelines for Better Nutrition, FAO, Islamabad

Co-Authors

1. Mr. M Aslam Shaheen, Chief Nutrition, MPDR
2. Dr. Nomeena Anis, Nutritionist and Gender Focal Person, FAO
3. Dr. Nazeer Ahmed, Deputy Chief Nutrition, MPDR
4. Ms. Nargis Hayat, Assistant Chief Nutrition, MPDR

4. List of Contributors

1. Dr. Aurangzeb, Director Nuclear Institute of Food and Agriculture (NIFA), Peshawar
2. Dr. Faqir Muhammad Anjum, Director, Institute of Home and Food Sciences Government College University, Faisalabad
3. Dr. Ghulam Sarwer Gilani, Health and Nutrition Advisor, Ottawa, Canada
4. Dr. S.M. Abid, Army Medical Corps, Lahore
5. Dr. Saeeda Raza, Director, Food Science and Product Development Institute, NARC, Islamabad
6. Dr. Iftikhar Alam, Chairman, Dept. Human Nutrition & Dietetics, Bacha Khan University Charsadda
7. Dr. Zia ud Din, Asstt. Prof. Dept. Human Nutrition, University of Agriculture, Peshawar
8. Dr. Sadaf Sardar, NPO SUN Secretariat, Islamabad
9. Mr. Bedar Abbas Ex-Deputy Chief Nutrition, MPDR

GLOSSARY

Adolescence	A period between 10-19 years of age associated with rapid body growth and development, time to replenish body nutrients stores for future increased responsibilities
Acceptable Macronutrient Distribution Range	It is the percentage of total caloric intake that should come from a particular macronutrient (carbohydrates, protein and fat) each day
Anaemia	A state in which blood hemoglobin concentration falls below normal adversely affecting physical performance and productivity
Bakery products/confectionaries	All foods which are baked, fried or prepared from cereals (mainly wheat flour) in combination with sugar, oil and salt are called bakery products. They may include breads, biscuits, cakes, confectionaries (sweets), samosa, pakora and many others. They are rich in sugar, oil and salt and therefore, considered unhealthy.
Balanced diet	A diet which is composed of all food groups (grains, vegetables, fruit, meat and pulses, dairy products) and provide all the essential nutrients to the body in adequate amount
Basal metabolic rate	Amount of energy required to maintain metabolic functions of the human body
Clean and safe drinking water	Freshwater which is free from physical, microbial and chemical contaminants is called clean and safe drinking water
Contaminant	Any chemical, biological or any other substance that may make the food unsuitable for human consumption and possess potential health risk
Complementary feeding	A mashed food or thick porridge or soft semi-solid food introduced to the baby at the age of six months and continued till the child is on adult type diet in addition to breast milk
Exclusive breast feeding	A period from birth to six months of age when only breast milk is given to the baby
Fortified foods	Any food to which vitamins and minerals are added to increase the availability of nutrients to combat micronutrient deficiencies in population
Junk foods	Any food that provides empty calories and no other nutrients in substantial amount to meet the nutrients demand of the body. Fat and oil fried food, sugar based bakery products and confectionaries fall under the classification of junk foods

193. Line: 1. Not needed, mostly inaccurate and no reference given.
194. Line: 2. why replenish? Why should we assume that body stores have been depleted in adolescents?. URL of Ref.: https: //www.google.com/search?q=replenish&oq=replenish&aqs=chrome..69i57.5736j0j4&sourceid=chrome&ie=UTF-8
195. Line: 12. cannot include non-sweet foods. URL of Ref.: https: //dictionary.cambridge.org/dictionary/english/confectionery
196. Line: 13. pakora samosa are neither baked nor confectionary.
197. Line: 14. Baked products may be healthy also e.g multigrain bread.
198. Line: 18. BMR is energy required only for metabolism at rest.
199. Line: 20. What is meant by fresh water? Does it mean recycled water being used after purification-treatment in many countries is unsafe?.
200. Line: 24. Why is it being limited to just mashed or semisolid food here?. URL of Ref.: https: //www.who.int/elena/titles/complementary_feeding/en/
201. Line: 27. EBF is a strategy not a period. If someone is feeding only breast milk even after six months what will it be called?. URL of Ref.: https: //www.who.int/elena/titles/exclusive_breastfeeding/en/
202. Line: 29. Food fortification has been defined as the addition of one or more essential nutrients to a food, whether or not it is normally contained in the food, for the purpose of preventing or correcting a demonstrated deficiency of one or more nutrients in the population or specific population groups (FAO/WHO 1994). Why are we limiting to vitamins and minerals here?. URL of Ref.: http: //www.fao.org/docrep/W2840E/w2840e0b.htm
203. Line: 10 to 14. completely wrong definition. URL of Ref.: https: //www.britannica.com/topic/bakingURL of Ref.: ref501342

1	Malnutrition	A condition resulting from decreased or increased intake of foods. It includes both under-nutrition (underweight, wasting, stunting) and over-nutrition (overweight and obesity)
2	Macronutrient	Nutrients such as carbohydrates, proteins and fat which are required by the body in large amounts
3	Micronutrient	Nutrients such as vitamins and minerals which are required in small amounts
4	Nutrient reference value	Numerical values that are based on scientific data for purposes of nutrition labeling.
5	Obesity	A condition characterized by increased fatness. Body mass index greater than 30 indicates obesity in adults
6	Overweight	A condition characterized by higher weight than normal or reference mean weight. Body mass index between 25-29.9 indicates adults with overweight
7	Processed Foods	Food processing refers to a variety of processes carried out in food industry or at home and restaurants to make raw food and food ingredients into an edible form to improve its appearance, taste, color, shelf-life, digestibility and suitability for human consumption. Industrially produced processed foods are most commonly marketed in cans, card-board packages and boxes, nutritionally labeled and are ready to eat.
8	Snacks	Foods and beverages consumed/eaten between two big meals are called snacks. Snacks may be classified into energy dense (soft drinks, candies, bakery products, French fries etc.) and nutrients dense (milk, fresh fruits, dry nuts and fruits, salads, meat etc.). Healthy snacks help to maintain constant supply of nutrients and prevent body from hunger and overeating to reduce the risk of overweight, obesity and chronic diseases.
9	Stunting	Low height for age due to chronic energy deficiency
10	Wasting	Low weight for height due to acute energy deficiency

204. Line: 4. NRVs are not for food labeling "The NRVs (Nutrient Reference Values) are a set of recommendations for nutritional intake based on currently available scientific knowledge." Category of Incorrect/Misleading information . **https: //www.nrv.gov.au/**
205. Line: 7. As per this definition all foods excluding the food eaten as given by nature are processed foods. If we use this definition we cannot suggest limiting processed food as it is done at several places in this document. Processed food that is to be limited needs to be differentiated from harmless or beneficial processed foods. . URL of Ref.: https: //www.eatright.org/food/nutrition/nutrition-facts-and-food-labels/processed-foods-whats-ok-and-what-to-avoid
206. Line: 7. Not all of the industrially processed are either labeled for nutrient or are ready to eat..
207. Line: 9. Stunting can occur even without energy deficiency The most direct causes are inadequate nutrition (not eating enough or eating foods that lack growth-promoting nutrients) and recurrent infections or chronic or diseases which cause poor nutrient intake, absorption or utilization. . https: //www.ncbi.nlm.nih.gov/pmc/articles/PMC5531099/https: //www.who.int/nutrition/healthygrowthproj_stunted_videos/en/

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NUTRITION
at the heart
of the SDGs
Every $1 invested
gives $16 return
$1
$16
Nutrition is a vital precondition for achieving these goals
Achieving these goals supports nutrition
Good nutrition supports productive lives
Good nutrition increases earning capacity
Good nutrition makes for good health
Good nutrition drives up IQ levels
Good nutrition supports women's development
50% of malnutrition is linked to poor sanitation
Essential for producing food and thus nutrition
0.9% of GDP is lost to iron deficiency alone
Essential for innovations to improve nutrition
Almost 50% of countries experience malnutrition
Malnutrition is widespread in slums | shanty towns
Reliable food supply helps stabilize food prices
Seasonal effects influence nutritional status
Healthy dietary choices can be good for the planet
Sustainable food production can improve nutrition
Ending malnutrition supports stable societies
Partnership is key to improving nutrition
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE AND JUSTICE STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS

Healthy People Strong Nation

Build healthy eating patterns

Drink plenty of water

Perform regular physical exercise

Adopt healthy life style and reduce stress

Limit Consumption of Unhealthy Foods

FAO Representation Office
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