Perspective

Adolescents and their Nutrition: A Landscape View from Pakistan

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Abstract

Adolescence is considered one of the most crucial stages, and the second most rapid-growth period of life because most of the developmental growth occurs during this period. However, adolescent children are deprived of healthy nutrition worldwide. They suffer from malnutrition resulting in both underweight and overweight, and other non-communicable diseases predisposing them to many cardiovascular risk factors later in their life. The status of adolescent nutrition in Pakistan needs attention especially amongst girls because of the increasing prevalence of malnutrition including wasting, stunting and micronutrient deficiency, early marriage, and unhealthy lifestyle. To improve nutrition amongst adolescents worldwide, the global strategies including United Nations Sustainable Developmental Goals, UNICEF's strategy for women's, children's and adolescent's health, and scaling up nutrition (SUN) movement have devised targets and goals. Pakistan is working on many aspects of the global strategies being recommended to improve the quality of health amongst the adolescent population. There is a dire need to incorporate evidence-based recommendations at both the individual and policy-making levels to address this public health issue.

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Introduction

Adolescence is considered as a transitional period when an individual moves from childhood to adulthood and is typically around the age of 10-19 years[1]. The protective factors for adolescent health comprise quality childhood health, having access to education, and delay in a family formulation[2]. Evidence suggests that teens who are involved in healthy behaviors and lifestyles such as good dietary habits, physical activity, and healthy nutrition, tend to have less tendency to acquires diseases later in life[3]. Due to variations in the epidemiological transitions which cause shifts in the fertility and mortality rate of different age groups within a population, adolescent health status is not similar across countries and so are their patterns of the diseases[2]. Adolescent health has variant patterns in high-income countries (HIC) and low- and middle-income countries (LMIC). Obesity and overweight are highly prevalent in HICs[4] whereas being underweight and stunting is more common in LMICs[5]. However, LMICs are now facing a double burden of diseases of malnutrition with increasing trends, both in obesity and undernutrition[6].

The adolescence period is considered crucial not just because of its transitional role from childhood to adulthood, but also because there is marked psychosocial development occurring in parallel to biological development[7]. According to the World Health Organization (WHO), approximately 3,000 adolescents die every day with a total death number of up to 1.2

million annually from preventable diseases[8]. Studies revealed that 70% of the non-communicable diseases (NCDs) arising in adulthood are directly linked with the risk factors that start to develop in adolescence such as obesity leading to cardiovascular diseases (CVD) later in life[9]. An overview of the global adolescent demographics highlighted that around 1.8 billion adolescent population is present globally, of which 90% lives in LMICs[10]. According to the recent data provided by the United Nations International Children's Emergency Fund (UNICEF), more than half of the adolescent population lives in the continent of Asia[11], making a total of around 340 million adolescents[12]. Although adolescence is considered a healthy transition period, the variations in the health patterns of adolescents globally are striking[10]. These variations in health patterns are due to behaviors related to physical activity, socioeconomic status, and dietary consumption amongst the adolescent population[13,14].

The Burden of Diseases in Adolescence

The Global Burden of Disease Study 2013 (GBD 2013) conducted an annual assessment of adolescents from the 188 counties in the world[15]. They cover the analysis of nearly 300 diseases, around 1230 sequelae, and around 80 risk factors. Their findings identified that in the age of 10-14 years, HIV/AIDS, drowning, and road injuries were more prevalent [15]. In 15-24 years of age, injuries related to vehicles were more common. Alcohol overuse was amongst the top risk factors which were predicted to affect the disability-adjusted-life-years (DALYs)[15]. However, their recent report of 2019 reported three important injuries affecting the DALYs in 10-24 years old which included road traffic accidents, suicidal atempts, and interpersonal violence[16]. Anaemia is also amongst the leading cause of DALYs which makes the adolescent population more vulnerable to infections, poor growth, and poor cognitive development[17]. Atherosclerotic microvasculature changes which lead to CVDs start during the initial years of adolescence which are directly related to health-risking behaviours such as alcohol consumption, smoking, sedentary lifestyle, poor dietary habits, and obesity[18].

With the growing burden of the NCDs worldwide in all age groups, the prevalence of NCDs in children and adolescents are also increasing. The NCDs specifically related to adolescent nutrition is of prime importance. Obesity is a strong predictor in the development of CVDs causes around 2.6 million deaths globally[19]. In children and adolescents, obesity and being overweight are calculated using age and sex-specific nomograms for body mass index (BMI). Literature suggests that obesity and overweight are becoming prevalent globally including in the HICs such as the United States[20]. However, these disease patterns are also very common in LMICs.

The NCDs which starts from early adulthood is mainly because of the high-risk behaviours that start early in life such as smoking, alcohol consumption, increased fat in the diet, increased sugar uptake, and physical inactivity leading to a myriad of health problems such as asthma, chronic obstructive pulmonary disease, liver diseases, obesity, hypertension, ischemic heart diseases and diabetes[21]. Inadequate consumption of fruits and vegetables is also one of the leading factors for NCDs[22]. This might be due to the lack of knowledge and awareness amongst the adolescent related to healthy living. A study was conducted in the 17-19 years old adolescent population in Sri Lanka which revealed that the majority of the students did not know unhealthy and healthy practices related to dietary habits and physical activity during this crucial period[23]. To address these health issues, many schools are targeting certain strategies to overcome the burden of NCDs. A systematic review highlighted a few broad components of interventions such as training and health education, policies introduced at the school level, fostering an enabling environment, and collaboration with health and other sectors[24].

Global Strategies for Improving Adolescent Nutrition

Sustainable Developmental Goals

Sustainable developmental goals (SDGs) were introduced by the United Nations (UN). They comprise 17 goals and serve as a standard for making a

Sustainable future for all[25]. Of these 17 goals, four are directly or indirectly related to adolescents and their nutritional health (**Table 1**). These goals are formulated to better facilitate the adolescent population in all aspects of life including their health and

nutrition, equality in rights, and promoting education and employment opportunities[25]. The WHO highlighted that adolescent health is significantly neglect-ted and had, therefore, made three agenda: for adolescent health now, for adult health later, and for the future generations[26].

Table 1: *Sustainable Developmental Goals Concerning Adolescence*

Goals	Sub-goals
Goal 2: Zero Hunger	**2.2** End all forms of malnutrition and address the nutritional needs for adolescent girls, pregnant and lactating women, and older persons
Goal 3: Good health and well-being	**3.7** Ensure universal access to sexual and reproductive health-care services, including family planning, information and education, and the integration of reproductive health into national strategies and programs
Goal 5: Gender equality	**5.2** End violence against all women and girls **5.3** Eliminate harmful practices such as child, early and forced marriage, and female genital mutilation (FGM) **5.6** Ensure universal access to sexual and reproductive health (SRH) and rights
Goal 8: Create job opportunities for the youth	**8.6** Reduce the proportion of youth not in employment, education, or training **8.B** Develop and operationalize a global strategy for youth

Survive, Thrive and Transform

The global strategy for women's, children's, and adolescent's health similar to SDGs is universal and works on different areas to ensure health sustainability[27]. The global strategy provides a pathway to reduce the occurrence of preventable diseases amongst women, children, and adolescents by the end of the year 2020 while also helping them identify their potential rights for better health[28]. It has primarily three objectives: 'survive' which means to end the preventable deaths, 'thrive' which means health and well-being, and 'transform' which means to foster enabling environments[28]. These objectives go parallel with nine of the 17 sustainable development goals[27]. **Table 2** highlights the three objectives for global strategy and five drivers which help to achieve these objectives.

Table 2: *The Global strategy for women's, children's and adolescent's health*

Objectives for the global strategy	Drivers
Survive (end the occurrence of preventable deaths) Thrive (health and well-being) Transform (foster enabling environments)	People (both individual and community involvement) Political effectiveness (economical, accountable, and providing leadership) Programs (innovation in research, health systems, etc.) Partnerships (with different organizations, institutions) Principles (based on gender, human rights, sustainability, evidence-based, equity-driven, etc.)

Scaling up Nutritional Movement

The Scaling Up Nutritional Movement (SUN) involves 61 countries and four Indian states which aim to align efforts in nourishing the mother and their babies during the initial 1000 days which are found to be critical for nutritional improvement[29]. Their main agenda is "nourishing people and the planet together". They have set certain targets which include: reduction in the numbers of childhood stunting under the age of five-year children, reduction in the prevalence of anaemia amongst women of the reproductive age, reduction in the numbers of low birth weight, fostering exclusive breastfeeding in the initial six months of life, no increment in childhood overweight, and reducing childhood wasting[29]. The recent report of 2019 highlighted that the numbers of stunted children in Asia decreased from 134.7 mil-

lion in 2000 to around 82 million in 2018[30]. However, Africa was the only continent whose numbers of stunted children have risen in the past year[30].

Global Nutrition Report

The Global Nutrition Reports not only highlight the nutritional patterns around the globe, but they also work on the reasons which include inequalities leading to poor nutritional outcomes in children and adolescence[31]. Taking into consideration the best reliable data, an in-depth analysis is done to propose the best evidence-based strategies to achieve health equity[31]. In 2020, the Global Nutrition Report targets "nutrition equity" and highlighted opportunities and barriers to achieve a healthy diet and lifestyle, and aims to end malnutrition by the year 2025[32].

Adolescent Girls Nutrition

Literature suggests that adolescent girls are more vulnerable to suffer from nutritional problems compared to boys[33]. According to the recent reports of UNICEF, the adolescent girls of South Asia show increased signs of malnutrition: Among the girls aged 15-19 years, nearly 10% are short and have stunted growth; up to 40% are underweight, and 55% of them are anaemic[34]. Adolescent girls are more vulnerable to anaemia and require higher iron contents in their meals because of the rapid physical growth, rapid maturation in terms of body physiology including menstruation, and cognitive transitions and transformations[35]. Menstruation causes loss of blood and haemoglobin which increases the iron demand as iron is the main component of the blood.

Adolescent obesity is another public health concern. Adolescent girls aged 12-19 years follow unhealthy dietary patterns: they consume a diet that is high in fat levels, consume sweetened canned drinks, and refined grains[36]. These unhealthy behaviours can prevail amongst adolescent girls because the promotion of unhealthy food items on social media, urbanization, and increased screen time on phones and tablets make them live a sedentary lifestyle[37]. The effects of this unhealthy dietary pattern are further aggravated by physical inactivity, specifically, the engagement in aerobic exercises[38]. According to the UNICEF global databases, 2019, based on the Demographic Health Survey (DHS), Multiple Indicator Cluster Survey, and other national surveys, 2012-2018, 30% of the women aged 20-24 years of age were married before the age of 18 years, and nearly 10% of the women aged 20-24 years of age were married before age of 15 years in South Asia[39]. In South Asian countries, the early marriage of girls is a very common practice. It is been found that young mothers are nutritionally more compromised because of their fast growth and development[40]. Alongside, pregnancy and breastfeeding further increases the "nutritional vulnerability" by depleting the microntrients and fat stores in adolescent girls[40]. Girls are mostly involved in unhealthy dietary practices because of their over consciousness of body image, and less physical activity than men[41].

The multi-sectoral nutritional strategies have made certain World Health Assembly (WHA) targets in relation to adolescent nutrition[42]. They aim to reduce stunting by 40% because adolescent pregnancies increase the likelihood of small for gestational age (SGA), low birth weight (LBW), preterm births, and stunting in childhood. The second target is to reduce anaemia by 50% because adolescent pregnancies make mothers vulnerable to iron deficiency due to poor access to iron supplements. The third target is to reduce LBW by 30% because an adolescent pregnancy leads to LBW. The fourth target is to reduce the incidence of childhood overweight because obesity is a major health concern in adolescence[42]. Please refer to **table 3** for more WHA targets.

Table 3: *Intergenerational cycle of malnutrition*

WHA target	Adolescent Nutrition
40% reduction in the number of under 5 stunted	Adolescent pregnancies, where they are themselves stunted→ low birth weight, preterm birth and SGA babies, →stunted during childhood
50% reduction in anaemia in WRA	Adolescence has the highest prevalence of anaemia Young maternal age increases the risk of maternal anaemia during pregnancy Adolescents are less likely than older women to be covered by existing nutrition supplementation services

30% reduction in babies born LBW	Adolescent pregnancies, where they themselves are stunted→ low birth weight, preterm birth, and SGA babies, →babies with low birth weight
No increase in childhood overweight	Obesity levels in adolescents are increasing
50% increase in rates of exclusive BF in first 6 months	Adolescents are less likely than older mothers to breastfeed or to receive support for breastfeeding
Reduce wasting to less than 5%	Adolescent pregnancies, where they themselves are underweight/stunted→ low birth weight, preterm birth, and SGA babies, →increased risk of wasting during childhood
Abbreviation: BF = Breastfeeding; LBW = Low Birth Weight; SGA: Small for Gestational Age; WHA = World Health Assembly; WRA = Women of Reproductive Age.	

The first 1000 days of a child's life are very crucial for adolescent mothers[43]. After the first year of life, adolescence is the time for faster growth and development than any other time in life. These initial 1000 days after delivery serves as the "second window of opportunity" for adolescent mothers to improve their nutritional status[43].

Adolescents and Nutritional Health in Pakistan

The population of Pakistan is around 220 million, contributing towards almost 3% of the world's total population[44]. According to the Pakistan Human Development Report of 2017, around 65% of Pakistan's population is 29 years and younger. Out of these, 30% of the population falls in the age bracket of 15-29 years[45]. UNFPA highlighted that 1/3rd of Pakistan's population falls in the age bracket of 10-24 years[46]. However, the young population of Pakistan faces major challenges during their transitional stage, especially for younger girls. As per the findings of the Pakistan Demographic Health Survey (PDHS) 2012-2013, nearly 15% of the girls who are between the age of 15-19 years have been married[47]. However, the recent report of the PDHS 2017-2018 highlighted that the median age of first marriage is 20 years for women and around 26 years for men [48].

According to the Pakistan National Nutritional Survey (NNS) 2018, the current literacy rate is 58% with a huge rural/urban disparity (rural 49% vs. urban 74%)[49]. Only half of the Pakistani adolescent have attained five years of schooling and only one in ten complete 10 years of schooling, and one in six girls in Pakistan is married before the age of 19, and birth rates are 46 live births for every 1000 girls aged 15-19 years[49].

Adolescent nutrition is a public health concern in Pakistan. The prevalence rate of being underweight is higher in adolescent boys than in girls aged 10-19 years with 21.1% in boys to 11.8% in girls respectively[49]. However, the prevalence of being overweight is a little higher in adolescent girls accounting for 11.4% than in adolescent boys which accounts for 10.2%. Obesity was found to be more prevalent in adolescent boys which are 7.7% than in adolescent girls which is 5.5%[49]. Obesity and overweight affect all adolescents likewise both in rural and urban areas of Pakistan. According to the WHO, the estimated prevalence of childhood obesity is between 15-20% in Pakistan[50]. Furthermore, in Karachi, the prevalence of childhood obesity was reported between 6 and 19%[50]. Not only obesity is prevalent, but the adolescent population is also under-weight. The signs of undernutrition are thinness, underweight, anaemia, and micronutrient deficiencies[51], and boys compared to girls have a higher prevalence of thinness. Also, thinness is found to be more common in rural areas whereas obesity is found to be common in urban areas[51]. The findings from a survey conducted among girls 11-19 years in Islamabad revealed that nearly 45% of them were underweight[52]. Nutritional anaemia is also an alarming concern for many adolescent girls living in Pakistan[53]. A study conducted amongst Peshawar adolescent girls highlighted that poor dietary patterns contribute to anaemia, the most common nutritional deficiency in Pakistan[53].

To achieve the SDGs, Pakistan recognized three dimensions that are interconnected and are important for the overall health which includes social, environmental, and economical domains[54]. These domains include hygienic environment, employment, social

protection, proper nutrition, and quality health education[54]. Following this integrated approach, Pakistan's poverty trends have declined, the stunting amongst children has reduced, the enrolment amongst school children has increased and Pakistan is now working on the formulation of policies on gender equity and women empowerment[54].

Pakistan became a member of SUN in 2013, and since then Pakistan is working to accomplish the SUN goals[55]. In 2016-2017, the National Planning Commission made a task force to meet the early childhood development, National and Provincial Fortification Alliances have been made to work on nutrition, and a Multi-Donor Trust Fund (MTDF) was created by the World Bank in Sindh which works on reducing stunting amongst the children[56]. Khyber Pakhtunkhwa introduced certain policies which work on the fostering of breastfeeding and child nutrition[56]. To achieve the goals, Pakistan's Multi-Sectoral Nutrition Strategy for 2018-2025 has been established to work on the implementation of the actions[56].

Evidence-based Interventions for Adolescent Nutrition and Health

A systematic review was conducted to identify the evidence-based interventions for adolescent nutrition and health[57]. Out of 67 studies which were included, 11 studies were related to iron supplementation, one study was on folic acid supplementation with an outcome of serum folate, 23 studies were found on iron-folic acid supplementation with an outcome of serum haemoglobin, two studies were found on zinc supplementation with an outcome of pre-term and LBW, two studies were found on calcium supplementation with an outcome of bone mineral density, three studies were found on food supplementation with an outcome of anaemia, 16 studies were found on obesity prevention with an outcome of BMI, and four studies on obesity management with an outcome to reduce BMI[57] (**Table 4**).

Table 4: *Evidence-based Interventions for Adolescent Nutrition and Health*

Nutritional supplementation	Outcomes	Estimate	No. of studies
Iron supplementation	Anaemia	SMD 1.83; 95% CI 0.59 to 3.08	11 studies
Folic acid supplementation	Serum folate	SMD 1.89; 95% CI 1.0 to 2.79	1 study
Iron-folic acid supplementations	Serum haemoglobin	RR 0.52; 95% CI 0.28 to 0.96	23 studies
Zinc supplementation	Preterm births low birth weight	RR 0.57; 95% CI 0.46 to 0.69	2 studies
Multiple micronutrients (MMN)	Serum haemoglobin	MMN supplementation among non-pregnant (SMD 0.55; 95% CI 0.30 to 0.81) and pregnant girls (SMD 1.30; 95% CI 0.31 to 2.28)	5 studies
Calcium supplementation	Bone mineral density	SMD 0.47; 95% CI −0.17 to 1.10	2 studies
Food supplementation	Anaemia	SMD 156.80; 95% CI −1.82 to 315.42	3 studies
Obesity prevention	BMI	SMD −0.05; 95% CI −0.11 to 0.01	16 studies
Obesity management	Reduce BMI	SMD −0.24; 95% CI −0.36 to −0.13	4 studies
Abbreviation: BMI = Body Mass Index; CI: Confidence Interval; MMN = Multiple Micronutrient; RR = Risk Ratio; SMD = Standard Mean Difference.			

There is a well-defined model which comprises the risk factors, interventions, outputs, and outcomes[58].

The pre-defined risk factors relating to adolescent nutrition include underweight, overweight, and obesity. The nutrition interventions identify exercise as

an intervention to promote nutritional wellbeing, alongside the strategies to manage and prevent the occurrence of obesity, a nutritional requirement in the pregnant adolescent, and supplementation of the micronutrients[58]. The outputs of the model relevant to adolescent nutrition include improved dietary behaviours and physical activity, and the outcome at a large scale includes improved health, better adult life, and increased work productivity[58]. However, there are some data gaps in the evidence-based literature. The data are predominantly from the high-income developed countries whose interventions might not be replicated in LMICs, there are shorter follow-up durations in the studies, they lack gender-specific interventions, evidence related to marginalized groups and disadvantaged youths, and the standardized outcomes specifically for interventions relating to behavioural change[58].

Salam et al. (2020) conducted a systematic review and meta-analysis of the interventions of life-style modification in childhood and adolescent obesity[59]. The review suggested that the adoption of the combination of exercise and diet may help reduce the BMI of children and adolescents in conjunction with behavioural therapies to modify the health-risking behaviours[59]. For the management of obesity only, life-style modifications (diet and exercise) with surgical and medical (pharmacological) interventions can be used[59]. To increase the knowledge of adolescent sexual and reproductive health and reducing adolescent pregnancy, the interventions that can be done are counseling, education, and increasing the accessibility and provision for contraceptive use[60]. In adolescent females where there is increased anaemia prevalence, these issues can be addressed by the use of micronutrient supplementation[60]. The sustainable development goals of no poverty, no hunger, quality education, and gender equality are all directly linked with the nutritional concerns amongst the poor especially the adolescent[61]. **Figure 1** summarizes the evidence-based interventions

Way Forward

The strategies and agendas for action can be subdivided based on the specified domain. The foremost strategy revolves around "adopt a life-cycle that prioritizes adolescents"[62]. To break the cycle of intergenerational malnutrition, and chronic diseases, there should be some nutritional policies across lifespan which address the nutritional needs of the adolescent

population. In mothers, the use of 1000 days' approach should be expanded by increasing the investment in adolescent girls of reproductive age. In addition to this, a broader lens is required to identify the possible reasons for gender inequality as it is found that the nutritional needs of adolescent girls cannot be fulfilled until and unless their sexual and reproductive rights with education are addressed[62].

There is a growing need to incorporate gender-sensitive nutritional interventions using a multi-sectoral approach by seeking opportunities to work with different partners and applying evidence-based interventions[62]. Eliminating anaemia is also of prime importance and the Nutritional Report (2018) highlighted the aim to increase adult productivity by 17%[62]. Global Nutrition Report estimated that at the current rate of progress it would take until the year 2084 to reach the anaemia target. The World Bank investment framework for nutrition, including anaemia, is compelling. Scaling up a core package of multi-sectoral nutrition-specific and nutrition-sensitive (including food-based) interventions would potentially have a positive impact[62].
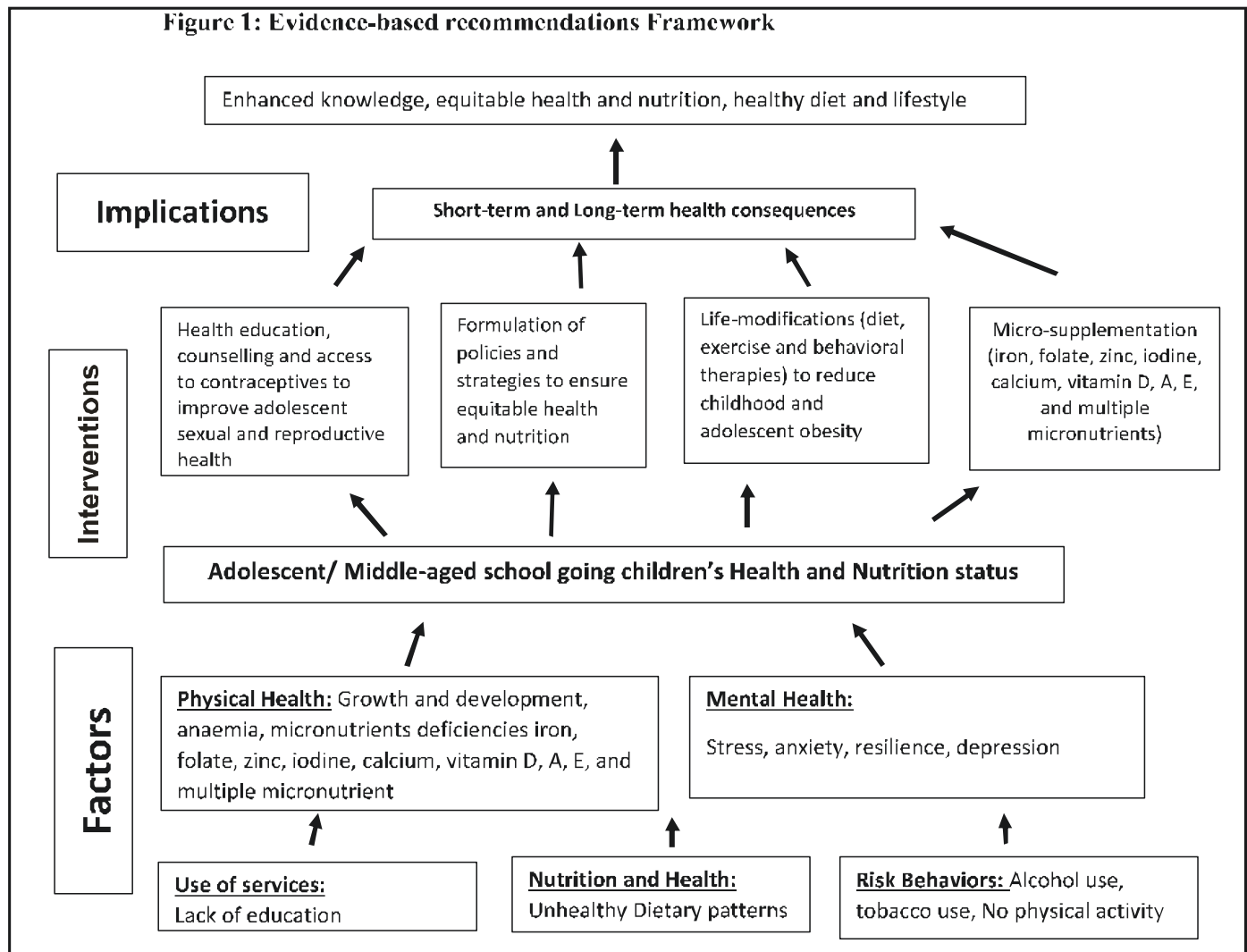
Given the importance of adolescent nutrition, and its increasing prevalence relating to issues relating to adolescent nutrition around the globe including Pakistan, seven pre-defined actions are on priority; highlighted in the Nutritional Report of 2018. These include: engage and collaborate with the adolescent population in the designing and implementation of research programs and policies, assess the relationship between policies and programs with food environment (influencing the dietary pattern and nutrition amongst adolescence, use standardize indicators to assess adolescent health, conduct evidence-based researches (both quantitative and qualitative) to address the underlying root causes of malnutrition, formulate implementation of research projects to improve the delivery of the program, and simultaneously evaluating the effectiveness of these interventions[62].

Conclusion:

Adolescent nutrition is a global public health concern, and it requires quite robust data to suggest possible remedial actions. To tackle the nutritional needs in adolescence, we need to have the leadership to champion the concern and develop some nutritional policies. It is also important to enhance access to the adolescent by capitalizing on programmes that deli-

ver an adolescent-responsive service. Furthermore, building the evidence base for multi-sectoral initiatives and establishing a standardized and doable asse-ssment method to support adolescent nutrition is of prime importance.

Figure 1: Evidence-based recommendations Framework

Enhanced knowledge, equitable health and nutrition, healthy diet and lifestyle

Implications

Short-term and Long-term health consequences

Interventions

| Health education, counselling and access to contraceptives to improve adolescent sexual and reproductive health | Formulation of policies and strategies to ensure equitable health and nutrition | Life-modifications (diet, exercise and behavioral therapies) to reduce childhood and adolescent obesity | Micro-supplementation (iron, folate, zinc, iodine, calcium, vitamin D, A, E, and multiple micronutrients) |

Adolescent/ Middle-aged school going children's Health and Nutrition status

Factors

Physical Health: Growth and development, anaemia, micronutrients deficiencies iron, folate, zinc, iodine, calcium, vitamin D, A, E, and multiple micronutrient

Mental Health:
Stress, anxiety, resilience, depression

Use of services: Lack of education

Nutrition and Health: Unhealthy Dietary patterns

Risk Behaviors: Alcohol use, tobacco use, No physical activity

Glossary

BF- Breastfeeding
BMI- Body mass index
CI- Confidence interval
CVDs- Cardiovascular diseases
DALYs- Disability-adjusted-life-years
DHS- Demographic Health Survey
FGM- Female Genital Mutilation
GDB- Global Burden of Diseases
HIC- High-income countries
LBW- Low birth weight
LMICs- Low-and-middle-income countries
MICS- Multiple Indicator Cluster Survey
MMN- Multiple Micronutrient

MTDF- Multi-Donor Trust Fund
NCDs- Non-communicable diseases
NNS- National Nutrition Survey
RR- Risk ratio
SGA- Small for gestational age
SMD- Standard mean difference
SRH- Sexual and reproductive health
SUN- Scaling Up Nutritional
UNFPA- United Nations Population Fund
UNICEF- The United Nations International Children's Emergency FundWHA- World Health Assembly
WHO- World Health Organization
WRA- Women of Reproductive Age

Salient Points

1. Both malnutrition and obesity are a problem in Low and Middle Income Countries

2. According to the Pakistan National Nutritional Survey (NNS) 2018, the prevalence rate of being underweight is higher in adolescent boys than in girls aged 10-19 years with 21.1% in boys to 11.8% in girls, respectively

3. One in six girls in Pakistan is married before the age of 19 and birth rates are 46 live births for every 1000 girls aged 15-19 years (49)

4. The estimated prevalence of childhood obesity is between 15-20% in Pakistan

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