Chapter 2
Adolescent Nutrition: A Focus on MENA

Mirna Fawaz

2.1 Introduction

While adolescence is generally deemed a healthier age, it is projected that more than 1.4 million adolescents die annually (97% of such fatalities take place in low- and middle-income states), and a much larger amount are suffering from diseases. Adolescence correlates with dramatic shifts that influence adult health outcomes. Such changes originate from factors that evolve through adolescent years (Obermeyer 2015).

Adolescence is a period of freshly found individuality and freedom of expression. This places adolescents in a category that is vulnerable to extrinsic pressures, especially from the media, school, and their contemporaries Adolescents undergo cycles of accelerated development correlated with shifts in hormones, behaviors, and emotions. Healthy eating behaviors throughout adolescence are an expansion of eating patterns that arise during early development, and thus nutrition could have a vital role in acute or chronic disease incidence, development, and even prognosis. For instance, malnutrition affects the prevalence of both communicable and non-communicable disorders and death rates and influences the growth of individuals and communities (Szabo et al. 2019).

Obesity and overweight are increasingly becoming serious concerns among adolescents in several regions of the Arab world, arising at times in the very same state parallel to under-nutrition within various economic classes. The Middle East and North Africa (MENA) region comprises of low- and middle-income states that face

M. Fawaz (✉)
Nursing Department, Faculty of Health Sciences, Beirut Arab University, Beirut, Lebanon
e-mail: mirna.fawaz@bau.edu.lb

C. Barakat et al. (eds.), *Adolescent Health in the Middle East and North Africa*,
Global Perspectives on Health Geography,
https://doi.org/10.1007/978-3-030-92107-1_2

a combined pressure of malnutrition (i.e., stunting, excess, and micronutrient inadequacies) and over-nutrition (i.e., overweight and obesity) and related chronic diseases. The nutritional condition of adolescents around MENA demonstrates inequities in the nutritional status of adolescents between and within nations. It is notable that the greatest rise in obesity prevalence was found in low- and medium-income states, with the MENA being one of the areas with the largest occurrence of overweight among adolescents. It should be recognized that while part of the growing rate of adolescent obesity in more deprived than richer societies may be due to globalization and epidemiological change, it might also be due to the issue of stunting among adolescents in the developing states. Disparities in the incidence of obesity in states of the Middle East and North Africa (MENA) region represent the various stages of the dietary transition – the mechanism by which economic reality, such as labor industrialization and improved food supply, contributes to the abolition of conventional diets, elevated sugar and fat intake, diminished cereal and fruit intake, and physical engagement (Farrag et al. 2017). In addition, the Middle East and North Africa (MENA) has been inundated with unresolved wars for several years, further influencing the nutritional status of the most marginalized populations. On the other hand, the combined pressure of nutritional disorders and the chronic issue of micronutrient deficiency should be recognized as factors for increased body mass index (BMI) in adolescents in developed countries of the MENA region (UNICEF 2020). Therefore, nutrition has a significant influence on adolescents' present and potential well-being. A good nutritious lifestyle with balanced eating habits throughout adolescent years has the ability to reduce any nutrient deficiencies and linear growth deterioration created within the first years of adulthood, thus restricting unhealthy activities that lead to the incidence of consequential chronic illnesses. Prioritizing youth well-being is an economic investment: enhancing the health security for adolescents today, enhancing well-being and prosperity in their potential adult years, and diminishing health threats to their offsprings. Yet, various factors might influence the nutritional intake and therefore overall health of adolescents. This chapter presents information and establishes data from evidence on adolescent nutrition in the MENA region. In doing so, an introduction into the general topic of nutrition and adolescence is initially presented, followed by our research methodology and findings.

2.2 Nutrition and Adolescence

2.2.1 Factors Influencing Eating Behaviors of Adolescents

Eating patterns and dietary choices that affect the caloric intake and the consumption of nutrients are normally determined over a span of years and especially during adolescence. There are several influences that affect food preferences and dietary consumption in this age category, like general awareness of nutritional intake, social class, urban or rural dwelling, family structure, ethnic and traditional activities, and

engagement in recreation. Living environments during adolescence is recognized to have a major impact on nutritional preference, where families act as role models, which enhances and promotes healthy eating behavior development. Adolescent food preferences are also influenced by peer pressure and heightened social interaction. Anorexia or refusal to eat meals, bingeing, eating anything accessible, and consuming comfort or junk foods are among the food-related reactions to adolescent lifestyle stresses. However, adolescents are generally in command of their food patterns relative to younger individuals, as they explore more in food preferences and detract from the norm of consuming three meals a day. Thus, food patterns impair the consumption of nutrients because the source of food differs; thus, nutritional requirements shall be safeguarded (Ferris et al. 2017).

2.2.2 Adolescent Nutritional Requirements

During adolescence, the developmental peak involves accelerated growth of tissue with specific nutritional requirements. The consumption of energy must adhere to the requirements of adolescents especially whether they participate in physical activity or regular exercise. In general, adolescent males have a higher calorie intake than adolescent females, leading to greater changes in height, weight, and lean body mass. The US Departments of Agriculture/Health and Human Services (USDA/HHS) Dietary Guidelines of 2010 find that 50% or more of the overall dietary calories must originate from carbohydrates, with no more than 10–25% of the energy extracted from sugars, such as sucrose and high-fructose corn syrup. Protein demands per unit of height are maximum for females in the age bracket of 11–14 years and for males in the age group of 15–18 years, which leads to the normal peak height velocity. Population-sensitive diets, such as dietary reference diets (DRIs) in the Americas, do not identify clear specifications for overall fat consumption but provide guidelines for the consumption of linoleic (n-6) and-linolenic (n-3) polyunsaturated fatty acids (López-Sobaler et al. 2019). The US DRI for calcium is 1300 mg/day for 9–18-year-olds, and the recommended dietary allowance (RDA) for iron is 8 mg/day for 9–13-year-olds, 11 mg/day for 14–18-year-old males, and 15 mg/day for 14–18-year-old females, because the advent of menstrual cycle places increased iron requirements on women. The US zinc RDA for males and females aged 9–13 years is approximately 8 mg/day, whereas the RDAs are 11 and 9 mg/day for males and females aged 14–18 years, respectively. Males and females aged 9–13 years must obtain 600 g/day to maintain optimal body uses of vitamin A, females aged 14–18 must obtain 700 g/day, and males aged 14–18 must absorb 900 g/day. The recommended daily allowance for vitamin E for 9–13-year-olds is 11 mg/day for the United States and 15 mg/day for 14–18-year-olds. US RDA for vitamin C is 45 mg/day for 9–13-year-olds, 75 mg/day for 14–18-year-old males, and 65 mg/day for 14–18-year-old females. The US folate RDA is 300 g/day for ages 9–13 and 400 g/day for ages 14–18. All macro- and micronutrients are essential to maintain the normal functions of the body as well as promote proper growth

rates, where any imbalances can lead to aliments, some of which might develop into chronic concerns (Kathleen and Raymond 2016).

Macronutrients

Carbohydrates

Carbohydrates comprise the primary fuel supply for adolescents and typically represent 55% of the total consumption of calories. The glucose and fructose monosaccharides, found in fruits and vegetables, are sources of "healthy" carbohydrates. Their biochemical impact is distinct: while they emit approximately the same level of energy, glucose generates more insulin and is digested in both tissues, whereas the liver metabolizes fructose. Fructose intake, used in soft beverages, is blamed for adolescent obesity. In most healthy diets, which contain fruits, cereals, and dairy, disaccharides, sucrose, lactose, and maltose are present. The most prevalent polysaccharide is starch, which constructs complex carbs alongside fibers. Carbohydrates function primarily at the core of hypothalamic satiety and influence other food intake afterward (Das et al. 2017).

Protein

Proteins are important to every individual as they are the basic components of the body's tissues and cells. These comprise essential muscle and other tissue constituents of critical body fluids, such as blood. Protein requirements are significantly correlated with the growth rate during adolescence than with actual age. When the consumption of energy is inadequate for some cause (e.g., nutritional shortages, medical illness, or efforts to reduce weight), nutritional proteins can be needed to satisfy the energy requirements and will not be necessary to synthesize new tissues or to restore tissues. This will result in lower rate of growth and reduction in lean muscle mass given an evident sufficient consumption of proteins. Protein digestion is responsive to calorie reduction in rapidly growing adolescents; for example, during a deficient intake of energy, protein is utilized for energy needs leading to undernutrition. The primary forms of animal and vegetable protein, such as beef, poultry, seafood, dairy, corn, grains and nuts, beans, and cereals, produce 20–25% of the overall energy and should be eaten two to three times daily (Ozdemir 2016).

Fat and Lipids

Fat is an essential dietary element which performs a variety of body processes. Fat is a condensed energy supply, so it offers more than double the energy provided by either protein or carbohydrate per unit mass. Only a tiny quantity of fat (9 kcal/g of fat), if obtained in a physically fit adolescent's diet, will fulfill the required energy.

Lipids have an important caloric feature performed in oils, soybean oil, butter, margarine, bacon, lard, sausages, creams, sauces, burgers, and mayonnaise by saturated and non-saturated fats (Ozdemir 2016).

Micronutrients

Minerals

Throughout puberty, all mineral requirements increase. During the years of growth peak, adolescents were shown to ingest higher amounts of calcium, iron, zinc, magnesium, and sodium in comparison with that during other ages. In adolescence, calcium and iron are especially required. Calcium is required for bone production. With a further rise of 2 g/dl in hemoglobin in the male and 1 g/dl in the female, the corresponding growth need alone is 0.7 mg/day for males and 0.45 mg/day for females, although mandatory liabilities rise with age as well. Throughout the phenotype manifestation of the genetic capacity of bone tissue development and calcification, sufficient consumption of these nutrients during the adolescent cycle is important (Gupta et al. 2018).

Vitamins

In adolescence, the vitamin demands are all boosted due to enhanced anabolism and caloric burn. Many causes, such as physical exercise, gestation, oral contraceptives, and serious illnesses, often lead to this rise. Throughout the pubertal peak, vitamin A, B, C, and D demands are high, with cellular differentiation and bone development. Consumption of folic acid is regularly recommended for pregnant adolescents. Thiamine, riboflavin, and niacin are necessary to extract energy from carbohydrates in a growing amount. Folacin and B12 are vital in the synthesis of DNA and RNA. Premenstrual syndrome (PMS) could be minimized if adolescent girls take 100 mg of vitamin B per day. Bone development demands vitamin D, while newly established cells' morphological and chemical integrity is dependent on the supply of vitamins A, C, and E. Such vitamins will, in most instances, be given by a deliberate diet without vitamin supplementation being needed. Vegetables, whole cereals, milk, nuts, poultry, eggs, and grains are primary sources. Water, juices, coconut milk, and other fluid sources should be supplied, averaging 4–6 glasses per day (Hans and Jana 2018).

2.3 Nutrition Screening

The Society for Adolescent Health and Medicine suggests regular reviews of wellness screening for all adolescents. Initial checks must involve height, weight, and body mass index measures focused on profiles of population-dependent growth.

Information on portion sizes, weight management habits, and excessive feeding can be elicited using a culturally aware, caring, and non-judgmental method. Daily meal schedules, food preparation techniques, consumer habits, and the dietary impact of society and faith shall be considered focusing on trends such as the use of sweeteners, beverages, and alcohol. Thus, comprehensive assessments can detect certain nutritional defects and chronic disorders among adolescents needing intervention (Kumar et al. 2018).

2.4 Nutrition and Eating Disorders in Adolescents

Adequate nutrition is important throughout adolescence, as development and growth perform vital roles in maintaining average adult weight and reproductive capacity during this time. The emergence of an eating disorder, such as anorexia nervosa or bulimia nervosa, is a significant impediment to healthy eating among adolescents. Anorexia nervosa entails extreme underweight, apprehension of weight growth, and poor self-esteem. Likewise, bulimia nervosa involves binge consumption accompanied by inappropriate compensation. Both are best tackled to resolve the medical, psychological, and dietary aspects by an interdisciplinary team of experts. Predispositions for developing adolescent eating disorder include gender, excessive dieting, early puberty, personality, obsessiveness, bullying, poor self-confidence, psychological traumas, and discord in the household (Leme et al. 2018). Other nutritional concerns are prevalent among adolescents and mainly are represented by obesity and undernutrition (Table 2.1).

While family therapy is widely used medically for adolescents with anorexia nervosa, only one type of family therapy has been routinely studied in cohort studies – originally designed by the Maudsley team at the Institute of Psychiatry in London and manually administered as family-based treatment (FBT) (Lock 2015).

Table 2.1 Difference between anorexia nervosa and bulimia nervosa

Anorexia nervosa	Bulimia nervosa
Lower weight	Normal weight
Early presentation	Late presentation
Never asks for help	May ask for help
Early onset	Late onset
Can be premenarchal	
Can afflict males	Generally afflict girls
Acute or chronic	Varying course
No prior ailment	Previous anorexia nervosa
Linked with stress, obsessive compulsive disorder, depression	Linked with depression, self-harm, substance misuse
Prognosis poor without early treatment	Up to 60% respond to specific treatment

Nagl et al. (2016)

The purpose of the therapy is to recognize and enable the family to change conditions that might have precipitated the problem. The findings of the strategy indicate that 80–90% of patients with decent to outstanding improvement are successful for adolescents in the short term and that therapy outcomes are sustained on the long run (Jewell et al. 2016). On the other hand, cognitive behavioral therapy (CBT) is proposed to be of value to adolescents who suffer from anorexia nervosa (AN) (Agras 2019). The reason for the method is that the AN patient has skewed perception of form and weight and overestimation of slenderness (Dalle et al. 2020). That, in fact, contributes to excessive dieting and weight loss due to overexercising. CBT for AN tackles these mental and skewed thoughts by standardizing dietary habits, tracking food consumption through food logs, collective problem-solving, behavioral tests, and cognitive transformation. CBT modifications for adolescents include the participation of caregivers, the use of real-time tracking, and exposure to behavioral dilemmas within the extended CBT paradigm. Medication trials for adolescents with AN are minimal, and the findings have not been positive to date (Linardon et al. 2017). While drugs in most psychoactive groups have been tested in small case series or in adult studies, none of them reliably show systemic efficacy. There was optimism for the prospects for SSRIs (e.g., fluoxetine) to be as effective as possible in avoiding weight loss following acute weight maintenance, although a major review now shows that this is unrealistic (Sysko et al. 2019).

As for bulimia nervosa (BN), CBT was also adjusted for adolescents and then manually employed in a case series of adolescents with BN who find abstinence rates (30–40%) close to those in adult trials. Just one RCT evaluated directed self-help CBT to FBT for BN in adolescents and observed comparable end-of-treatment and follow-up effects for both classes, but CBT was more cost-efficient. Overall progress was comparable to that recorded in adults treated with CBT with abstinence at 6-month follow-up to about 30% (Hail and Le Grange 2018). Medications are also prescribed for the treatment of BN. In specific, antidepressants have been studied in a number of BN trials. Antidepressants are beneficial and effective for BN, while doses were typically higher than those commonly recommended for depression, and the result seems to be linked to preventing binge incidents rather than modifying mental state. Just one minor case series illustrated the appropriateness and potential value of antidepressants (fluoxetine) for adolescent BN, although this was in the form of an inpatient interdisciplinary recovery facility (Gorrell and Le Grange 2019).

Obesity is described as an anomalous or disproportionate buildup of fat, which poses a health hazard. The body mass index (BMI) is a significant obesity screening tool. Obesity is a dynamic physical condition that has hereditary and environmental determinants. An elevated calorie consumption (e.g., diets rich in saturated fat and sugar) and inactive lifestyle are extrinsic variables that lead to childhood and adolescent obesity (Farrag et al. 2017).

Undernutrition signifies inadequate energy and food consumption to fulfill the requirements of a person to preserve healthy nutrition. Undernutrition is interchangeably used for malnutrition. Variables correlated with adolescent undernourishment in developed countries are poor socioeconomic circumstances in the family,

intermittent food scarcity, child labor (family income-poverty marker), chronic diseases, insufficient understanding of the long-term effects of adolescent undernourishment, the availability and quality of food, and exposure to health and nutrition facilities (Leme et al. 2018).

2.4.1 Management of Nutritional Disorders

These nutritional disorders require collaboration from interdisciplinary team members to provide holistic care. Optimally, adolescents with dietary problems should be assigned to an interdisciplinary team specialized in adolescent health, comprising a physician or nurse specialist, a dietician, and a psychiatrist. It is necessary to educate adolescents that there are no "healthy foods" or "poor foods" but rather evaluate their choices beforehand. Providers must recognize that adolescents suffering from food deprivation may not be able to reliably adopt instructions for daily eating habits with all food classes being included. Nevertheless, irregular eating habits attributable to food scarcity can contribute to dysfunctional feeding, either by perpetuating dietary restraint or by promoting binge when there is food. Adolescents and parents should be informed that it is the combination of all food types that includes all the nutritional requirements for well-being and that restrictive diets can lead to micronutrient, macronutrient, or energy deficiencies that can be particularly harmful in development cycles. Therefore, adolescents who obtain deficient amounts by food alone, or who have biological or medical proof of micronutrient insufficiency, should be given micronutrient supplements (Golden et al. 2016; Das et al. 2017).

2.5 Methodology

In order to meet our research objectives of presenting information and established data from evidence on adolescent health nutrition in the Middle East and North Africa (MENA) region, a review of the current MENA-based research has been undertaken through accessing PubMed, Google Scholar, and EBSCO using the keywords "nutrition," "teens," "teenagers," "adolescents," and "MENA" and country names and technical terms for conditions such as bulimia and anorexia, where the relevant researches were filtered to turn up in the past 10 years. The research strategy yielded 3780 publications, of which 10 were based in the MENA. Our rather narrow aim was to recognize concerns of specific interest to the MENA region and to demonstrate important topics for prospective study. We also looked for global and international analyses, hand-searched journal articles of key regional studies, and collected data from comparable recent surveys.

2.6 Findings and Discussion

Upon review of the relevant literature, this paper has resulted in the acknowledgment of diverse nutritional problems among adolescents in the Middle East and North Africa (MENA) region that have been precipitated by the current socioeconomic conditions and political unrest in the region as well as recent changes in the dietary pattern that have been produced by the globalization in the past decades. This notion calls for various national and regional actions to be taken.

2.6.1 Nutrition in the MENA

According to evidence from the 2010 Global Burden of Disease, transportation deaths, other accidental fatalities, and cardiac/circulatory disorders are the main three reasons of mortality among male adolescents aged 15–19 years in the MENA region (Arthur 2014). Among female adolescents aged 15–19 years, infectious diseases (diarrhea, respiratory diseases, and meningitis) are the major cause of death – part of the unresolved problem of communicable diseases that persist in the area. The second and third factors of mortality are coronary and circulatory disorders and accidental accidents. The proportion of deaths from cardiovascular and circulatory disorders among MENA adolescents (both male and female) is almost three times greater than the worldwide levels. Diabetes and cancer also lead at higher proportions than the world average. Malnutrition and over-nutrition are significant predispositions for cancer, death, good growth, and development (Black et al. 2013). Malnutrition and over-nutrition are popular in the MENA area, even within the same states, and often within the same family. Adolescent malnutrition is common in low-income states; in countries suffering humanitarian disasters such as Iraq, Somalia, and Sudan; and among poor communities in prosperous countries. Obesity and overweight have been major community health issues for MENA adolescents (Mirmiran et al. 2010), leading to elevated levels of early metabolism disorders and elevated blood pressure. As a main reason for cardiovascular/circulatory illnesses, diabetes, and musculoskeletal conditions, the ratio of DALYs among adolescents in these circumstances may be significantly higher and in line with evidence among adults in the area (Mokdad et al. 2014). Global school-based student health surveys (GSHS) have found rates of overweight/obesity among adolescents of almost 50% in Gulf countries; low rates (<16%) in nations such as Morocco, Sudan, and Yemen; and between one-fourth and one-third in others, aligned with research from Bahrain, Jordan, the United Arab Emirates (UAE), and Saudi Arabia. A comprehensive analysis found that the levels of overweight or obesity between children and adolescents in MENA were only surpassed by North America and South Latin America (Fleming et al. 2013). The World Health Organization (WHO) indicated that obesity rates must be treated very seriously in East Mediterranean states, where 18 nations form the vast bulk of the Middle East and North Africa region (MENA) have undergone

a dietary change. Various research have been established in the field. For instance, the research by Boodai and Reilly (2013) is the first experiment in Kuwait on obesity management. The therapy was meant to eliminate sedentary habits, raise physical exercise levels, and boost health, where the controls sought attention from primary health care while the experiments engaged in focus groups with an interdisciplinary team. The analysis found that intervention had no major control-related impact on the body mass index (BMI) Z-score, and did not lead to any substantial increases in waist girth and blood pressure. The research emphasized the need for inclusion of obese adolescents and their parents in the programs being tested and the necessity for longitudinal research on obesity. In addition, Kuwait has launched a collaboration among its Medicare system, education institutions, industry, and public sector called the Kuwait-Scotland eHealth Innovation Network (KSeHIN), which aims to provide a bundle of healthcare resources, awareness, and clinical trials, which includes around 300 children annually (Conway et al. 2014). Moreover, Habib-Mourad et al. (2014) performed a clinical experiment in Lebanon to determine the efficacy and usefulness of the Health-E-PALS initiative to encourage balanced food and physical exercise focusing on the principle of social cognition among adolescent students. Participants in the treatment group reported consuming less chips and sugar-sweetened drinks bought and eaten. The procedure had little impact on physical exercise and screen time, and there were no records of any differences in body mass index (BMI) among post-intervention classes (Habib-Mourad et al. 2014). A 3-year action research was carried out in schools of Sousse, Tunisia. The treatment strategy contained both training activities and behavioral improvements. Students were motivated to engage in physical exercise by coordinated games of afterschool football. Nutritious eating patterns have been promoted by providing alternate healthy products in school cafeterias. Post-intervention survey found that the consumption of fruits and vegetables in the treatment group improved substantially, whereas the control group was flat (Maatoug et al. 2015). Likewise, a study in urban sites in seven Arab countries found that the percentages of male adolescents who were overweight or obese were lowest in Algiers City, Algeria (13.4%), and highest in Kuwait City, Kuwait (60.4%), whereas the number of overweight or obese female adolescents varied from 16% in Al-Khalil, Palestine, to 41.4% in Kuwait City, Kuwait (Rey-López et al. 2019).

2.6.2 Future Research Areas

Adolescents now are more vulnerable than in the past years due to nutritional problems, excessive alcohol usage, communicable diseases, and other threats. There are broad disparities in the incidence of predispositions to chronic ailments in adulthood, alcohol misuse, obesity, and sedentary habits within areas of adolescent health profiles. Future work is needed to better understand the adolescent nutrition needs in varying contexts. Investing in this generation can yield dividends for generations to come. Future studies should identify regionally and culturally relevant

interventions for all nutritional disorders in every nation. Researchers should investigate strategies for avoiding pitfalls of weight-based nutritional counseling, which may inadvertently encourage disordered eating. Studies are required to investigate how often social factors of health lead to metabolic problems in adolescence, such as traumatic experiences in the childhood or oxidative stress from socioeconomic injustice. Experts must explore methods to prevent weight-based dietary consultation drawbacks that can unintentionally promote maladaptive feeding.

2.6.3 Challenges

The nutritional condition of adolescence around the Middle East and North Africa (MENA) shows disparities within and inside countries in the nutritional health of children under 5. Action reports across 13 countries (Algeria, Djibouti, Egypt, Iran, Iraq, Jordan, Lebanon, Libya, Morocco, Syria, Tunisia, the State of Palestine, Yemen) show that the biggest success has been in eradicating severe deprivation and ensuring access to better hygiene. For several years, the area has been overwhelmed by persistent wars, thus impacting the nutritional condition of the most troubled area. The implications of chronic MENA conflict are not restricted to death and disability but have indirect secondary repercussions. Nutrition systems disperse from conflict and non-conflict states, while the former tend to have initiatives based on urgent hunger care and preserving lives. In addition, these states are subjected to broader subnational disparities, particularly within quartile of wealth and residence area (UNICEF 2020).

2.6.4 Recommendations for MENA Adolescent Nutrition Programming

1. Ideally, adolescents must be provided with dietary monitoring by a professional healthcare practitioner annually.
2. Exclusive diets which are not appropriate from a medical, religious, or cultural point of view should be avoided.
3. Schools, public service agencies, legislatures, and NGOs have a vital part in the detection and care of juvenile dietary problems.
4. Healthcare professionals must support increasing exposure to, and coverage of, adolescent nutritional programs in high-income countries (HIC) and low- and middle-income countries (LMIC).
5. Education exercises should be simple and enjoyable and should prove that nutritious meals are inexpensive and simple to cook and can be flavorful.

There is an ample proof of initiatives in the Middle East and North Africa (MENA) area to tackle vigorously the child obesity issue. A clear indication of this

initiative is the Kuwait-Scotland e-Health Innovation Network (KSeHIN). A significant public health hurdle, authors say, is how to create positive dietary habits among adolescents. Peer participation, self-assessment, and encouragement as well as environmental strategies complementing behavioral change and community engagement are essential to the effectiveness of adolescent nutrition education. Continued attempts to decrease the incidence of childhood obesity are significant. In order to achieve that, recommendations would include making instructional resources useful but still enjoyable, engaging, and important to the public.

2.7 Conclusion

Over the past decade, the MENA area experienced a startling and well-reported increase in the levels of overweight and obese adolescents. Although statistics are not comprehensive, the rate of growth tends to be quicker than that observed among adults in the same area and is relatively fast in certain states, notably in the Gulf area, particularly in Kuwait, Qatar, and Saudi Arabia. The rate of childhood obesity in many MENA nations is observably greater than in Western nations. Economic influences and shifts in nutrition and activity, as well as how children and adolescents expend their time in sedentary habits versus active exercises, seem to be key drivers of this dramatic, recent rise in overweight and obesity levels.

Reflection Questions

1. What characterizes adolescence as a developmental stage?
2. What is the difference between macro- and micronutrients needed during adolescence?
3. How are eating disorders precipitated during adolescence?
4. How do the cultural and sociopolitical contexts affect nutrition in the MENA region?
5. How can nutrition be inducted on the policymaking table and what actions could be taken?

References

Agras, W.S., 2019. Cognitive behavior therapy for the eating disorders. *Psychiatric Clinics*, *42*(2), pp.169–179.

Arthur, M., 2014. Institute for health metrics and evaluation. *Nursing Standard (2014+)*, *28*(42), p.32.

Black, R.E., Victora, C.G., Walker, S.P., Bhutta, Z.A., Christian, P., De Onis, M., Ezzati, M., Grantham-McGregor, S., Katz, J., Martorell, R. and Uauy, R., 2013. Maternal and child under-

nutrition and overweight in low-income and middle-income countries. *The lancet*, *382*(9890), pp.427–451.

Boodai, S.A. and Reilly, J.J., 2013. Health related quality of life of obese adolescents in Kuwait. *BMC pediatrics*, *13*(1), p.105.

Conway, N.T., Al Wotayan, R., Alkuzam, A., Al-Refaei, F.F., Badawi, D., Barake, R., Bell, A., Boyle, G., Chisholm, S., Connell, J. and Emslie-Smith, A., 2014. The Kuwait-Scotland eHealth Innovation Network (KSeHIN): a sustainable approach to quality improvement in healthcare. *Quality in primary care*, *22*(1), pp.43–51.

Dalle Grave, R., Conti, M. and Calugi, S., 2020. Effectiveness of intensive cognitive behavioral therapy in adolescents and adults with anorexia nervosa. *International Journal of Eating Disorders*, *53*(9), pp.1428–1438.

Das, J.K., Salam, R.A., Thornburg, K.L., Prentice, A.M., Campisi, S., Lassi, Z.S., Koletzko, B. and Bhutta, Z.A., 2017. Nutrition in adolescents: physiology, metabolism, and nutritional needs. *Annals of the New York Academy of Sciences*, *1393*(1), pp.21–33.

Farrag, N.S., Cheskin, L.J. and Farag, M.K., 2017. A systematic review of childhood obesity in the Middle East and North Africa (MENA) region: Prevalence and risk factors meta-analysis. *Advances in pediatric research*, *4*.

Ferris, K.A., Babskie, E. and Metzger, A., 2017. Associations between food-related parenting behaviors and adolescents' engagement in unhealthy eating behaviors: The role of nutrition knowledge. *The International Journal of Aging and Human Development*, *84*(3), pp.231–246.

Fleming, N., Ng, N., Osborne, C., Biederman, S., Yasseen III, A. S., Dy, J. and Walker, M., 2013. Adolescentpregnancy outcomes in the province of Ontario: a cohort study. *Journal of Obstetrics and Gynaecology Canada,35*(3), 234–245.

Golden, N.H., Schneider, M. and Wood, C., 2016. Preventing obesity and eating disorders in adolescents. *Pediatrics*, *138*(3), p.e20161649.

Gorrell, S. and Le Grange, D., 2019. Update on Treatments for Adolescent Bulimia Nervosa. *Child and Adolescent Psychiatric Clinics*, *28*(4), pp.537–547.

Gupta, A., Noronha, J.A. and Garg, M., 2018. Dietary intake of macronutrients and micronutrients among adolescent girls: A cross sectional study. *Clinical Epidemiology and Global Health*, *6*(4), pp.192–197.

Habib-Mourad, C., Ghandour, L.A., Moore, H.J., Nabhani-Zeidan, M., Adetayo, K., Hwalla, N. and Summerbell, C., 2014. Promoting healthy eating and physical activity among school children: findings from Health-E-PALS, the first pilot intervention from Lebanon. *BMC public health*, *14*(1), p.940.

Hail, L. and Le Grange, D., 2018. Bulimia nervosa in adolescents: prevalence and treatment challenges. *Adolescent health, medicine and therapeutics*, *9*, p.11.

Hans, K.B. and Jana, T., 2018. Micronutrients in the life cycle: Requirements and sufficient supply. *NFS journal*, *11*, pp.1–11.

Jewell, T., Blessitt, E., Stewart, C., Simic, M. and Eisler, I., 2016. Family therapy for child and adolescent eating disorders: a critical review. *Family Process*, *55*(3), pp.577–594.

Kathleen, M and Raymond, J. 2016. Krause's Food & the Nutrition Care Process. 14th Edition. Saunders.

Kumar, M.M., AlBuhairan, F., Galagali, P., Docter, A.D., Weiss, A. and Keough, L., 2018. Addressing Nutritional Disorders in Adolescents. *JOURNAL OF ADOLESCENT HEALTH*, *63*(1), pp.120–123.

Leme, A.C.B., Thompson, D., Dunker, K.L.L., Nicklas, T., Philippi, S.T., Lopez, T., Vézina-Im, L.A. and Baranowski, T., 2018. Obesity and eating disorders in integrative prevention programmes for adolescents: protocol for a systematic review and meta-analysis. *BMJ open*, *8*(4).

Linardon, J., Wade, T.D., De la Piedad Garcia, X. and Brennan, L., 2017. The efficacy of cognitive-behavioral therapy for eating disorders: A systematic review and meta-analysis. *Journal of consulting and clinical psychology*, *85*(11), p.1080.

Lock, J., 2015. An update on evidence-based psychosocial treatments for eating disorders in children and adolescents. *Journal of Clinical Child & Adolescent Psychology*, *44*(5), pp.707–721.

López-Sobaler, A.M., Aparicio, A., Rubio, J., Marcos, V., Sanchidrián, R., Santos, S., Pérez-Farinós, N., Dal-Re, M.Á., Villar-Villalba, C., Yusta-Boyo, M.J. and Robledo, T., 2019. Adequacy of usual macronutrient intake and macronutrient distribution in children and adolescents in Spain: A National Dietary Survey on the Child and Adolescent Population, ENALIA 2013–2014. *European journal of nutrition*, *58*(2), pp.705–719.

Maatoug J, Msakni Z, Zammit N, Bhiri S, Harrabi I, Boughammoura L, et al. School-Based Intervention as a Component of a Comprehensive Community Program for Overweight and Obesity Prevention, Sousse, Tunisia, 2009–2014. Prev Chronic Dis. 2015; 12:E160.

Mirmiran, P., Sherafat Kazemzadeh, R., Jalali Farahani, S. and Azizi, F., 2010. Childhood obesity in the Middle East: a review. *EMHJ-Eastern Mediterranean Health Journal, 16 (9), 1009–1017, 2010.*

Mokdad, A.H., Jaber, S., Aziz, M.I.A., AlBuhairan, F., AlGhaithi, A., AlHamad, N.M., Al-Hooti, S.N., Al-Jasari, A., AlMazroa, M.A., AlQasmi, A.M. and Alsowaidi, S., 2014. The state of health in the Arab world, 1990–2010: an analysis of the burden of diseases, injuries, and risk factors. *The Lancet*, *383*(9914), pp.309–320.

Nagl, M., Jacobi, C., Paul, M., Beesdo-Baum, K., Höfler, M., Lieb, R., & Wittchen, H. U., 2016. Prevalence, incidence, and natural course of anorexia and bulimia nervosa among adolescents and young adults. *European child & adolescent psychiatry*, *25*(8), 903–918.

Obermeyer, C.M., 2015. Adolescents in Arab countries: health statistics and social context. *DIFI Family Research and Proceedings*, *2015*(1), p.1.

Ozdemir, A. 2016. Macronutrients in Adolescence. *International Journal of Caring Sciences*, 9, (2), 1162–1166.

Rey-López, J.P., Hashem, R., Hamer, M., McMunn, A., Whincup, P.H., Owen, C.G. and Stamatakis, E., 2019. Prevalence of overweight and obesity and associations with socioeconomic indicators: the study of health and activity among adolescents in Kuwait. *Minerva pediatrica*, *71*(4), pp.326–332.

Sysko, R., Hildebrandt, T. and Walsh, B.T., 2019. Pharmacological treatment of eating disorders.

Szabo, K., Piko, B.F. and Fitzpatrick, K.M., 2019. Adolescents' attitudes towards healthy eating: The role of self-control, motives and self-risk perception. *Appetite*, *143*, p.104416.

Unicef.org. 2020. MENA Nutrition. [online] Available at: <https://www.unicef.org/mena/nutrition> [Accessed 3 November 2020].