

Cultural determinants of obesity in low- and middle-income countries in the Eastern Mediterranean Region

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Increasing prevalence of obesity

In the Eastern Mediterranean Region (EMR), there is a high burden of obesity and an increasing trend in the prevalence across all age groups. Differences have been noted between countries and between sexes. In adults, the prevalence of obesity is higher among women than among men, whereas in children, the prevalence of obesity is higher among boys than among girls in most countries in the region.

This increasing prevalence of obesity is potentially linked to an obesogenic environment, which includes cultural and social issues such as urbanization, increased wealth, and lower levels of physical activity, coupled with high consumption of energy-dense foods. Addressing these issues in a holistic manner could curb the escalating prevalence of obesity in these countries and re-

lieve the health cost of management of noncommunicable diseases.

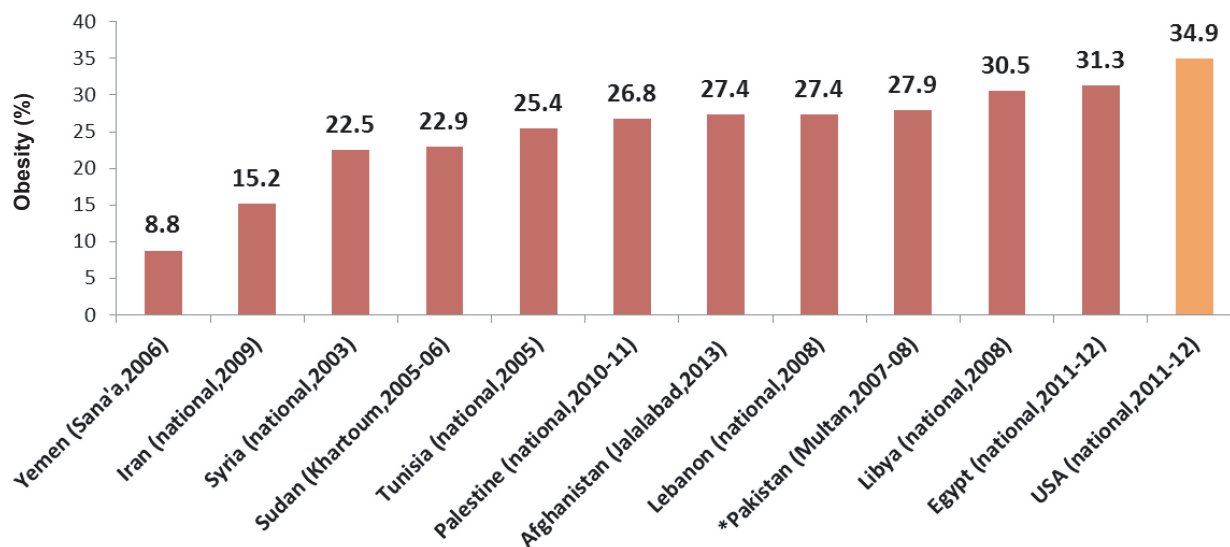
The prevalence of obesity among adults in selected low- and middle-income countries (LMICs) in the EMR ranges from 8.8% to 31.3% and approaches the prevalence of 34.9% observed in the USA (Fig. 8.1) [1–12]. Of greater concern is the increasing secular trend in the prevalence of obesity among adults in several countries in the region, with annual secular increases of +1.7 to +16% [5, 13–17].

In adolescents, the prevalence of obesity in LMICs in the EMR ranges between 1% and 8.9% (according to the 2007 World Health Organization [WHO] criteria), which is lower than the prevalence of 20.5% observed in the USA (according to the 2000 Centers for Disease Control and Prevention [CDC] criteria) [12, 17–32]. However, data on secular trends in the region are limited. In some countries where data at differ-

ent time points were available, the average annual increase in the prevalence of obesity ranged from +2% to +13.5% [14, 26, 28, 33–38].

In children younger than 5 years, rates of overweight and obesity in selected LMICs in the EMR range from 2% to 22.4%; the lower figures are comparable to the estimates from developing countries (6.1%), and the highest figures are double the estimates from developed countries (11.7%) [17, 39–51]. Of greater concern is the increasing trend in the prevalence of overweight and obesity among children younger than 5 years in many countries in the EMR; the annual secular increases of +1.9 to +10.4% are extremely alarming. In contrast, a decrease in the prevalence of overweight and obesity among children younger than 5 years was reported in a few countries in the EMR, with annual decreases ranging from –1.1% to –7.7% [16–17, 39–40, 42, 44–59].

Fig. 8.1. Prevalence (%) of obesity (body mass index [BMI] ≥ 30 kg/m²) among adults in selected low- and middle-income countries in the Eastern Mediterranean Region. * BMI > 30 kg/m² (WHO recommendations for the Asia-Pacific Region). Sources: Sana'a, Yemen: Gunaid (2012) [1]; Islamic Republic of Iran: STEPS (2009) [2]; Syrian Arab Republic: STEPS (2003) [3]; Khartoum, Sudan: STEPS (2006) [4]; Tunisia: El Ati et al. (2012) [5]; Palestine: STEPS (2011) [6]; Jalalabad, Afghanistan: Saeed (2015) [7]; Lebanon: Sibai and Hwalla (2010) [8]; Multan, Pakistan: Aslam et al. (2010) [9]; Libya: STEPS (2009) [10]; Egypt: STEPS (2012) [11]; USA: Ogden et al. (2014) [12].



Cultural determinants of obesity: situation analysis and associations

The increase in the prevalence of obesity in Eastern Mediterranean populations has been associated with several sociocultural, behavioural, and environmental changes, such as the nutrition transition, changes in socioeconomic status, cultural and social factors, and urbanization, all of which have negatively affected the quality and the quantity of the food consumed and have encouraged sedentary behaviour.

Data from the Food and Agriculture Organization of the United Nations (FAO) food balance sheets and from food consumption surveys conducted in the EMR during the past four decades (between 1969–1971 and 2011) have shown a remarkable change in eating behaviour, marked by a shift away from the traditional diet, rich in fruits, vegetables, and whole grains, and towards a diet

high in fat, sugar, and refined carbohydrates. Other factors, such as food marketing, body image, and early-life feeding practices, also appear to play an important role in the burden of obesity in the region. The interrelationships between the different sociocultural, behavioural, and environmental determinants of obesity in LMICs in the EMR are discussed in detail below.

The nutrition transition

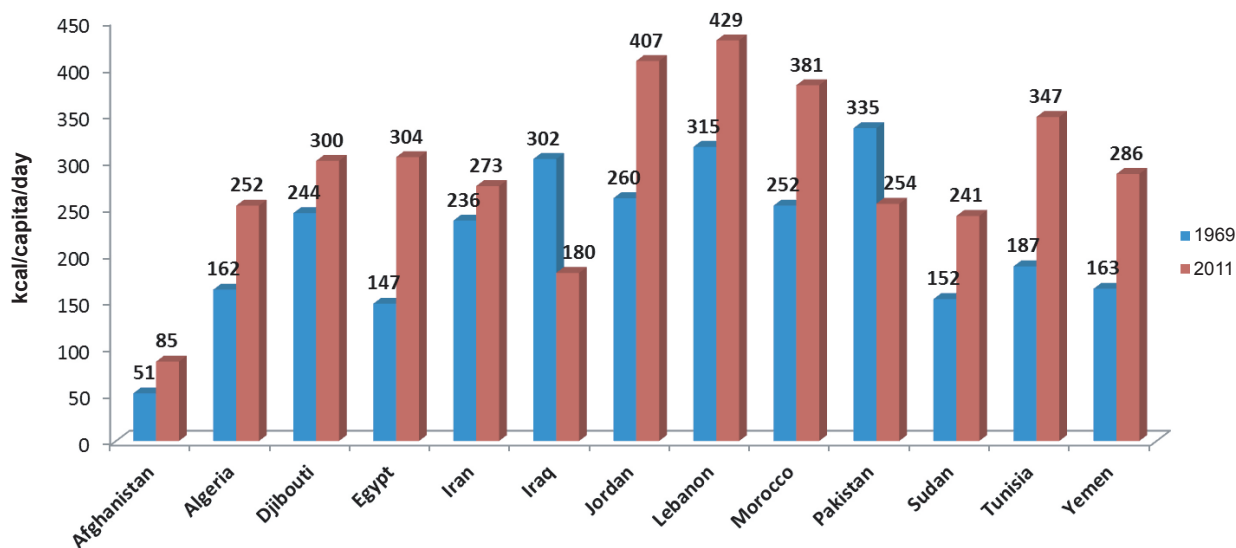
Food availability and consumption

To understand the nutrition transition in LMICs in the EMR, it is important to analyse the changes that have occurred in food availability and food consumption, to properly address these changes. Data from the FAO food balance sheets and from food consumption surveys between 1969–1971 and 2011 highlight a shift towards an increasingly energy-dense diet and high intakes of fat and sugar, coupled with a parallel

decrease in consumption of carbohydrates [60–65]. Data from FAO also show that sugar availability, which is reported to be a predisposing factor to obesity, increased considerably during the same period (1969–2011) in several LMICs in the EMR, such as Afghanistan, Sudan, Tunisia, and Yemen, and doubled in Egypt. However, a reduction was noted in Iraq and Pakistan (Fig. 8.2) [60].

A strong association has been reported between high consumption of harmful food components (processed meat, red meat, trans-fatty acids, sugar-sweetened beverages, and sodium), low consumption of protective foods (fruits, vegetables and beans, nuts and seeds, whole grains, and omega-3 fatty acids [found in fish and seafood]), and increased risk of cardiometabolic disease deaths across all countries in the EMR; therefore, a food consumption pattern that is collectively high in harmful foods and low in protective foods is a strong predictor of cardiometabolic disease mortality

Fig. 8.2. Change in sugar availability (kcal/capita/day) between 1969 and 2011 in selected low- and middle-income countries in the Eastern Mediterranean Region. Source: FAO (2015) [60].



[66]. In addition, the dietary energy supply from the different food groups (harmful and protective) shows that the traditional diet has been modified, so that most of the countries have shown insufficient per capita consumption of protective foods, which fell well below recommended levels, as well as higher than recommended per capita consumption of harmful food components across all countries in the EMR [66].

The nutrition transition reflected in changes in food consumption patterns has been reported to be correlated with the prevalence of obesity in several countries in the EMR and across different age groups. High energy intake has been significantly associated with higher risk of obesity [15, 67]. The contribution of fat to energy intake was higher among obese individuals than among their non-obese counterparts, whereas the opposite was found for the contribution of carbohydrate to energy intake [68].

Countries have reported on the association of dietary patterns with obesity and metabolic diseases. In the Islamic Republic of Iran, a posi-

tive association was shown between an unhealthy dietary pattern and the risk of obesity in women, whereas the opposite was shown for a healthy dietary pattern [69]. A more recent cross-sectional study in a large cohort of Iranian adults found that adherence to a pattern of nutrient intake characterized by high consumption of thiamine, betaine, starch, folate, iron, selenium, niacin, calcium, and manganese was associated with a lower likelihood of general obesity (particularly in men), whereas a pattern of nutrient intake characterized by high consumption of glucose, fructose, sucrose, vitamin C, potassium, total dietary fibre, copper, and vitamin K was associated with a greater likelihood of general obesity in men [70]. In Lebanon, an unhealthy dietary pattern was also reported to be positively associated with high body mass index (BMI) and increased waist circumference, and tripled the risk of hyperglycaemia and metabolic syndrome among adults [71]. Table 8.1 summarizes the associations of different dietary and nutrient patterns with obesity in Lebanon and the Islamic Republic of Iran.

Food marketing

The contribution of food marketing to the rise in the prevalence of obesity in the EMR is governed by six major elements: availability, price, education and knowledge, labelling, food subsidy policies, and the impact of these policies.

LMICs in the EMR have been significantly affected by globalization, which has resulted in the wide spread of fast-food chains as well as different food retail industries and markets, making energy-dense and processed foods more readily available than ever before and easily accessible by consumers of all ages. This trend has been further exacerbated by the convenient and affordable prices of energy-dense foods and snacks compared with healthy food items, which tend to be more expensive.

In the EMR, knowledge and education about healthy food products are largely influenced by the media. Exposure to television commercials for fast foods, soft drinks, sweets, and chocolates may markedly influence the food choices and dietary habits of

Table 8.1. Association of dietary and nutrient patterns with obesity in Lebanon and the Islamic Republic of Iran

Country Dietary/nutrient pattern	Measure of obesity	
	Body mass index (general obesity)	Elevated waist circumference (abdominal obesity)
Lebanon		
Unhealthy dietary pattern ^a	Positive	Positive
Traditional/Lebanese dietary pattern ^b	None	None
Islamic Republic of Iran		
Healthy dietary pattern ^c	Negative	Negative
Unhealthy dietary pattern ^d	Positive	Positive
Traditional/Iranian dietary pattern ^e	None	None
First nutrient pattern ^f	None	None
Second nutrient pattern ^g	Negative (in men)	None
Third nutrient pattern ^h	Positive (in men)	None

^a High in fast-food sandwiches, pizza, pies, desserts, carbonated beverages, butter, juices, and mayonnaise.

^b High in fruits and vegetables, olives and olive oil, traditional dishes and desserts, eggs, and whole dairy products.

^c High in fruits, other vegetables, tomatoes, poultry, legumes, cruciferous and green leafy vegetables, tea, fruit juices, and whole grains.

^d High in refined grains, red meat, butter, processed meat, whole dairy products, sweets and desserts, pizza, potatoes, eggs, hydrogenated fats, and soft drinks, and low in other vegetables and low-fat dairy products.

^e High in refined grains, potatoes, tea, whole grains, hydrogenated fats, legumes, and broth.

^f High in fatty acids (including saturated, monounsaturated, and polyunsaturated fatty acids), cholesterol, vitamin B12, vitamin E, zinc, choline, protein, pyridoxine, phosphorus, and pantothenic acid.

^g High in thiamine, betaine, starch, folate, iron, selenium, niacin, calcium, and manganese.

^h High in glucose, fructose, sucrose, vitamin C, potassium, total dietary fibre, copper, and vitamin K.

Sources: Lebanon: Naja et al. (2014) [71]; Islamic Republic of Iran: Esmailzadeh and Azadbakht (2008) [69], Salehi-Abargouei et al. (2015) [70].

the viewers, particularly children and adolescents. In Egypt, for example, television advertisements were found to be the main driver for the purchase of chocolate and sweets by school-age children [72]. Moreover, food labelling standards have not been mandatory in the EMR and have not been given enough consideration for public awareness and education about food content and portion sizes. As a result, consumers are either indifferent towards reading labels or find it challenging to understand the information on the label, especially consumers with low socioeconomic status.

Most countries in the EMR have opted to subsidize food items such as wheat, rice, vegetable oil, and sugar, hence possibly contributing to the high burden of obesity in the region by making consumers highly dependent on these energy-dense subsidized foods. In Egypt, mothers' BMI was found to be inversely correlated with the price of subsidized

baladi bread and subsidized sugar but directly correlated with the price of healthier foods such as fruits, milk, and eggs [73]. Hence, reducing the price of healthy food items may contribute to weight reduction among mothers by better promoting the consumption of healthier food items, reducing the consumption of energy-dense foods, or both [73]. The impact of such policies can be understood through more robust research in the EMR on the influence of food marketing policies on consumer behaviour and dietary intake, as well as obesity.

Early-life feeding practices

Inadequate feeding practices in the first years of life have been reported to be associated with an increased risk of adult obesity [74]. A longer duration of exclusive breastfeeding was suggested to reduce the risk of overweight and obesity in children [75]. In addition, very early introduc-

tion of complementary foods has been shown to increase the risk of obesity and cardiovascular disease later in life [76].

In the EMR, suboptimal breastfeeding is highly prevalent, coupled with untimely complementary feeding. This may have led to the double burden of child malnutrition in the region, manifested by concomitant high rates of stunting and obesity among children younger than 5 years.

The available studies highlight the low rates of exclusive breastfeeding in the first 6 months in most countries in the EMR. The rates range from 5.3% to 58.4%, falling below the World Health Assembly's global nutrition target for 2025 of 50%, except in the Islamic Republic of Iran and Afghanistan [17, 41, 48–50, 58, 77–84].

Complementary feeding practices in the EMR are also suboptimal and fall short of global recommendations. In most countries in the region, solid foods are introduced before the

recommended age of 4–6 months, a practice that may have contributed to the high prevalence of obesity [85–87].

Data on the association between early feeding practices and the risk of obesity are scarce in the EMR. In the Islamic Republic of Iran, for example, a longer duration of breastfeeding was found to be significantly associated with a lower prevalence of overweight among school-aged children and adolescents [88–89]. In Lebanon, a high likelihood of overweight and obesity were observed among children (0–2 years) who were exclusively breastfed for less than 4 months or less than 6 months, who received formula milk in the first 6 months, and who had high intakes of carbohydrates, sugars, and total fat (Nasreddine et al., unpublished data).

Socioeconomic status

Countries in the EMR are classified into three income groups: low-income countries, middle-income countries, and high-income countries. The prevalence of obesity in middle-income countries is high and similar to the prevalence in high-income countries, whereas the prevalence of obesity is lower in low-income countries [90].

Several studies in EMR countries have shown a correlation between an

individual's socioeconomic status and the likelihood of obesity. In general, obesity is more prevalent in unemployed people and in married individuals of both sexes [67, 91–95]. In the Islamic Republic of Iran, living in an urban area and having a higher education level increased the likelihood of obesity among adults [96], whereas in Lebanon, obesity was found to be inversely associated with the socioeconomic status of women, and the likelihood of obesity decreased significantly with higher education level, greater household assets, and lower crowding index [67]. Socioeconomic indicators were also correlated with paediatric obesity. Risk of obesity increased among adolescents in the Syrian Arab Republic who reported a low crowding index and whose parents had attained a higher education level [65] and among children and adolescents in Pakistan who were in a higher school grade (grade 4 vs grade 1) and living in an urban area with higher socioeconomic status [97]. Table 8.2 summarizes the association of socioeconomic indicators with obesity in these four countries.

Cultural and social factors

Cultural factors may play an important role in the occurrence of obesity in some countries in the region. For

example, a culture that promotes plumpness as a sign of beauty, health, and affluence has been suggested to be an underlying factor for the high prevalence of obesity in the high-income countries in the EMR. Additional factors that may contribute significantly to the rise in the prevalence of obesity are eating habits (plate sharing) and the types of traditional clothing (*abaya* or wide gowns) worn by a substantial number of women in the region [98].

The influence of men in determining women's attitudes towards body size is an important issue in some countries in the EMR. In Qatar, for example, about 43% of the Arab women surveyed believed that men preferred plump women [99]. Similar findings were reported in Morocco, where a cultural preference for body fatness among women exists [100].

The traditional long, wide dress for men or women in some countries may hide body fat and consequently reduce a person's motivation to lose weight [101]. In some countries in the EMR, women are mandated by law to wear full-body covering when they are in public. This covering makes it difficult to observe the size and shape of the female body, thereby reducing the emphasis on these features and possibly acting as a protective factor against body image concerns [102].

Table 8.2. Association of socioeconomic indicators with obesity in selected low- and middle-income countries in the Eastern Mediterranean Region

Country (population)	High education level	High socioeconomic status ^a
Islamic Republic of Iran (adults ≥ 19 years)	Increasing obesity	Increasing obesity
Lebanon (women ≥ 20 years)	Decreasing obesity	Decreasing obesity
Syrian Arab Republic (adolescents 15–18 years)	Increasing obesity ^b	Increasing obesity
Pakistan (children and adolescents 5–12 years)	Increasing obesity	Increasing obesity

^a High socioeconomic status is reflective of: living in an urban area in the Islamic Republic of Iran; high household assets and low crowding index in Lebanon; low crowding index in the Syrian Arab Republic; and living in an urban area with high socioeconomic status in Pakistan.

^b Association of obesity in adolescents with educational attainment of their parents.

Sources: Islamic Republic of Iran: Tavassoli et al. (2010) [96]; Lebanon: Chamieh et al. (2015) [67]; Syrian Arab Republic: Nasreddine et al. (2010) [65]; Pakistan: Mushtaq et al. (2011) [97].

Studies on the association of culture with obesity in the EMR are scarce. The prevalence of obesity was found to be greater among Iraqi women who wore traditional clothing (*abaya*), and the prevalence of obesity was higher among those who shared the plate with family members (77.5%) than among those who had individual plates (69.4%) [98].

Urbanization

LMICs in the EMR have been undergoing rapid urbanization, characterized by large movements from rural to urban areas, coupled with increased growth of large cities [103, 104]. Urbanization is suggested to intensify the burden of obesity [105].

In most of the countries in the EMR, obesity is more prevalent in urban sectors than in rural sectors for both sexes [93, 106–108]. After adjustment for possible confounding factors, including demographic and socioeconomic factors in a binary regression model, urban dwelling remained a major determinant of obesity in the Islamic Republic of Iran [109]. A similar pattern was found in Palestine, where BMI levels of urban women and men were significantly

higher than those of their rural counterparts [108].

Physical inactivity

Most of the available studies on physical activity in the EMR are hampered by the limited amount of reliable data, the varying methodology, and the different physical activity instruments used by different researchers [110]. WHO has provided crude estimates of the prevalence of insufficient physical activity among adults (≥ 18 years) and adolescents (11–17 years) in selected LMICs of the EMR where data are available. The prevalence of insufficient physical activity among adults differed across countries and ranged from 15.6% in Jordan to 49.3% in Iraq, whereas it reached alarming levels ($> 75\%$) among adolescents, ranging from 76.7% in Lebanon to 91.9% in Sudan (Fig. 8.3) [111].

According to the Global School-based Student Health Survey from 2003–2007, the proportion of schoolchildren (13–15 years) who spent 3 hours or more per day on sedentary activities (sitting and watching television, playing computer games, talking with friends, or doing other

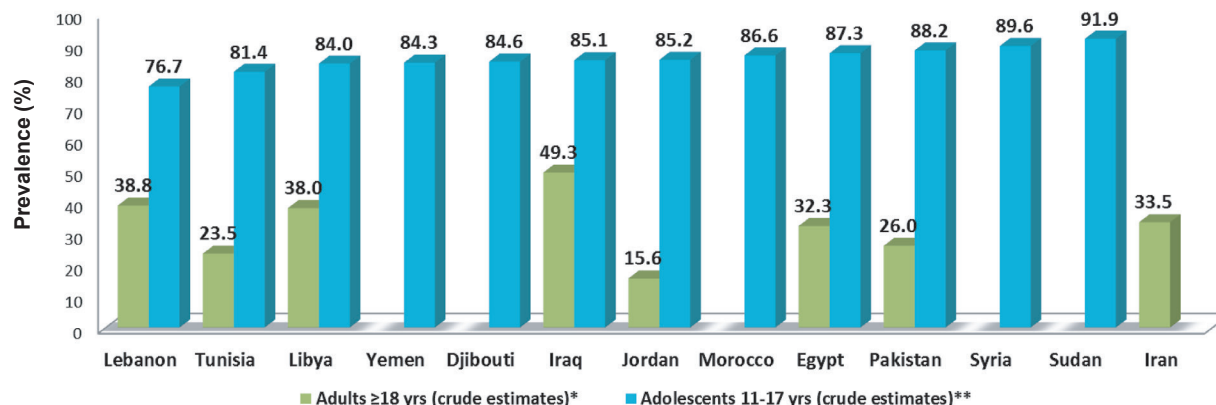
seated activities) in some countries in the EMR was relatively high, ranging from 22.4% in Egypt to 42.0% in Jordan [112].

In most countries in the EMR, labour-saving changes in occupations, a high dependence on cars and buses for transportation, massive urbanization, satellite television, and increased reliance on computers and telecommunication technology may all have contributed to an increase in the burden of obesity [113]. Outdoor activities are hampered by the overall lack of public parks and walking and bicycle lanes, and by the hot climate [114]. In the region, women face more barriers to participating in physical activity compared with men. This is because men, in general, have more freedom and more places to practise sport and other recreational activities, whereas women are often restricted due to cultural and religious beliefs, which make them unable to publicly and freely participate in physical activity [115].

Conclusions

LMICs in the EMR have been undergoing a nutrition transition, with a parallel increase in obesity rates

Fig. 8.3. Prevalence (%) of insufficient physical activity among adults and adolescents in selected low- and middle-income countries in the Eastern Mediterranean Region. * < 150 minutes per week of moderate-intensity physical activity, or < 75 minutes per week of vigorous-intensity physical activity, or equivalent; ** < 60 minutes per day of moderate- to vigorous-intensity physical activity. Source: WHO (2010) [111].



across all age groups and among both sexes, which can be attributed to socioeconomic, cultural, and social factors, as well as urbanization. Many factors may have contributed to the escalating burden of obesity in the region, including an unhealthy dietary pattern, low breastfeeding rates coupled with untimely and faulty complementary feeding practices, unemployment, low education

levels, physical inactivity, perceptions of beauty and a preference for plumpness in women, and cultural habits such as plate sharing and traditional clothing (*abaya*).

Intervention strategies to combat obesity should adopt a holistic approach in addressing the obesogenic factors comprehensively. A single intervention alone may not be viable and economically efficient for

a multifaceted problem like obesity, which involves complex interactions. Therefore, adopting a model as suggested by Amarasinghe and D'Souza [116], which is adapted to Eastern Mediterranean populations and which encompasses economic, environmental, social, and individual elements, would constitute a promising approach to curb the rising burden of obesity in the region.

Key points

- There is a high burden of obesity and an increasing trend in the prevalence across all age groups in LMICs in the EMR.
- Obesity in LMICs in the EMR is associated with sociocultural, behavioural, and environmental determinants (e.g. the nutrition transition, socioeconomic status, cultural and social factors, and urbanization) that are closely interrelated.
- An unhealthy dietary pattern, food marketing that promotes consumption of energy-dense foods, faulty and untimely early feeding practices, unemployment, low education levels, physical inactivity, perceptions of beauty and a preference for plumpness in women, as well as plate sharing and traditional clothing are all factors implicated in the escalating burden of obesity in LMICs in the EMR.

Research needs

- Adequate research data are needed on sociocultural determinants of obesity in LMICs in the EMR.
- There is a need for the development of intervention strategies and the assessment of their impact in addressing obesity prevention in LMICs in the EMR.
- Cohort studies are needed to adequately investigate culturally related early-life infant and young child feeding practices and their future impact on obesity in LMICs in the EMR.

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