Diet and Prevention of Coronary Heart Disease in the Arab Middle East Countries

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Abstract

The picture of health and nutritional status in the Arab Middle East countries has changed drastically during the past four decades as a result of changes in dietary habits, socio-economic situation and lifestyle. The chronic non-communicable diseases such as coronary heart disease (CHD), diabetes, hypertension and cancer have become the main public health problems in most of these countries. Pattern of food consumption may play an important part in the increasing incidence of CHD in this region. The traditional diet, characterized by a high-fiber content and low in fat and cholesterol has changed to a more westernized diet with high content of fat, free sugars, sodium and cholesterol. Daily per capita fat supplies showed an impressive increase in most of these countries, ranging from 13.6% in Sudan to 143.3% in Saudi Arabia. A high intake of cholesterol is reported in some of these countries. Also, the consumption of fiber-rich foods such as whole grains, vegetables and fruits is low. Data from food composition tables in the region showed that sodium content in the Arab Middle East diet is high. Dietary guidelines and recommendations for the prevention and control of chronic diseases, including CHD, in these Arab countries are provided.

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Introduction

Most of the Arab countries in the Middle East have faced marked changes in demographic, socio-economic and health situations during the last four decades. These changes have made great alteration in the dietary habits and lifestyle of the population. However, the effect of these changes in the trends of disease varies from country to country. These countries can be divided into three categories: (a) High-income countries such as Arab Gulf countries. (b) Intermediate-income countries such as Egypt, Jordan, Iraq and Lebanon. (c) Low-income countries such as Djibouti, Somalia, Sudan and Yemen.

Changes in Food Consumption Patterns

In general, the food situation in the Middle East has markedly improved during the last four decades (1960–2000). However, the change in food habits is not the same in the three groups of countries. In the high-income countries, the traditional diet, which consisted of dates, milk, fresh vegetables and fruits, whole wheat bread and fish, has changed to a more diversified diet, with an excess intake of energy-dense foods rich in fat and free sugars and deficient in complex carbohydrates [1], with the daily energy intake exceeding 3,000 kcal/per capita. Although

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sugar consumption is already very high (30–40 kg/per capita/annum), it continues to rise and its contribution to the total energy intake ranges from 10 to 15%. The same trend is applicable to fat consumption (both vegetables and animal) that is now estimated at approximately 20 kg/per capita/annum, contributing over 30% to the total energy intake [2].

The average per capita calorie supply in the intermediate-income countries is between 2,700 and 3,000 kcal. Cereals contribute more than half of the calorie intake. Sugar consumption has also risen considerably to reach an average level of 30–40 kg/per capita/annum. Similarly, fat consumption has increased in several countries and it contributes 20–25% of the daily energy supply. The change in habitual dietary intakes in these countries is mainly due to the shift to middle and upper social classes in the two last decades (1970–1990) following the economic boom and the development of industry and services. Most of the people now live in large cities which are gradually adopting the eating habits and lifestyles of the wealthier classes elsewhere [3].

The low-income countries have the same food consumption characteristics as many poor countries in the world. The daily caloric intake is insufficient (2,000–2,300 kcal) and cereals contribute 60–80% of total calorie intake. It is worth mentioning, however, that in the large cities of these low-income countries, the higher social classes have similar dietary intakes to their counterparts in the intermediate- and high-income countries.

Diet-Related Chronic Non-Communicable Diseases

Trends in morbidity and mortality have changed dramatically in the high-income countries (especially in the Arab Gulf countries) and in some parts of the intermediate-income countries. In the low-income countries, chronic noncommunicable diseases are not common health problems, and there are no reliable reports of their prevalence in the community.

Diet-related chronic diseases such as coronary heart disease (CHD), hypertension, diabetes and cancer have become the major health problems in most Arab Middle East countries, especially those with high and middle incomes. Several factors have contributed to the high prevalence of these diseases including the rapid change in food consumption patterns and socio-economic status during the last four decades. The traditional diet, which was characterized by high-fiber content and was low in

fat, cholesterol and sodium, has changed to a ‘westernized’ diet with high intake of foods rich in fat, cholesterol free sugars and sodium and low in dietary fiber. Increase in tobacco smoking and sedentary life-style has also played an important role in the occurrence of some diet-related chronic diseases [1, 3, 4].

However, at the same time improved standards of living and health services have contributed to a longer life expectancy in many Arab Middle East countries, which is now above 65 years in more than half of these countries and exceeds 70 in some Arab Gulf countries. Thus people are living longer but suffering more from diet-related chronic disease.

Coronary Heart Disease

CHD in general is emerging as a major health problem in most of the Arab Middle East countries [4]. Although reliable mortality data are hard to obtain, and some countries do not report death by cause, data provided from Arab countries of the Gulf, Iraq, Jordan and Syria revealed that CHD was the leading cause of death, in 18–40% of total deaths.

Studies on risk factors associated with CHD in these countries are limited. Studies conducted in some countries on the risk factors profile and related lifestyle patterns reveal levels generally similar to those in industrialized communities. High fat and cholesterol diet, lack of physical activity, obesity, diabetes, hypertension and tobacco smoking were the main factors responsible for the high incidence of CHD in these countries [5].

Role of Diet in CHD

Despite methodological difficulties involved in dietary studies of various populations, there is extensive documentation of the adverse effects of certain dietary patterns on the prevalence of CHD. Dietary components of particular interest include total and saturated fat, cholesterol, fiber and salt. Fish, coffee and tea have received recent attention as they may be linked to CHD [6].

Fat and Cholesterol Intake

Excessive dietary fat intake has been linked to increased risk of obesity, CHD and certain types of cancer. The mechanisms by which these are linked are complex, varied and, in many instances, not clearly understood. Elevated levels of serum cholesterol and low-density lipo-

Table 1. Trends in daily per capita dietary energy and fat supplies in the Arab Middle Eastern Countries, 1971–1997 [2]

Country	Calories, kcal			Fat, g		
	1971	1997	% increase	1971	1997	% increase
Egypt	2,351	3,287	39.8	47.1	57.6	22.3
Iraq	2,258	2,619	16.0	42.5	77.2	81.6
Jordan	2,436	3,014	23.7	58.5	86.2	47.4
Kuwait	2,637	3,096	17.4	71.4	94.7	32.6
Lebanon	2,356	3,277	39.1	62.9	107.8	71.4
Libya	2,457	3,289	33.9	74.1	106.1	43.2
Saudi Arabia	1,876	2,783	48.3	32.3	78.6	143.3
Sudan	2,180	2,395	10.0	66.3	75.3	13.6
Syria	2,342	3,351	43.0	61.9	92.9	50.1
Tunisia	2,279	3,283	44.0	56.8	92.9	63.6
Yemen	1,779	2,051	15.3	30.2	36.5	20.8
UAE	3,093	3,390	9.6	85.6	109.0	27.3

protein (LDL) constitute major risk factors for atherosclerosis and CHD. The degree of risk of these and other factors may vary according to, inter alia: type and level of fatty acid intakes, percentage of energy from total fat, dietary cholesterol, lipoprotein levels, intakes of antioxidants and dietary fiber, activity levels and health status. Low-fat diets are often lower in cholesterol and higher in antioxidants than dietary fiber. Among adults, there is no nutritional advantage to consuming high-fat diets once essential energy and nutrient needs are met [7].

There has been an increase in per capita energy and fat supplies in most of the Arab Middle East countries during the period 1971–1997 (table 1). The increase in calorie supplies during this period ranged from 10% in Sudan to 40% in Egypt. Data from food balance sheet showed that high percentages of these calories came from animal foods [2]. This is particularly true in high-income countries. Daily per capita fat supplies showed impressive increases compared to the supply of calories. The percent of increase ranged from 13.6% in Sudan to 143.3% in Saudi Arabia. Although some low and intermediate countries showed a marked increase in per capita fat supplies, most of the fat comes from plant origin. In contrast, the increase in per capita fat supplies in the Arab Gulf countries is of animal origin. Some Arab countries (Kuwait, Libya and UAE) already had high per capita supplies in 1971.

Information on cholesterol intake in the region is at most scanty. In a study among obese adults in Kuwait it was found that the mean daily intake of cholesterol ranged between 600 to 4,900 mg, with an average of 1,676 mg [8]. Several studies showed that a high percentage of adults in the region have elevated blood cholesterol [9–11]. In the

United Arab Emirates, the elevated cholesterol ranged from 66 to 84% in adult men aged 35–49 years [10]. In Lebanon, about 18% of men and 23% of women had blood cholesterol levels more than 240 mg/dl [10].

The Food and Agriculture Organization (FAO) of the United Nations made the following recommendations: the upper limit of dietary fat intake for active individuals who are in energy balance is up to 35% of their total energy intake from dietary fat if their intake of essential fatty acids and other nutrients is adequate and the level of saturated fatty acids does not exceed 10% of the energy they consume. Sedentary individuals should not consume more than 30% of their energy from fat, particularly if it is high in saturated fatty acids which are derived primarily from animal sources [7].

Fiber Intake

The relationship between dietary fiber intake and management of some chronic diseases including hyperlipidemia, diabetes and obesity has been under investigation for many years. In terms of hyperlipidemia, consumption of fiber has been shown to reduce blood cholesterol levels in several studies [12].

Studies on the intake of fiber in the Arab Middle East countries are few. This is mainly due to the lack of information on the fiber content of several foods consumed, as well as to a general neglect of the role of fiber in health and disease in nutritional surveys. However, since fiber is found only in the carbohydrate portion of the diet, it is widely accepted that the level of fiber in the Arab diet is decreasing. This can be assumed from the evidence for a decrease in the percentage of dietary intake from carbohydrate in most countries in the Arab region. Additionally,

Table 2. Frequency of intake of fresh vegetables and fruits in some Arab Gulf states

Country	Age years	Sex	Sample size	Food	% frequency intake			
					daily	4–6/w ¹	1–3/w ¹	rarely or none
<i>Bahrain</i>								
Musaiger and Al-Roomi [17]	30–79	M	299	veg.	78.9	2.3	10.4	8.4
				fruit	63.5	4.7	19.1	12.7
	30–79	F	217	veg.	81.1	3.7	9.7	5.6
				fruit	65.4	6.5	12.4	15.7
<i>Oman</i>								
Musaiger [14]	15–50	F	900	green veg.	50.3	3.1	31.3	15.4
				yellow veg.	33.2	3.9	11.1	51.8
				citrus fruit	76.5	2.0	2.6	18.0
<i>UAE</i>								
Musaiger and Radwan [15]	18–30	F	215	veg.	59.1	20.0	7.9	13.0
				fruit	40.9	32.1	9.3	17.7
Musaiger and Abuirmeileh [16]	20–80	M	1,090	veg.	59.6	22.8	15.4	2.2
	20–80	F	1,122	veg.	64.7	17.2	15.3	2.8
				fruit	52.5	21.4	22.0	4.1
¹ Frequency per week.								

foods in the region are becoming increasingly processed with the result that grain products tend to be more refined and thus lose their fiber content. A further decrease in fiber intake takes place with a decrease in the consumption of whole grains. For example, sorghum and millet which are usually unrefined (and therefore keep much of their fiber) are becoming less important in the diet of poor Arabic countries, and are being replaced by refined wheat flour [4].

In Saudi Arabia, Zahran and Zahran [13] found that the average daily consumption of fiber was almost equal among both sexes (13.2 and 13.4 g for males and females, respectively). The national nutrition survey in Saudi Arabia [14] reported a higher figure than Zahran and Zahran [13] with a daily average intake of fiber of 24.4 g. The main contribution to fiber intake comes from vegetables and their products (31%), followed by cereal and their products (26%), and fruits and their products (25%). However, the methods of preparation of foods, such as peeling the vegetables and fruits, and using low extraction rate of wheat flour in breads are contributing to lower intake of fiber than those reported in these studies.

Fresh fruits and vegetables are considered rich sources of dietary fiber. The trend in consumption of these foods can be a good indicator for fiber intake in the Arab countries. Food frequency studies of fruit and vegetable intake

in the Arab Gulf states indicate low intake [15–18]. Between 23 and 59% of adults did not consume fresh fruit daily, and between 19 and 50% did not consume vegetables daily (table 2). According to Pender [19] using the four groups guide, an adult should consume at least two to four servings of fruit and a similar number of servings of vegetables per day. Thus, a high proportion of adults in the Gulf community do not eat the amount of fruits and vegetables currently regarded as desirable.

The intake of fiber-rich foods by children and adolescents in most Arab countries is alarmingly low. The dietary habits of school children and adolescents in the region are characterized by low intake of fresh fruits, vegetables and milk and a high intake of carbonated beverages and fast foods. In general, the food habits of the Arab adolescents, particularly in urban areas, have become similar to those reported for Western communities in relation to snacking patterns and consumption of fast foods [15, 20, 21]. These changes in food habits may in part explain the increase in CHD in some Arab countries.

Salt Intake

The role of salt, or sodium intake principally as sodium chloride, as a determinant of blood pressure levels and a cause of hypertension has been under study for many decades. Although studies were not consistent, there is a

general agreement that salt intake should be reduced for patients with hypertension, diabetes and CHD. The estimated daily requirements for salt are no more than 8–10 mmol of sodium or 500 mg of sodium chloride per day [6]. Indicators showed that the intakes of sodium in this region exceed these requirements. In Jordan, for example, the intake of sodium was 10 times higher than the minimum requirement. However, the minimum recommended intake of sodium for the people in the Arab Middle East countries is probably higher than the US recommendations due to the hot and humid climates in these countries [22]. Data from food composition tables for the Middle East [23–25] showed that sodium content in the diet of the Arab Middle East countries is high. This is due to several reasons: high use of table salt, spices and pickles, and the salinity of water (in some countries). Therefore, nutritional education should focus on healthy preparation of food at home, including low use of salt and fat.

Dietary Recommendations for Prevention of Coronary Heart Disease

The evidence concerning the role of diet in the occurrence of CHD implies the need for establishing dietary recommendations for prevention of this disease. The main recommendations are maintaining body weight, consumption of fat less than 30% of total energy, increase consumption of complex carbohydrates, keeping dietary cholesterol less than 200–300 mg per day, reduction of fat intake, eating fish at least once per week and increased consumption of antioxidants (table 3).

Dietary Guidelines for the Prevention and Reduction of Diet-Related Chronic Diseases in the Arab Countries

In 1994, the first workshop on diet and chronic diseases in the Arab Middle East was held in Al-Ain, United Arab Emirates. One of the objectives of this meeting was to establish dietary guidelines for the prevention and reduction of diet-related chronic diseases in the region. The following dietary guidelines were recommended [26].

Fat and Cholesterol

A reduction in the consumption of fat (especially saturated fat) and cholesterol was highly recommended. Foods that are relatively low in these substances, such as

Table 3. Dietary recommendations for cardiovascular fitness [29]

Golden rule: maintain body weight (energy balance) at young adult level with BMI of 20–22 kg/m ² , i.e. 'eat less, exercise more'
Adults keep fat intake <30% of total energy (<33 g/1,000 kcal) and saturated fatty acids (SFA) <10%. Avoid trans fatty acid-rich foods and fats
Derive the major portion of energy from complex carbohydrates in cereal grains, vegetables, and fruits
Keep dietary cholesterol <200–300 mg/day or even lower depending on total cholesterol and LDL-cholesterol concentrations
Restrict visible fat consumption, especially animal fat sources of saturates and cholesterol (cheese, ice cream, whole milk, fatty meats)
Assure daily intake of 5% as 18:2 (5 and 1 g/1,000 kcal, respectively). Best accomplished with soybean oil- or canola oil-based salad dressing (1 tsp/1,000 kcal/day).
Eat fish at least once per week
Consume vitamin E (50 mg) and vitamin C (50 mg) daily as a supplement (for the high-risk individuals)

vegetables, fruits, whole grain foods, fish, poultry, lean meats and low-fat dairy products should be chosen. Food preparation methods that add little or no fat should be used.

Energy and Weight

Achieve and maintain a desirable body weight. This should be done by choosing a dietary pattern in which energy intake is consistent with energy expenditure. In order to reduce energy intake, the consumption of foods containing fats and sugars that are relatively high in calories should be limited. Since physical inactivity is an additional risk factor for chronic disease, energy expenditure should be increased through regular and sustained physical activity.

Complex Carbohydrates and Fiber

Increase the consumption of whole grain foods and cereal products rather than the refined varieties. The consumption of vegetables, especially leafy green vegetables, should also be increased. Maintain the consumption of legume products such as chickpeas, beans and lentils and increase the consumption of fruits, including local varieties.

Sodium

Cooking salt contains both sodium and chloride, both of which are essential nutrients. Excess salt can, however, be hazardous for those with, or at risk of, high blood pres-

sure. Thus salt and salty foods should be taken in moderation. Many processed foods may contain high levels of sodium and the use of additional table salt should be minimized.

Calcium

Increased consumption of foods high in calcium is recommended for all, but especially for adolescent girls and adult females. The most important source of calcium is dairy products. Low-fat versions of dairy products are recommended where available.

Iron

Children, adolescents and women of childbearing age are at high risk of iron deficiency anaemia. Foods that are good sources of iron are lean meat, organ meats, fish, beans, legumes, leafy vegetables and whole grain products. These foods should be consumed when available. This issue is of special concern for low-income families in whom anaemia may be very common.

Sugars

Excessive sugar consumption increases the risk of developing dental caries (cavities), especially in children. Sugar consumption is high for many in the Middle East region, thus reduction in the consumption and frequency of use of foods high in sugars is recommended.

Fluoride

Community water systems contain fluorides but excessive use should be avoided to reduce the risk of fluorosis.

Salty, Smoked and Pickled Foods

Consumption of certain highly salted, pickled and smoked foods had been linked to an increase of certain types of cancer. These foods should therefore be consumed in moderation.

Smoking

Cigarette smoking is strongly linked to increased risk of both heart disease and lung cancer and thus should be avoided.

Alcohol

Avoidance of alcohol consumption is recommended.

Recommendations

There is a clear evidence that diet-related chronic diseases such as heart disease, hypertension, diabetes, obesity and some forms of cancer are increasing in this region. Therefore, measures should be undertaken to establish programmes to control the diet-related chronic diseases in the Arab Middle East countries. In order to prevent and control diet-related chronic diseases including coronary heart disease, the following recommendations are suggested:

(1) Programmes that aim to prevent and reduce diet-related chronic diseases should be an integral part of any health plan in these countries.

(2) The health authorities in collaboration with educational bodies should initiate and strengthen professional training programmes at both undergraduate and postgraduate levels, to ensure that the role of diet in the prevention of chronic diseases is understood by the health-care givers and social workers.

(3) The health authorities in collaboration with the Ministry of Education should include sufficient information on prevention measures for chronic diseases in the school curriculum.

(4) Encourage exercise habits among schoolchildren and adults, as this can play an important role in the prevention and control of most chronic diseases. WHO [27] urges countries to encourage the public to engage in physical activities. Both familial and social factors influencing behavior must be taken into account as well as the availability of necessary facilities. Sedentary lifestyles are encouraged by familial habits of watching television and using cars. In connection with need for greater physical activity and general fitness, WHO recommended the following short-term measures:

- Encourage children to adopt a lifestyle involving aerobic forms of exercise.
- Introduce health education on exercise for schoolchildren.
- Encourage families to participate in physical activities all year round.
- Train physical educators to recognize the importance of frequent aerobic exercises for children in addition to skills.
- Provide physical educators with the skills to teach and supervise appropriate aerobic exercise for children.
- Allow sufficient time in the school schedule for exercise activities (ideally every day) which evoke a heart response rate between 65 and 80% of the maximum for a period of 15–60 min; the optimum is 65% for 20–30 min.

- Encourage routine physical examinations of young adults before they enter competitive sporting activities.

(5) Modify dietary habits of the region because the intake of food rich in fat, cholesterol and sodium is relatively high by initiating WHO's dietary guidelines [28]. These guidelines should not prejudice normal growth and development of children or the quality of nutrition for adult, nor should they detract from the pleasure of eating.

WHO considered that the following dietary changes would be appropriate for the populations with high incidence of heart diseases:

- A reduction in saturated fat and dietary cholesterol, which together are the primary factors that raise blood-cholesterol levels. This could be done by replacing some of the saturated fat by mono-unsaturated and polyunsaturated fat.
- A reduction of cholesterol intake to below 100 mg per 4.18 MJ (1,000 kcal) per day, or below an average of 300 mg for the adult population.
- An increase in complex carbohydrate consumption.
- Avoidance or correction of overweight.

(6) Reduce the rates of cigarette smoking among both schoolchildren and adults. Based on three WHO Expert Committees [28] concerned with smoking, the following recommendations should be emphasized:

- High priority should be given to prevention of cigarette smoking. They should be well planned and adequately funded, especially in schools.
- The sale of cigarettes to minors should be prohibited and cigarette vending machines, should not be located

in places where young people are likely to have access to them.

- All advertising and promotion of tobacco products should be prohibited so as to end the attempt to depict smokers as role models to be imitated by children and young people.
- Sponsorship of sports events by cigarette manufacturers and advertising on television of such sponsored events should not be allowed, so as to end the efforts to link smoking with sports in the mind of children and young people.
- Special antismoking campaigns should be launched and directed towards the parents of children and adolescents so as to prevent the untoward effects of passive smoking.
- Legislation prohibiting the promotion of alternative forms of tobacco use (smokerless tobacco) should be introduced.
- Role modeling of parents as non-smokers should be encouraged at home and in the workplace and other public places.

(7) The government should consider its investment and subsidy policy in both agriculture and food industry to ensure that they are consistent with the nutritional concepts mentioned above. Food policy should be geared to promote the growing of plant foods, including vegetables and fruit, and to limit the promotion of fat-containing products, wherever possible [28].

(8) The governmental and private organizations should encourage epidemiological studies on dietary factors associated with chronic diseases, including cardiovascular disease.

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