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DIET-RELATED NON-COMMUNICABLE DISEASES IN SAUDI ARABIA

A.A. AL-SHOSHAN

Department of Food Science, College of Agriculture, King Saud University, Riyadh, S. Arabia.

ABSTRACT

The aim of this paper is to review the current situation of chronic diseases which are related to change in diet and lifestyle in Saudi Arabia. Health statistics show that seven out of ten leading causes of death are related to this group of diseases. Cardiovascular diseases (CVD) are the major cause of death in the country. Diabetes, hypertension, and obesity are highly prevalent in the community and are among the main risk factors for CVD. It was reported that 4.5% of the adult population in urban areas had diabetes mellitus, mostly in non-insulin dependent form. The prevalence of diabetes increased to 13% among those aged 55 years and over. Obesity is highly prevalent, especially among women, and highly correlated with age. Several studies on cancer were carried out among hospitalized patients; these revealed that lung cancer, gastro-intestinal malingnancies, malignant lymphomas, head and neck cancers, and breast cancer are common in the country. The incidence of cancer was estimated to be 800 per million population per year. The prevalence of dental caries among school children is alarming as 68% of them had dental caries. It can be concluded that diet-related non-communicable diseases have become major public health problems in Saudi Arabia, and there is an urgent need for a health strategy to prevent and control these diseases.

Key Words : Cancer, cardiovascular disease, diabetes, obesity, oral health, Saudi Arabia.

INTRODUCTION

The Kingdom of Saudi Arabia now faces a new challenge : how to combat the chronic health problems due to overnutrition, lifestyle and behaviour changes associated with wealth, abundance, and affluence. Seven out of the ten leading causes of death are now diet and lifestyle related diseases. Overnutrition, a gross imbalance between the food energy intake and expenditure results in obesity which, in turn, triggers the onset of major chronic killer diseases, such as diabetes, hypertension, cardiovascular diseases, kidney failure, certain types of cancers, and the associated complications. This new emerging trend, termed the "affluent diet", characterized by wealth, high standard of living, prosperity, high purchasing power, taste for rare commodities, and sedentary lifestyle, is now causing an outbreak of health hazards which are sometimes referred to as "*the diseases of affluence*" (Al-Shoshan, 1992).

The increased GDP, wealth, prosperity and income distribution in the Arabian peninsula have resulted in unique changes in lifestyles and associated consumption patterns. There have been drastic changes in food consumption patterns, and dietary habits asa result of high income and the associated prosperity. Musaiger (1987) describes the seventies, the oil boom period, as the "Golden Decade" for the Arabian peninsula and especially for the Gulf region, and points out the invasion of western civilization to every household in the region. Western countries themselves have now developed new national polcies, strategies, and guidelines in order to deal with, and alleviate the consequences of affluent diets and associated lifestyles (Al-Shoshan, 1992).

This paper highlights the situation of diet-related non-communicable diseases in Saudi Arabia based on available information.

Obesity

The association between obesity and diabetes, hypertension, cardiovascular diseases, certain cancers, some digestive diseases, and reduced life expectancy are well established (USDHHS, 1988). Therefore, the prevalence of obesity in a general population is a rough indication of the health status as a whole. Available data clearly indicate the prevalence of adult obesity in the Kingdom, affecting women in particular. However, the data are insufficient to quantify the trend for the entire adult population(WHO/EMRO, 1989). Childhood obesity, and its continuation to adulthood, is now a well established risk factor (USDHHS, 1988). A survey, utilizing the National Center for Health Statistic Standards, NCHS/USA, carried out in the Kingdom, revealed 14% childhood obesity among those between 0 to 6 years of age (WHO/EMRO, 1989). A study carried out by Khwaja and Al-Sebai (1987) on 467 married non-pregnant Saudi female patients showed an overall prevalence of 27% obesity. Age was more a contributing factor to obesity than was parity. A significantly higher proportion of women, age 25 years and above as compared to those under 25 years of age, were found to be obese (Table 1). A study by Bacchus et al. (1982) in Saudi males in the Al-Kharj area showed that 65% of the diabetic patients were overweight as compared with 26% of the non-diabetic population, and that diabetes in Saudi Arabia appeared to be related to obesity.

Similar findings were also reported by Fatani (1987) and his co-workers on rural subjects of both sexes in the western region. The Body Mass Index (BMI) was used as an index of obesity. Men and women were considered to be obese when their BMI's were equal to or over 27.0 and 25.0, respectively. Among adult subjects, fifteen years and over, the rate of obesity among diabetic subjects, (41.4%) was

TABLE 1

Prevalence of obesity among married non-pregnant females

Quetelet's index kg/m^2	No. of Patients	%
< 20	51	10.9
20-24.9	164	35.1
25-29.9	126	27.0
30-34.9	88	18.8
35 over	38	8.2
Total	467	100.0

Source : Khwaja and Al-Sibai (1987)

significantly higher than that among normal subject (29.3%). For men, the obesity rate was significantly higher among diabetic subjects, (39.1%) than in normal subjects, (21.3%). The differences for women were much less (42% compared to 30%). It was concluded that for both urban and rural areas the impact of modernization and affluence, occurring in the area over the last two decades, have brought the problems of obesity, and diabetes mellitus to the surface in a vulnerable society. The changes in lifestyle, diets rich in energy, sedentary lifestyle, and urbanization have all probably contributed to the higher prevalence of obesity, and diabetes. This study also showed that for normal subjects, the obesity rate increased with the increase of income, and was more prevalent among people of 35-54 years old.

In a recent study, Khashoggi et al. (1990) and her co-workers examined the factors affecting obesity among adult females in the Western Province of the Kingdom. It was found that the prevalence of obesity was correlated with age, income, marital status, parity, education, type of job, age of husband, number of servants, and the availability of an elevator.

Diabetes mellitus

Although diabetes mellitus in Saudi Arabia has attracted the attention of many scientists and health professionals, during the last several years, only a few studies on the disease have been published. These studies were performed in local communities and were mostly among hospital patients. The general impression from the limited literature, is that diabetes is an emerging problem in Saudi Arabia particularly in urban societies. Some studies showed a relatively high prevalence of 4.5% in urban communities. It has been suggested that the rapid socio-economic changes in the country, over the last 20 years, may have contributed to the high prevalence rate. Many questions regarding the magniture of the problem, its distribution, contributing factors, pathogenesis and criteria for diagnosis still need to be answered. Sebai (1987) pointed out that populations in which diabetes was not a public health problem may show an increased incidence of the disease as they become more affluent or the carbohydrate intake increases markedly, Apparently, this is what happened in Saudi Arabia in general, and in its urban societies in particular, as a result of the rapid socio-economic development. Another study showed that the prevalence of diabetes in urban communities was 2.5% and 4.7%, among males, and females respectively.

The impact of modernization and affluence on the prevalence of diabetes has also been discussed by Fatani et al. (1987). Rural

subjects of both sexes in Western Saudi Arabia, were examined for blood glucose, body weight and height. The results showed an overall prevalence of 4.3%. The prevalence of diabetes differed between sexes, and increased with age and income (Table 2). It was suggested that the rapid socio-economic changes in the country over the last two decades have contributed to the high prevalence rates of diabetes. The authors emphasize the urgent needs for health planning and education as well as the establishment of specialized centers for the better management of the disease.

In a study on non-insulin dependent Saudi diabetics, the prevalence of adult onset diabetes (85%) was similar to that of western societies (Kingston and Skoog 1986). It was concluded that most diabetes in Saudi Arabia is non-insulin dependent with onset in middle age, and patients are characteristically obese at the time of diagnosis. Polyuria, nocturia, and ketosis are often absent or mild, despite severe hyerglycemia (Kingston and Skoog, 1986). Hagroo and his co-workers (1986) studied the pattern of diabetes mellitus in Saudi diabetic patients at Riyadh Central Hospital. They noted the following characteristics among the patients examined and monitored : a) The prevalence of non-insulin dependent diabetes mellitus (NIDDM) was 80.8% as compared to only 19.2% for the insulin-dependent type (IDDM). b) A special tropical type was encountered in 43.7% of the IDDM. c) Neurovascular microangiopathic complications, including diabetic foot disease were common in all groups. The authors emphasized the importance of education, and dietary management rather than insulin administration, and chemotherapy for the diabetic population.

A review on diabetes mellitus in Saudi Arabia (Ahmed, 1989) concluded that the prevalence of diabetes was 3.6%, and that it increased with age to 13% of subjects over 55 years of age. Socio-economic status was also correlated with the prevalence. A pilot study was conducted in different regions of Saudi Arabia, in order to estimate the frequency of fasting hyperglycemia in the Saudi population. Most of the cases were found to be at the age of 40 years and above. It suggested the need for epidemiological studies in order to determine the prevalence of different types of diabetes, etiological factors, clinical manifestations, genetics, and the morbidity and mortality associated with diabetes in this population (El-Hazmi and Warsy, 1989).

Cardiovascular Diseases and Hypertension

There has been little published information or reliable data indicating the true prevalence of cardiovascular diseases in the Kingdom of Saudi Arabia. Data from other countries of the region suggest that these diseases are the major causes for morbidity,

TABLE 2

Prevalence of Diabetes mellitus in rural Saudi Arabia

Age (year)	Subjects studied (N)	Subjects with diabetes	%
0 - 14	2,033	14	0.7
15 - 34	1,821	41	2.3
35 - 54	936	111	11.9
55 above	432	58	13.4
Total	5,222	224	4.3

Source : Fatani, et al. (1987)

hospitalization, and of economic burdens on the health care services, and thus, on national development. The most acceptable information concerning cardio-vascular diseases are in the form of mortality data which can be extrapolated from the entire region.

As a whole, cardiovascular diseases, both ischemic and cerebrovascular diseases, show clear signs of elevation in the Kingdom of Saudi Arabia, and the entire region (WHO/EMRO, 1989). The most recent data from the National Nutrition Survey, concerning the parameters of cadiovascular diseases and hypertension are now available for some regions, but are not conclusive enough for inclusion in this paper (KACST, 1991).

Cancer

A recent review article from the region states that cancer in Saudi Arabia is an ever increasing problem as people change their lifestyle, and their longevity increases (Sebai, 1989). The incidence of cancer is estimated to be around 800 new cases per million population per year, as compared to 400 cases in Kuwait and 1,000 in Iraq. More than 70% of cancer patients are admitted to hospitals at an advanced stage, usually beyond the curative therapy. The care of terminally ill patients is becoming a burden in Saudi Arabia. The traditional extended family is gradually being transformed into a nuclear family which makes the care of terminally ill cancer patients a major problem for both family and the government. Taking into consideration the rate of population growth, a longer life expectancy at birth, rapid industrialization, affluent lifestyle, and the associated dietary pattern, up to 10,000 new cases of cancer per year could be expected. Therefore, as the author suggests, balanced intervention, both preventive and curative, should be given utmost attention and priorities. The most successful approach for control of carcinogenesis lies in its prevention; both primary, avoiding the carcinogens, and secondary, early detection and treatment (Sebai,1989).

Several studies, mostly epidemiological, have been carried out on cancer in the Kingdom in order to determine the magnitude of the problem. In the absence of a national survey or national cancer registration, these studies are the only source of information to date on cancer in the Kingdom. Mahboubi (1987) reviewed the cancer profile in the Kingdom of Saudi Arabia, covering more than 11,000 cases, representing the entire country, and concluded that a true incidence of cancer in Saudi Arabia can not be known until a national population-based cancer registry is established. Environmental factors such as tobacco, alcohol, snuff, carcinogens, and co-carcinogens are emphasized in the etiology of cancer incidence. According to the review, the most prevalent cancers among males are malignant (non-hodgkin's) lymphomas, and cancers of the

oesophagus, lung, liver and stomach. Among females, cancers of the breast, non-hodgkin's lymphomas, thyroids, oesophagus, and cervix are the most prevalent.

El-Akkad (1983) investigated the patterns of cancer occurrence in the different regions of the country. It was suggested that environmental, social, and genetic factors, among others, may be responsible for its heterogeneous distribution in the Kingdom. In another study by El-Akkad et al. (1986) it was found that there was an upward trend in the incidence of lung, breast, colon and rectum cancer; and a downward trend in oesophageal cancer. These trends were related to the rapid pace of economic progress, industrialization, and affluence.

Koreich and Al-Kuhaymi (1984) studied 297 patients with malignant disorders, referred to the Oncology Unit of the Riyadh Armed Forces Hospital, Al-Kharj. They concluded that no correlation, due to small sample size could be established between the types of malignant disorders, and any environmental, social, or dietary factors. They indicated, however, an upward trend of bronchogenic carcinoma, due to smoking and stress, as a result of rapid urbanization, sedentary lifestyle and industrialization. Although the etiology is not yet clearly understood, Seraj and Sabbah (1983), ruling out a single factor in the etiology of oesophageal cancer, suggested multifactors, involving hot spicy food, saleeg, nutritional deficiencies, environmental agents, and possibly genetic factors in the etiology, pattern, and distribution of cancer of the oesophagus.

Amer (1982) monitoring 1,000 consecutive cancer patients in King Faisal Specialist Hospital and Research Center, found that gastrointestinal malignancies accounted for about 25% of all the patients. He stated that the finding, even though it does not represent the overall incidence of cancer, may indicate that gastrointestinal malignancies, malignant lymphomas, head and neck cancers are relatively common in the Kingdom. The importance of diet and consumption pattern in the etiology was emphasized. According to the author, dietary variables were found to be strongly correlated geographically with several types of cancer. Cancer of breast, corpus uterus, and colon cancer were found to be strongly associated with total protein and fat consumption, particularly meat and animal fat, while gastric cancers, and possibly head and neck cancers, were related to malnutrition, especially the lack of vitamins. Breast cancer was reported to be more common among women of middle and upper socio-economic status. Changing trends in gastric cancers have been attributed to changes in dietary pattern and associated lifestyle. All these studies were hospital-based, thus, the results are not representative of a region or the country as a whole.

Data originating from the Annual Report of the Tumor Registry : of the King Faisal Specialist Hospital and Research Center, a primary national referral center of excellence for specialized medical therapies and treatment of neoplastic disease, founded in 1975, Riyadh, are known to be highly reliable, and could be considered as national clearing house for data reflecting all the cancer cases found in the Kingdom of Saudi Arabia (KFSH & RC, 1988). A total of 15,115 cancer cases were registered during the period of 1975-1987; representing 8,575 (56.7%) males and 6,540 (43.3%) females, respectively.

The case distribution by age showed the largest number of known cases that occurred during the 5th and 6th decades in males, and 4th and 5th decades in females. Frequencies of the common malignancies in the Kingdom are somewhat different from those of the western world. Common tumors of the West such as lung, colon and prostate, are much less frequent in Saudi Arabia, except breast cancer which is just as common as in the West. Breast cancer is, by far, the most common tumor, and represents 16.5% of all female malignancies. The mean age at diagnosis is a decade younger as compared to those of the West. All leukemias constitute the second most common neoplasm seen at the KFSH & RC. The leukemias make up the most common malignancy in children under the age of 15 years. The incidence of oesophageal cancer is markedly more frequent in Saudi Arabia than in the West. The frequency of lung cancer is much lower than in Western countries; indicating much lower level of smoking and industrial pollution. It is, however, the second most common tumour in males. Colorectal cancer is markedly less common as compared to West, for which dietary factors may play a role. It represents 3.1% of all tumours registered at the KFSH & RC compared to 15% in the West.

It should be noted that there are noticeable differences in the relative frequency of cancers between different regions in Saudi Arabia which reflect the diversity of the geography, climate, urbanization, availability of health services, consumption pattern, dietary habits, educational level, and lifestyle of people in different parts of the Kingdom.

Oral Health and Cariogenesis

Major oral public health problems in the Gulf area include the prevalence of cariogenesis, and periodontal diseases. As a result of rapid urbanization and socio-economic progress oral health and dental care services have been given some attention in the Kingdom by concerned health care authorities, as well as by researchers. Investigators have, however, been hampered by lack of reliable data

on the problem, and have recommended in depth and comprehensive studies (El-Angawi and Yousif, 1982; and Salem and Holm, 1985).

These early small scale regional studies, do not reflect the national profile in Saudi Arabia. Al-Shammary and Guile (1986), in the mid-eighties, presented a comprehensive overview of dental diseases in the Kingdom and the role of the King Saud University, as a center of higher education and training in dental care services, was evaluated from the view point of national needs and future projections. Al-Shammary (1987), in another study, dramatizing the role of preventive dentistry in the Kingdom, reviewed the demand for dental care in the Riyadh area. Monitoring the distribution of major complaints by age and sex, the author pointed out that the lack of data on the prevalence of dental diseases among the Saudi population created difficulties for planners, educators, and health professionals who were involved in the dental care delivery services of the Kingdom. In a more recent study, Al-Sekait and Al-Nasser (1988), investigated the prevalence of dental caries in a population of 7,040 school children. The prevalence was 68%, and the DMF index (decayed, missing & filled) was 2.0. The study indicated that caries was more prevalent in middle and upper income group, and was probably related to the high consumption of refined sugar and sugar products. It was concluded, that the application of preventive dentistry and dental education in the primary schools should be a major step for the ultimate goal of a caries-free community in the Kingdom of Saudi Arabia. A recent review article by Al-Khadra (1989) also highlighted the increasing incidence of cariogenesis and dental fluorosis in certain regions, due to high fluoride content in the drinking water, and pointed out the shortage of dental health professionals in the country.

Conclusion

Although reliable information on the prevalence of some diet-related non-communicable diseases in the Saudi community are not available, the hospital-based studies and mortality statistics indicate that these diseases are increasing dramatically. Cardiovascular diseases have become the major causes of death in the country. Diabetes and cancer are problems of concern and create a heavy load on the curative health services. The prevalence of obesity especially among women and of dental caries among school children is very high. Epidemiological surveys and other research activities are urgently needed to demonstrate the risk factors associated with these diseases in Saudi Arabia, so that more effective preventive measures can be undertaken.

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