EMIRATES JOURNAL OF AGRICULTURAL SCIENCES

Special Issue

Proceedings of the Workshop

on

NUTRITION AND CHRONIC DISEASES IN THE ARAB MIDDLE EAST COUNTRIES
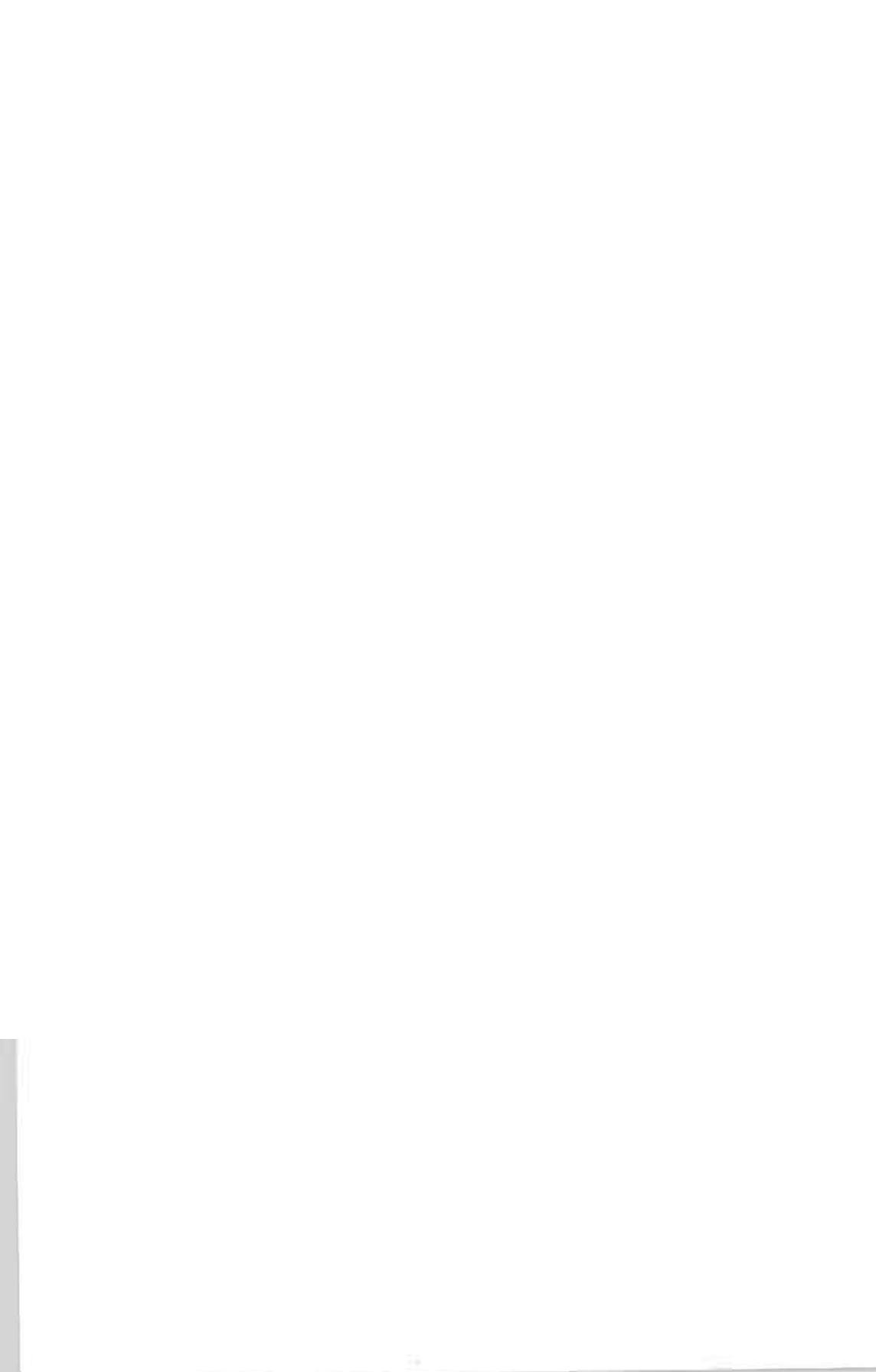
April 10 - 12, 1994

AL-AIN, UNITED ARAB EMIRATES

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Special Issue

EMIRATES JOURNAL OF AGRICULTURAL SCIENCES

Faculty of Agricultural Sciences
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PETER L. PELLETT
Department of Nutrition
School of Public Health and Health Sciences
University of Massachusetts
Amherst, MA 01003, U.S.A.

ABDULRAHMAN O. MUSAIGER
Department of Food Sciences & Nutrition
Faculty of Agricultural Sciences
UAE University, Al-Ain.

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By

H.E. Sheikh Nahayan Bin Mubarak Al-Nahayan
Minister of Higher Education and Scientific Research and
Chancellor of U.A.E. University

Honoured Guests
Ladies & Gentlemen

It gives me great pleasure to welcome you to this workshop which deals with a topic of great importance, namely the relationship of nutrition to chronic diseases in the Arab Middle East Countries.

This topic, as you well know, is closely related to the economic and social developments that determine the quality of life in our society and influence food consumption patterns and habits that are beginning to spread in our societies.

The convening of this Conference comes at a time when the University is directing its research activities towards areas of emphasis that are applied and closely linked to the needs of our community and its well-being.

In all these efforts, we are guided by H.H. Sheikh Zayed Bin Sultan Al-Nahayan, the President, who emphasized that this University be a center of excellence of research that serves the community well by diagnosing its needs and providing feasible solutions to problems that affect the life of every individual.

It is now well established that the types of food and eating habits of every community have an influence on chronic non-communicable diseases. Simultaneously, as countries all over the world move towards guiding their people to better eating habits such as less fat, sugar, salt, artificial additives, we in the Arab World are moving away from our old healthy eating habits. We continue to acquire some foreign eating habits that create nutritional and health problems as well as create economic burdens on our countries.

We are aware of the improvements that have taken place in the health status of our population such as reduced mortality rates. However, we also know that these achievements are being threatened by the bad food habits which will increase the death rate in our society especially in middle-aged and senior groups and lead to a rise

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in the cost of medical care in the country. This will undoubtedly reflect negatively in our plans to move forward with health services.

The close relationship between nutrition and non-communicable chronic diseases and the resultant effect on the well-being of our society, require a joint and concerted effort on the part of the individual as well as the society at large. To accomplish this, let me suggest the following approach or scenario :

1. We should look at nutrition and eating habits in the context of medical prevention measures. This will require changing to better food habits which will decrease the occurrence of these non-communicable chronic diseases as evident in the scientific literature the world-over.

2. We should strongly strive to promote good nutrition and eating habits through implementation of a viable public awareness program with emphasis on a 'healthy diet'. This campaign will also emphasize nutrition education, overnutrition, and bad eating habits.

3. We should all exert special efforts in explaining our traditional diet in the Arab and Gulf countries with emphasis on the food items that evolved under our local conditions. Efforts should also concentrate on conducting scientific studies to improve the nutritional value of our diet, amount to consume in a healthy manner, and ways to reduce food wastage.

4. We should also formulate national policies and strategies in consultation with the agricultural and medical groups. These policies should clearly spell out guidelines for proper nutrition, suggest means and ways of carrying out joint programs among all relevant parties, define research and development needs and outline criteria for evaluation and follow-up.

We should also bring to focus all other issues that are of paramount importance to food and nutrition. These are, to mention a few, production and importation of food, nutrition education, public awareness programs, scrutiny of food advertisements, preventive and treatment measures of non-communicable chronic diseases as well as promotion of scientific research and its application in human nutrition and health.

I would like to close by welcoming you all once again in our country and wishing you the best in your deliberations and discussions.

Address Delivered at the Opening Ceremony

By

Dr. N.J. DAGHIR, DEAN,
Faculty of Agricultural Sciences
UAE University

It is indeed both an honour & a pleasure to address you at this occasion, the opening of the Workshop on Nutrition and Chronic Diseases in the Arab Middle East Countries. The idea of organizing this workshop comes as a result of the urgent need to assess, analyze, and understand the very rapid changes in the dietary habits of the people of the M.E. region in general and the gulf region in particular and the consequent effect on their health. It also comes at a time to inaugurate the department of Food Science and Nutrition at the Faculty of Agricultural Sciences in the UAE University and launch it's local and regional activities. This department has been newly established and was installed to answer to the rising need of professionals in Food Science and Nutrition.

The question may be raised at this time as to what is the role of Nutrition Education in an Agricultural Faculty and in the University at large. Before I answer this question, I would like to ask an even more general question and that is what is Nutrition and what do the Nutritional Sciences cover ?

Nutrition means different things to different people and one's understanding of the term usually reflects his own particular interest or involvement in the field. Thus, the concept of nutrition held by the molecular nutritionist is not the same as that of a whole animal or a population nutritionist. The one common ground of agreement is that nutrition is an applied science rather than a basic one. One definition of the nutritional sciences includes a comprehensive spectrum of the science of food, the nutrients that make up foods, the chemistry & physiology of utilization of those nutrients and ultimately the set of complex relationships of food & nutrients and their consequent effects on the health & well-being of all people. Therefore, it is a science that concerns all people and pertains to humanity at large.

Let me now go back to the original question and that is the role of an agricultural Faculty in nutrition education. It is well known that the origins of much of nutrition as a science developed in agriculture- oriented research. This was because the solution of problems in animal nutrition was recognized to be a necessary step

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toward improvement of food production and utilization. The problems of animal production led to such work as the studies of energetics, the discovery of several of the vitamins and trace minerals, and the development of plant protein resources. Agricultural scientists therefore have played a major role in the development of our basic knowledge of nutrition principles and their applications to food production and use. The Food Sciences are an integral part of the broad field of Nutritional Sciences. Agriculturists in any nation are usually concerned in having enough food for all people in that nation to eat, but they need to be concerned in providing people with enough information to know what and how to eat. Safeguarding the nutritional content of food is as essential as maintaining its abundant supply. Merely by producing food we do not solve the problems of malnutrition. The presence of an abundance of these foods accentuates the problems of getting these foods to the people who need them most. To accomplish this, there must be greater emphasis on nutrition education, on the processing, marketing, distribution and delivery of foods to the consumer. Access to food itself and also to information about a healthy diet and the safe handling of food, is a right of every human being on the face of this globe. Regardless of their professional interest, university students in any faculty should be exposed to nutrition as part of their general education. This is particularly important if graduates get into teaching or extension work after graduation or other public welfare programs.

We have started at this University a general education elective course in human nutrition open to all students in this University. After three years of starting this course, we are proud to say that student enrollment in it is higher than in any other elective course offered at this University.

Realizing the importance of nutrition education, the U.S. which is one of the biggest food producers in the World has taken several steps in that direction. For example, more than half of the U.S. Department of Agriculture's $ 68 billion budget is spent on nutrition programs. Some of these programs feed more than 25 million children lunch each school day or provide groceries for more than 27 million families through the Food Stamp program.

Nutrition information today is available thru several computer-based systems. Electronic Bulletin Boards and databases are an important method of information exchange. They are available around the clock, so information is available whenever it is needed. Nutrient Data Bank Bulletin Board sponsored by the Human Nutrition Information services in the U.S., provides information about the current publications and computer files on nutrient composition of foods. There is also an International Food & Nutrition Database.

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This is besides the bibliographic databases, namely AGRICOLA and QUERRI (Questions on University Extension Regional Resource Information).

The preparation of this program, reminded me of the yearly symposia held on Near East Nutrition & Health at the American University of Beirut during the late sixties & early seventies. The subjects at that time were on Protein-Calorie Malnutrition. It is interesting to note that today, about 25 years later, we are dealing with overnutrition and the problems that are covered are those of affluent societies mainly. There has been a tremendous shift in nutritional problems of the area and our relative concern to these various problems.

We at this University are committed to serve the whole region and particularly the Gulf region in nutrition education, research and services. We are prepared to assist in any way possible and our job should not be too difficult for it has often been said that the story of Nutrition is one of the most dramatic stories in modern day science and every effort must be made on the part of nutritionists to bring this story to the public.

I would like to take this opportunity to thank H.E. Sheikh Nahayan Bin Mubarak Al-Nahayan - Minister of Higher Education and Scientific Research and Chancellor of UAE University for his patronage of this workshop as well as for his continued guidance and help in the programs of our Faculty. Thanks are also due to all our guests who accepted our invitation and to all those on the Faculties of Agricultural Sciences and Medicine & Health Sciences that participated in preparing for it. Special thanks go to Dr. M. Afifi, our Associate Dean who chaired the arrangements committee and Dr. A. Musaiger, the chairman of the technical committee. We would also wish to acknowledge the cooperation and help of the Ministry of Health, the FAO and WHO in putting this program together. Finally, I would like to thank Nestle's Company for their financial support of this workshop. I wish you all a successful workshop and a very pleasant stay in the Garden City of Al-Ain.

CHRONIC DISEASES IN THE EASTERN MEDITERRANEAN REGION : AN OVERVIEW

A. ALWAN

Noncommunicable Diseases, WHO Regional Office for the Eastern Mediterranean, Alexandria, Egypt.

ABSTRACT

Profound demographic, socio-economic, and behavioural transformations have taken place in the Eastern Mediterranean Region (EMR) over the last three decades. Longevity has progressively increased and a steady shift from traditional and rural lifestyles to more urbanized and modernized patterns is demonstrated. With modernization, lifestyles characterised by smoking, physical inactivity and new eating habits have emerged. The significant transition to economic affluence in the Region has been associated with changes in nutritional status and dietary consumption trends. Analysis of data collectd from some Arab countries demonstrate a rapid rise in food energy availability and a steep upward trend in the consumption of animal fats and sugar. Rates of obesity presently reported are remarkably high. The impact of these changes on health are considereable and the implications for the epidemiological profile in countries of the Region have been dramatic. While infections and parasitic diseases generally remain priorities, countries now face a new set of health problems relatedto urbanization, emergence of westernized lifestyles and progressive aging of populations. Among the so-called diseases of modern lifestyles, cardiovascular diseases (CVD), cancer and diabetes emerge as the most important in terms of morbidity and mortality. Data from the Region indicate increased death rates from hypertension and coronary heart disease. A steadily rising rate of mortality from CVD has been reported; these groups of diseases are now reported to be the leading identifiable cause of death in many countries. The increasing magnitude of non-communicable diseases calls for urgent action to initiate prevention and control measures.

INTRODUCTION

A multitude of factors influence health. They include genetic predisposition, environmental factors as well as demographic and socioeconomic variables. Behavioural risk factors in the form of life-style characteristics of modernization have become increasingly visible as underlying causes of preventable morbidity and premature death. Alcohol, tobacco, overnutrition, high serum cholesterol levels.

mental stress and injuries are the major precursors of the leading causes of morbidity and mortality namely, cardiovascular diseases, neoplasms, diabetes and accidents (Last and Wallace, 1992).

It has been shown that modern "disturbances of human culture" operating from early childhood onwards, are responsible for the epidemic of noncommunicable diseases and their complications. These disturbances include :

-       Overnutrition associated with elevated levels of blood pressure, serum cholesterol and body weight, as well as high prevalence of diabetes;

-       The twentieth century mass habit of cigarette smoking; and
-       A sedentary life-style (WHO, 1990).

With modernization and urbanization of developing poulations, new eating trends have emerged. These include habitual high intakes of :

-       Total food energy in relation to energy expenditure (physical activity);
-       Total fats, saturated fats and cholesterol;
-       Refined sugar and other processed foodstuffs low in fibre;
-       Salt and other high sodium compounds and
-       In some populations, alcohol.

High intakes of saturated fat and cholesterol, together with low fibre intake, lead to high levels of serum cholesterol which is one of the major aetiological factors for cardiovascular diseases. Obesity, high dietary intake of sodium and heavy alcohol consumption lead to higher level of blood pressure and increased prevalence of hypertension from youth onwards. High blood pressure is also a major risk factor for other cardiovascular diseases such as coronary heart disease and strokes. In addition, obesity and physical inactivity are closely linked to the aetiology of non-insulin dependent diabetes which is also a significant risk factor for cardiovascular diseases.

Worldwide, smoking is responsible for an estimated 30% of all cancer deaths, 21% of deaths from coronary heart disease, 18% of stroke deaths and 82% of deaths from chronic obstructive pulmonary disease. Globally, tobacco is estimated to cause at least three million deaths a year, about one million of which occur in developing countries (WHO/PAHO, 1992).

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A recent analysis of studies of exercise and heart disease concludes that lack of exercise is causally related to increased risks of heart disease, and that the relative risk of this factor is in the order of magnitude as those of moderate smoking and elevated cholesterol Powell et al. (1987). Analysis of studies on the role of behavioural factors in disease suggests that approximately two thirds of deaths in the United States are attributable to preventable precursors. Tobacco and three other precursors strongly related to personal health behaviour, namely high blood pressure, overnutrition and alcohol, account for the majority of preventable deaths, life-years lost and hospital days (Emler and Eddins, 1987).

Coronary heart disease (CHD), diabetes and hypertension are now considered examples of multifactorial disorders which result from the interaction of environmental factors with genetic predisposition. Although individuals differ in the nature of their responses to the environmental "disturbances of human culture", these differences in genetic predisposition appear to play a smaller part in accounting for the interpopulation differences in the incidence of, and mortality from, these diseases (WHO, 1990). Thus, by controlling environmental factors, which exert an overwhelming influence on the occurence of the noncommunicable diseases, the potential for the prevention of this epidemic is indeed great, as the recent marked declines in CHD mortality in several developed countries indicate (WHO/EURO, 1988).

The so called "diseases of modern lifestyles" are now the major causes of morbidity and mortality. Cardiovascular diseases (CVD) taken together account for a major proportion of all deaths during adulthood in both developed and developing countries. It is estimated, that around the year 1980, almost 50% of all deaths in developed countries were caused by CVD and about 20% by cancer (WHO, 1990).

Like CVD, cancer is forcing itself into every country's health agenda. Each year it affects at least nine million people and kills five million. Its economic, as well as health consequences, are considerable. More than one half of all cancers occur among the three quarters of the world's population residing in developing nations (WHO, 1992).

The prevalence of diabetes shows considerable variations between various poulation groups. Up to 35% of adults have been reported to have diabetes in certain predisposed communities. While available data confirm the global nature of the problem, there is evidence to indicate that the disease

reaches its greatest frequency in developing countries and among minority groups and the disadvantaged in the industrialized world (King et al. 1991).

This paper attempts to review available data on the epidemiological aspects of the most common chronic health problems associated with modern lifestyles in the Eastern Mediterranean Region (EMR), and to discuss the potentials for their prevention and control.

Demographic trends

During the last two decades, significant demographic changes took place. The total population in the region has almost doubled in 20 years. The population has grown from 209 millions in 1970 to 376 in 1990 and is estimated to be 513 in the year 2000. Children under 15 years constitute about 44% (range : 26-48%). The percentage of persons aged 65 years and over has been maintained at a low proportion, 3% in 1990. However, because of the favourable trend in infant and under 15 years mortality, life expectancy at birth has increased from 56 years in 1985 to 62 years in 1990 (WHO/EMRO, 1991).

The population density is 28 inhabitants per sq. km with a range of 3-746 inhabitants per sq. km highlighting the differences among countries in their space distribution. Urbanization continues to increase. The proportion of the urban population has changed from 39% in 1985 to 44% in 1990. In some countries, up to 100% of the population is urbanized.

There is a wide variation in demographic trends among countries. At one end of the spectrum are countries with a life expectancy as high as 76 years and on the other extreme are those with life expectancies as low as 42 years. A more striking pattern exists concerning socioeconomic indicators where extreme variations are seen. The per capita income ranges between US $ 190 in one country to $ 15 700 in another (average of $ 1130). Adult literacy rate ranges from 11% to 95% (average 43.5%).

Despite this heterogeneity, follow up of the demographic and socioeconomic indicators generally demonstrates a steady shift from traditional and rural lifestyles to more urbanized and modernized patterns.

Nutritional trends

In the EMR, the significant transition to economic affluence has been associated with changes in dietary pattern and nutritional status. Analysis of the data collected from some countries of the region on dietary consumption trends demonstrates a rapid rise in food energy availability and consumption beyond requirement. It is predicted that if the increase continues at the present rate, the food energy availability in the Region as a whole will exceed that in developed countries in less than a decade (WHO/EMRO, 1989). In a significant number of countries, consumption of animal fat and sugar shows a steep upward trend. Adverse consequences on health are anticipated if this trend continues.

Information on adult obesity is only available from a few countries. Nevertheless, it is clear that it represents a significant problem in the region. The rates of obesity reported from some member countries are remarkably high. In one country, up to 53% of males and 63% of females are obese. Among Saudi Arabian adults aged 18 to 74 years attending a primary health care centre, 51.5% of the men and 63% of females were considered obese. Overall marked obesity, defined as a body mass index of 30 Kg/m^2 was seen in 25% of people (Benhemd et al. 1991).

Studies on total serum cholesterol levels are scarce in the Region. However, available data from one country indicate that a substantial proportion of the population have levels above what is considered as the upper permissible limit (Inam et al, 1991).

Cardiovascular Diseases : Mortality and morbidity data

Precise data on the magnitude of CVD as a public health problem in the EMR are generally scarce. Despite the general impressions held by the medical profession and the general public of the increasing occurence of CVD, the extent of the problem has not been adequately examined in most Member States. Reliable mortality data are hard to obtain. However, data reported to the WHO Regional office from several member countries over the last 5 years provide valuable indicators on mortality trends. In most of these countries, CVD is the leading identifiable cause of death. The proportion of cardiovascular deaths ranged from 25% in one country to over 45% in another.

Analysis of mortality data from selected populations of the region reveals interesting results. Data from Kuwait indicate increasing deaths from coronary heart disease and hypertension (Nissinen et al., 1988; Uemura et al., 1988). The mortality rates

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for cardiovascular diseases, accidents and malignant neoplasms represented almost half of the general mortality rate in 1984. Review of the data available on the main causes of death registered in Jordan in 1985 show that CVD is clearly the leading cause of death. It is responsible for 39.1% of all male deaths in 1985. The same data indicate a steadily rising rate of mortality from CVD over the period 1961-1985. In males, CVD was responsible for 5% of all deaths in 1961, rising to 12.6% in 1970, 18.9% in 1975, 22.2% in 1979 and 39.1% in 1985. Corresponding figures for females are 2.9%, 11.7%, 13%, 18.5%, and 27.2% respectively. The same data show concomitant reductions in mortality due to communicable diseases over the same period (MOH, 1989).

The frequency of CVD morbidity in the general population of EMR countries is not known. No nationwide morbidity statistics are generally available; however, a limited number of prevalence studies has been carried out and other descriptive epidemiological data are available in some countries. As countries are realizing the increasing importance of these diseases and the need for action at the national level, the importance of reliable epidemiological data is becoming more recognized.

Coronary Heart Disease

CHD seems to be the predominant type of heart disease now encountered in many countries of the Region. Hospital data indicate rising trends. In Jordan, analysis of data on patients managed by the National Cardiovascular Centre between 1973 and 1987 revealed an interesting pattern that provides confirmatory evidence on the changing pattern of cardiovascular diseases in the country. A progressive increase in CHD is associated with a decline in the number of cases of rheumatic heart diseases. Almost half of all patients with angiographically confirmed CHD were below the age of 50 years and only 17% were above the age of 60 years (Doghmi et al., 1989).

Studies conducted on the risk factor profile and related lifestyle patterns reveal levels generally similar to those in industrialized communities. Although the evidence based on a few isolated observations does not provide firm conclusions on the exact role of the individual coronary risk factors in the region, a high prevalence of smoking (over 70%) has been consistently reported among sufferers of acute myocardial infarction. Hypertension is found in 22-47% of cases and diabetes in over 30%. Most patients had at least one coronary risk factor.

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Hypertension

Hypertension has long been recognized as a risk factor of CVD. Several studies have examined blood pressure levels in EMR populations. Using the WHO criteria of 160/95, the prevalence rates have been reported to range between 10% to over 17% of the adult population (Alwan et al., 1982; Faruqui, 1983). Although these surveys have generally used the same standardized methodology, the age groups studied varied from one place to another. This factor is at least partly responsible for the variation in prevalence rates. For example, although hypertension (160/95) was detected in 12% of the Iraqi sample studied and over 17% in one of the Pakistani surveys, the age groups studied were 15 years and over in the first and 30 years and over in the second.

Based on these figures, there are over 7 million hypertensives in Pakistan alone (Pakistan Medical Research Council, 1980). Moreover, the prevalence of hypertension appears to increase in the EMR, parallel to affluence. Studies carried out in Egypt since 1959 confirm this rising trend (Badawi, 1987). A national hypertension project has recently been initiated in Egypt to study the prevalence of hypertension in samples of the Egyptian adult population; preliminary results reported indicate that about 30% of the subjects examined have a blood pressure of over 140/90 (Ibrahim, unpublished).

As indicated above, urbanization is a progressive trend in the region. Data from studies conducted on both urban and rural population groups confirm higher prevalence in the urban populations. It is also reported that the rise of blood pressure with age is more marked for the urban compared with the rural population in Pakistan (Alwan et al., 1982 and Faruqui, 1983).

Detection rate and the level of awareness among hypertensive persons are generally low. In the report from Iraq, only 19% of hypertensives were aware of their high blood pressure prior to the survey. Similarly, in Pakistan, for every known case of hypertension, there are three undetected cases. Hypertension, like diabetes, may remain asymptomatic for years and is only detected when one of its devastating consequences occurs.

In conclusion, from the data available, evidence suggests that in many countries of the region, the present epidemiological and clinical patterns of hypertension do not appear to differ markedly from those in developed countries. While studies to

provide further knowledge on the role of ethnic, geographic and socioeconomic factors are needed, countries of the region should, at present, acknowledge the emergence of hypertensive disease and its consequences like CHD and cerebrovascular disease and initiate action for their control.

Diabetes Mellitus

During the last decade, data on the epidemiology and clinical characteristics of the two types diabetes have been reported from several countries of the region. Using varying diagnostic criteria, non-insulin dependent diabetes has been detected in 5%, 4.8% and 4.3% of Saudi Arabian, Iraqi and Egyptian population samples respectively (Al-Kasab et al., 1979; Fatani et al., 1987; and Arab, 1992). Ten percent of Tunisians and 14% of Omanis in the age range 30-64 years have been estimated to have diabetes. As with hypertension, the Egyptian data demonstrate distinct geographical differences with the highest prevalence in urban areas and the lowest among rural and desert populations.

The survey from Oman, which used the WHO diagnostic criteria, revealed the highest prevalence documented in the region; 9.8% of the population sample, 20 years and over, was found to have glucose values consistent with the diagnosis of diabetes (Asfour, unpublished). The intermediate category of impaired glucose tolerance (IGT), which may be associated with increased susceptibility to macrovascular complications, affects an additional proportion. In the Omani survey, IGT was found to affect 10.9% of the sample studied, thus the overall prevalence of glucose tolerance abnormalities (Diabetes and IGT) exceeds 20%.

The first report on the epidemiology of insulin dependent diabetes came from Kuwait and showed an incidence in the 0-14 and 0-19 years age groups of 3.96 and 5.6 per 100 000 respectively (Taha et al., 1983). Higher incidence rates have been subsequently reported elsewhere (El-Amin, 1989 and Salman et al., 1991). A report on childhood diabetes in Saudi Arabia, based on hospital records, suggests incidence peaks around 4-6 years and 11-14 years of age. In Sudan, the prevalence of this type of diabetes was determined in 43,000 school children 7-14 years of age. The overall crude prevalence rate was 0.95 per 1000. The incidence of diabetic children 0-14 years of age was reported to be 5.9 per 100,000 in 1987 increasing to 10.1 per 100,000 in 1990 (El-Amin, 1989).

Thus, available data indicate differences in the frequency of insulin dependent diabetes and may also suggest an

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increasing trend in recent years. More extensive investigation of the epidemiology of this disease in the EMR is clearly needed.

Clinical aspects of diabetes were reported from several member states in the region. In a study involving a sample of 1,175 Iraqi diabetics, the majority were in the age group 40-59 years. Those presenting with the classical symptoms of diabetes accounted for less than 50% of patients. The rest were diagnosed because of atypical symptoms or complaints related to the development of complications. More than 20% were totally asymptomatic and were detected through routine examination conducted for unrelated reasons (Alwan and Shamdeen, 1989).

The proportion of non-insulin dependent diabetics who suffer from obesity range between 75% in Iraq (Alwan and Shamdeen,1989) to 46% in Sudan (Elmahdi et al., 1991). A substantial proportion of insulin dependent diabetes presents with ketoacidosis. This serious and potentially fatal condition has been reported to be present in 82% and 67% of diabetic children at the time of diagnosis in Sudan (El-Amin, 1989) and Saudi Arabia (Salman et al., 1991) respectively and is the presenting manifestation in about 30% of Iraqi diabetics.

While these data demonstrate the high susceptibility of EMR populations to diabetes, reports have also shown that diabetics develop long term complications such as CHD at a rate similar to that seem in Western countries. This means that up to 20% of non-insulin dependent diabetics have been found to have retinal complications at the time of first diagnosis and that most would develop them over subsequent decades. A substantial proportion of people with IDDM eventually develop end stage renal failure and the majority of the diabetic population will eventually develop a potentially lethal cardiovascular complication.

While diabetes and its complications are major causes of morbidity, disability and premature death, the essential health care requirements for these patients are generally inadequate in the region. Facilities for self care are scarce and there is, at present, a serious lack of initiatives for organized programmes to remedy the situation. In some countries, very alarming facts have been reported on the health care status of people with diabetes. People may have no easy access to even life-saving drugs like insulin. Mortality appers to be disturbingly high among children with diabetes. Available data suggest that maternal complications and perinatal complications in infants of diabetic mothers are remarkably high. Facilities and experience required for the management of long-term complications such as vision-

threatening retinopathy and end-stage renal failure are simply not available in many places and grossly inadequate in others. Health care institutions are often overwhelmed by the increasing demands related to the diagnosis and tretment of the various disorders associated with diabetes.

Potentials for prevention and control

Profound demographic, socioeconomic and behavioural transformations have taken place in the EMR over the last two decades and further changes are projected in coming years. The impact of these changes on health is considerable and the implications for the epidemiological profile of member countries have been dramatic. While infections and parasitic diseases remain a priority in many countries, new sets of health problems related to urbanization, emergence of westernized life-styles and progressive aging of populations are also being faced.

Action is urgently needed at the national level. Health policymakers must engage in undertaking an epidemiological and socioeconomic analysis of the major disease problems and consider cost-effective intervention strategies. The traditional deeply rooted commitment to protect children and young people from infections and nutritional deficiencies by providing timely immunization and promoting optimal feeding must be continued.

Prevention of hypertension and cardiovascular diseases can be remarkably successful. Success has been demonstrated by several programes in developed countries; significant reductions occurrede for all the risk factors and substantial declines in CVD mortality have been recorded. Most of this improvement appears to be due to primary prevention of the disease (WHO/EURO, 1988 a, b).

Several recent WHO reports deal extensively with the strategies and practical approaches in the prevention of the epidemic of CHD and other atherosclerotic diseases. Top priorities with proven success in several developed countries include control of smoking and formulation of national food and nutrition policies. To prevent adult CVD, intervention should be based on preventive efforts in childhood and youth and focus on controlling the unhealthy behavioural risks and lifestyle characteristics such as smoking, eating patterns, lack of physical activity, and the like. Since attitudes and behaviours that influence future health are established during childhood and adolescent life, schools have a great potential to promote health,

Exercise has been shown to have a protective effect against diabetes as well. There is evidence to indicate a substantially higher diabetes prevalence among the least active, versus the most active. Intervention studies have demonstrated a beneficial effect of physical activity in improving insulin sensitivity and glucose tolerance.

An atherogenic and thrombogenic diet is an underlying cause of CVD. Obesity is associated with increased risk of diabetes in both sexes and in many ethnic groups. Evidence has accumulated to suggest that increased dietary intake of saturated fats and decreased intake of dietary fibre does, not only contribute to atherosclerosis, but can also result in abnormal glucose tolerance. Westernization of the diet appears to worsen glucose tolerance and there is evidence to suggest that return to a traditional diet is associated with a dramatic improvement of glucose tolerance.

Smoking predisposes to CVD, chronic lung disease and cancer. At least 30% of the estimated future cancer burden is potentially preventable by tobacco control.

In view of the above, intervention against non-communicable diseases in the region is not only needed but is also feasible. The main approach of such intervention is through health promotion, disease prevention and risk reduction. An integrated programe for the prevention of chronic noncommunicable diseases should be established. This programme can be built to prevent and correct behavioural risk factors associated with socioeconomic development and modernization. It will focus on three major elements: these are :

-   Exercise promotion;
-   Dietary modification; and
-   Smoking prevention.

A variety of intervention approaches will be used ranging from health education to regulations, taxation, subsidies, and information programmes. Efforts to implement this programme and to promote healthy lifestyles should be encouraged. Prevention of noncommunicable diseases such as CVD, cancer and diabetes is more cost-effective when it can be incorporated into personal lifestyles rather than added on as a clinical intervention (Weinstein, 1990).

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CHANGES IN FOOD CONSUMPTION IN THE ARAB COUNTRIES

S.S. MILADI

FAO Regional Office for the Near East, Cairo, Egypt

ABSTRACT

During the last 30 years food consumption patterns have been changed in several Arab Countries. Many factors contributed to these changes such as : the rise of income level and in turn, purchasing power, food price system and subsidies, urbanization, migration, food processing, food import, advertisements, internal conflict and wars, food aids, etc. It is difficult to quantify exactly the changes from food consumption surveys which have been conducted in the Region. Food balance sheet data for certain Arab countries of the region indicate, however, that the available per caput food energy and protein have doubled and fat has increased 3 fold. It was also observed, in a number of countries, that the per capita consumption of sugar, fat and oil, cereals, meat, milk and dairy products, fruits and vegetables, have greatly increased during the last two decades. On the other hand, food consumption patterns have deteriorated in some Arab Countries as a result of internal conflicts as in Iraq, Somalia and Sudan. At present, with the application of structural adjustment programmes in several countries of the region there has been a reduction in the consumption of certain food commodities especially sugar, vegetable oil, meat and cereals because of the increase of their prices after the removal of subsidies as in the case of Egypt. Similarly, with regard to infant feeding, artificial feeding has replaced breastfeeding and the consumption of processed weaning food has replaced traditional weaning food.

Key Words : Food consumption, socio-economic factors, Near East, Arab countries.

INTRODUCTION

The terms Middle East and Near East are often used without any clear definition of the territorial limits involved and there has never been general acceptance of their precise meanings. The Arab Middle East countries included for discussion in this paper comprise the twenty Arab countries who are members of the Arab League. The region under consideration sits astride the lines of communication with Europe, Africa and East Asia, and it has been, as a result, subjected to influences, in terms of their food consumption patterns, from the East as well as the West (Patwardhan and Darby, 1972).

The total land area covered by the twenty Arab countries is 13.67 million Km^2. Only about one quarter of this area is under agriculture, in which 85% is pasture land with remaining 15% being devoted to arable land and permanent crops. The latter area of permanent crops represents only 3.9% (53.5 million hectares) of the total area of the region. Only 18.7% of the arable land is irrigated and the remaining 81.3% is rain fed. The erratic rainfall in the region contributes to the instability of food production. Thus, the fluctuation and uneven distribution of rainfall in the region affect food production, food availability and consumption in several countries. The two major constraints affecting the expansion of food production in the Arab Middle East are : first, about 75% of the total area is desert and second, the scarcity of water resources in the remaining 25% of agricultural land. In the limited irrigated areas, water resources are to some extent under control, while the other areas, depending on rainfall, suffer from erratic and unpredictable amounts of water. Some countries in the region are thus affected from time to time by severe droughts such as Somalia, Sudan and Mauritania, while other countries may also suffer occasionally from droughts, such as Tunisia, Morocco and Jordan leading to acute food shortages in these countries.

The total population of the Arab Region was about 220 million in 1990/91 with an annual average growth rate (3.1%) which is considered to be among the highest in the world (FAO 1993). This means that the population in the Region will be doubled within the next 23 years, whereas the population of Europe, in contrast, would expect to be doubled in about 235 years. Consequently, food security, availability and consumption in this region will be affected by the high population pressures on the limited arable land as well as scarce water resources coupled with the increased food demand.

The Region is also characterized by a high increase in urbanization which ranges from 4 to 6% per year. As a result, more and more food producers are becoming food consumers, and, the expansion of the cities is mostly at the expense of the limited agriculture land. During the last two decades the region has additionally witnessed massive population movements both within as well as from outside the region. The latter have been mainly from the East Asian countries and have led to changes in food consumption patterns, especially in the labour importing countries (Miladi and Farrag, 1993).

During the last three decades, a very rapid change in food consumption patterns has occurred greater than in all its history and greater than in many other region of the world. This paper will deal with the changes in these patterns.

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MAGNITUDE OF THE FOOD PROBLEMS IN THE NEAR EAST REGION

Available data on the food gap in the FAO Near East Region, which consists of all Arab countries with the addition of Turkey, Pakistan and Iran, show that, during the last three decades, the average annual growth rate of food production increased by only 2.2% compared to an increase in food demand which exceeds 5%. This led to an increase in the dependence on costly food imports from outside the Region, which amounted to 44.3 million MT in 1988/90 in comparison to 8.1 million MT in 1969/71. The self-sufficiency ratio (SSR) for major food commodities in turn decreased remarkably during these decades. For example the SSR for cereals declined from 98 to 70%, for wheat from 80 to 68%, for rice from 108 to 86%, for sugar from 75 to 62% and for meat from 99 to 85%. This widening food gap, especially in the Arab Region, is expected to further increase, particularly, if appropriate measures are not taken at both national and regional levels to meet the rapid growth of food demand (FAO, 1993).

Trends in agricultural trade balance in the Near East Region are shown in Table 1, and trends in food imports in the Near East Region (Million US dollars) are shown in Table 2. The large difference between Arab countries and non-Arab countries in terms of trade balances in food and agricultural commodities should be noted.

In addition to the above mentioned constraints, the other factors that affect food production are : (1) The problem of land fragmentation, which hinders the application of modern technology in food production, e.g. Tunisia, Jordan and Egypt. (2) The land tenure system, which is a special problem affecting food production as in Egypt. (3) Inadequate water control and management combined with inefficient drainage systems which has led to progressive loss of cultivated land in many countries. (4) Insufficient use of agricultural inputs such as improved seeds, fertilizers and insecticides, e.g. Sudan and Yemen. (5) Continuous and high rates of urbanization, more and more of the good agricultural land being lost, e.g. Egypt, Syria and Jordan. (6) Desertification and deforestation are becoming real threats to the life of rural populations and food production capacities, e.g. Somalia and Sudan. (7) Agricultural credit facilities have not been always used in favour of small farmers. (8) The marketing system of basic foods from producers to consumers has always been to the disadvantage of producers. (9) The wide gap between agricultural research and agricultural extension services, has had a negative effect on the transfer of modern technology in several countries of the Region (FAO/RNEA, 1992).

Table 1
Trends in Agricultural Trade Balances in the Near East Region* ($ million)

COUNTRY	1976	1977	1986	1987	1988
Afghanistan	+ 161	- 153	- 81	+ 52	+ 39
Algeria	- 826	- 1 115	- 2 052	- 1 952	- 2 302
Bahrain	- 97	- 134	- 245	- 256	- 260
Cyprus	+ 24	+ 44	- 5	+ 12	+ 1
Djibouti	- 26	- 35	- 80	- 86	- 92
Egypt	- 643	- 724	- 2 954	- 2 883	- 4 421
Iran	- 1 209	- 1 618	- 1 059	- 1 622	- 1 544
Iraq	- 529	- 753	- 1 571	- 1 593	- 2 265
Jordan	- 228	- 216	- 443	- 460	- 483
Kuwait	- 430	- 520	- 954	- 925	- 986
Lebanon	- 251	- 310	- 410	- 379	- 484
Lybia	- 473	- 722	- 1 168	- 1 089	- 1 155
Mauritania	- 43	- 46	- 71	- 88	- 101
Morocco	- 195	- 254	- 246	- 213	- 149
Oman	- 97	- 124	- 361	- 349	- 379
Pakistan	- 1	- 15	- 93	+ 36	+ 146
Qatar	- 86	- 105	- 227	- 222	- 244
Saudi Arabia	- 971	- 1 484	- 3 389	- 3 464	- 3 403
Somalia	+ 11	- 31	- 63	- 55	- 38
Sudan	+ 428	+ 474	- 64	- 223	+ 262
Syria	- 92	- 24	- 281	- 251	- 288
Tunisia	- 77	- 136	- 289	- 204	- 481
Turkey	+ 1 137	+ 1 002	+ 1 552	+ 1 382	+ 2 096
U.A.E.	- 348	- 407	- 919	- 1 032	- 1 083
Yemen Arab Rep	- 160	- 208	- 407	- 342	- 434
Yemen Dem.	- 58	- 74	- 173	- 148	- 203

TOTAL .					
ARAB STATES	- 5 948	- 6 948	- 16 219	- 15 768	- 18 989
NON-ARAB STATES	+ 112	- 432	+ 476	- 140	+ 738
TOTAL NEAR EAST	- 5 081	- 7 380	- 15 743	- 15 908	- 18 251

* Agricultural Trade Balance = Agricultural Exports - Agricultural Import

Source · FAO/Agrostat (1992)

Table 2

Trends in Food Imports in the Near East Region (Million US $)

COUNTRY	1970 - 75 Average			1983 - 88 Average		
	Cereals	Other Food	Total Food	Cereals	Other Food	Total Food
Afghanistan	10.6	28.3	38.9	23.9	89.3	113.2
Algeria	168.2	292.3	460.5	734.9	963.7	1,698.6
Bahrain	10.9	24.6	35.5	28.1	153.8	181.9
Cyprus	23.3	27.7	51.0	54 5	67.7	122.2
Djibouti	3.0	4.1	7.1	13.5	25 8	39.3
Egypt	350.3	156.8	507.1	1,588.7	1,406.8	2,995.5
Iran	233.8	392.4	626 2	744 8	991.6	1,736.4
Iraq	110.3	200 6	310.9	732.4	976.2	1,708 6
Jordan	26 6	70.4	97 0	147 6	325.3	472 9
Kuwait	36.7	130.3	167.0	125.7	700.1	825.8
Lebanon	57 3	107 2	164.3	78.7	318 6	397 3
Libya	78.8	160.4	239.2	247 1	579.2	826.3
Mauritania	11.7	17.8	29.5	45.1	58.1	103 2
Morocco	119 9	180.4	300.3	273.2	238.8	512.0
Oman	10 2	18.6	28.8	70.2	237.2	307 4
Pakistan	100.3	80.4	180.7	130.3	537.8	668.1
Qatar	5 8	25.2	31.0	29.4	131.9	161.3
Saudi Arabia	104.8	189.6	294.4	1,163.9	1,988 8	3,152.8
Somalia	15 0	10.7	25.7	60.9	38.6	99.5
Sudan	21.5	60.6	82.1	122.2	82.9	205.1
Syria	64 9	111 7	176.6	240.0	248 0	488 0
Tunisia	39 3	86.8	126.1	176.7	192.4	169.1
Turkey	93 9	54.7	148 6	131 0	255.3	386 3
U.A.E.	28 0	66 8	94.8	127.3	744 3	871.6
Yemen Arab Rep.	25 2	30.3	55.5	130 6	228.1	358.7
Yemen Dem.	20.0	26.0	46 1	65.2	122.3	187.5
TOTAL ARAB STATES	1,308.4	1,971.1	3,279 5	6,201.4	9761.0	15,962.4
NON-ARAB STATES	461 9	583.5	1,045.4	1,084 5	1,941 7	3,026.2
TOTAL NEAR EAST	1,770.3	2,554.6	4,324 9	7,285.9	11,702.7	18,988.6

Source . FAO/Agrostat (1992)

As a consequence of these effects the income gap between rural and urban communities has encouraged rural migration to the cities, which has resulted in new food consumption patterns for those migrants. Problems of the gap between food production and food consumption in the Arab Region will be further elaborated upon in later sections.

FACTORS AFFECTING CHANGE IN FOOD CONSUMPTION PATERNS IN THE ARAB MIDDLE EAST COUNTRIES

In examining the factors affecting change in food consumption in the Arab Middle East countries, it should be observed, that there are vast differences in socio-economic, ecological and cultural conditions in the different countries. The Region contains the poorest countries (Somalia, Sudan) and the richest countries (U.A.E., Qatar) of the world; the over populated Egypt to the least populated Qatar and from those of highest illiteracy rates (Yemen, Mauritania) to those with some of the lowest rates (Jordan, Tunisia) in the developing world. Due to these wide differences and the complex interrelations among the factors affecting food consumption in the Arab Region it is difficult to consider all the factors involved. In addition, differences in government policies and programmes (particularly as regard to the socio-economic development plans in the countries of the Region and their implications) also significantly affect food consumption and nutrition.

Finally in the context of the Middle East food carries special social and cultural meanings in various communities and psychological significance well beyond consideration of nutritional value or physiological needs.

1. Economic Factors

The food consumption pattern in a given country is a function of food prices and consumer income. Food consumption patterns change as personal income grows. In fact, there is a positive relation between GNP/capita and food energy derived from animal sources, fat and sugar. Additional factors are that low income groups tend to be conservative in their food choices and resistant to change, while high income groups show increased demand for convenience foods and for eating meals outside the home (FAO, 1989).

Food prices are conditioned by several factors. Locally produced food costs are initially affected by prices of agricultural inputs, such as fertilizers, insecticides, high yielding varieties, as well as by rainfall and/or the price of water for irrigation. They are also affected by the marketing and distribution systems, seasonal

variations, food taxation or subsidies, price control or free market, storage and processing, food losses and wastages, use of by-products (as in the case of wheat bran, or molasses in case of sugar industry) and international market demand (as in the case of olive oil in Tunisia or potatoes and rice in Egypt). Several countries ration basic food commodities such as Jordan, Egypt and presently Iraq especially for vegeable oils, sugar and rice. The price of imported food is affected by the international market (suppy and demand) and by agreements between governments as in the case of wheat prices (FAO, 1989).

Many governments of the region do have certain food policies especially as regard to price control mechanisms for basic food commodities as in the case of wheat bread in Egypt, couscous in Tunisia, sugar in Syria and rice in Jordan. These food policies need to be reviewed and modified. Recently, Egypt has adopted structural adjustment progammes for both the producers and consumers. These programmes have affected supply and demand for several food commodities. In addition to the above, economic factors such as devaluation of local currency, inflation, and exchange rates also affect food prices.

Consumer income is fundamental in determining food choice. It is influenced by the degree of the economic development of the country, distribution of income, family size, cost of non food items, employment policies and income generating activities as well as the geographic location of the consumer in rural or urban areas.

2. Environmental Factors

The amount of rainfall and its distribution, affect food production and, in turn, food prices and farm income. Certain countries such as Sudan, Somalia and Morocco sometimes suffer from drought. As the price of sorghum increases in Sudan, the price of livestock decreases due to the shortage in animal feed and its high price. Floods also affect food production. Seasonal variations also determine food availability as in the case of fruits and vegetables.

3. Social and Cultural Factors :

Social and cultural factors affect food consumption patterns. The level of education, family size, employment of women, health and nutrition education are important determinants. In addition, cultural factors including religion, beliefs and taboos and local traditions are also significant. This is seen in the spread of bottle feeding replacing breast feeding in many parts of the region as well as the widespread adoption of street foods for low income groups and of fast and convenience foods for those with high income. With the changes in life styles, particularly in countries importing labour, new

food habits have emerged. This is especially noticeable in the Gulf countries that import large numbers of Asian workers.

4. Food Industries and Advertisements

The food industries and their advertisements play a vital role in changing consumption patterns in several countries of the Arab Middle East. This is exemplified in the wide spread consumption of soft drinks and "empty calorie" foods. Furthermore the canning and freezing industries, make it possible for the consumer to have access to several food choices all the year around. The expansion of the dairy industries has also contributed to the increased consumption of dairy products for certain income groups. The food industries also change consumption patterns by improving food appearance such as colour, texture, odour, and flavour, and accordingly the food demand increases. In most countries of the Arab Region food industries are expanding at a very fast rate. As a result of these expansions, more urban as well as rural consumers are becoming users of processed foods such as biscuits, sweets, soft drinks, and snack foods.

5. Physiological and Psychological Factors

Age, sex and physiological requirements, play major roles in food choices. Psychological conditions of the consumer affecting emotions, moods and appetites can significantly change food consumption patterns as in the case of marriage and other special occasions such as religious feasts. This is well seen in the Arab countries particularly during the month of Ramadan where an increase in consumption of certain types of food commodities, especially fat, sugar, and meat are observed.

6. Disaster

The Arab Region faces both man-made disasters, especially wars and international conflicts, as in Iraq, Sudan and Somalia as well as natural disasters such as drought and flood. These disasters have short and long implications on changes in food consumption patterns. Food aid has also contributed to these changes as in the case in Sudan of wheat replacing sorghum which was not previously known to the nomadic population (FAO/RNEA, 1992).

TRENDS IN FOOD CONSUMPTION PATTERNS FOR DIFFERENT FOOD GROUPS IN THE ARAB REGION DURING THE LAST 30 YEARS

The trends in food consumption patterns in the Arab Region are derived from the FAO Food Balance Sheets showing per capita food availability by commodity in a year (FAO/Agrostat, 1992). Only very

limited numbers of countries in the Region have data on national household food consumption derived from surveys based on representative samples of their communities. Food consumption surveys, however, tend to over-estimate actual consumption, particularly for some commodities that can be subject to partial loss and wastage during preparation and consumption. Such over-estimation also includes, other commodities that can be stored at household level such as cereals, oils and sugar.

Cereals

Cereals contribute more than half the food energy and protein supply to the population of the Arab countries. The most popular cereal in many of these countries is wheat which is largely imported and heavily subsidized. Rice follows wheat in order of importance, while sorghum is the basic cereal for a country such as Sudan. Barley is also consumed in North African countries.

For the purpose of this paper a review of the trends of the consumption of major food commodities is presented and discussed briefly using the Food Balance Sheet data.

Cereals availability on per caput basis increased in all the Arab Countries during the period 1961/63 to 1988/90. The lowest cereal consumption was in Somalia at 108.6 kg/head with the highest in Egypt 241.7 kg. (1988/90). Prior to 1961/63 the per caput cereal availability did not exceed 200 kg/head/year in any of the countries. However, in 1988/90 the per capita availability exceeded 200 kg/head/year in Algeria, Egypt, Iraq, Morocco, Syria and Tunisia. Lebanon and Somalia have not shown significant increases in cereal availability during the last 30 years in comparison with the other countries of the Arab Region.

Wheat

The per capita availability of wheat increased in all the Arab countries. Very high increases in the availability of wheat have occurred. These include Yemen (8 fold), Mauritania (6 fold), Somalia and Sudan (3 fold) and an almost doubling in Egypt. The highest per capita availability of wheat was noted in Tunisia (1988/90), followed by Syria, Algeria, Iraq and Egypt. These countries have a very heavy subsidy programmes for wheat. The lowest availabilities for wheat are in Sudan, Somalia and Mauritania. The per capita availability of wheat exceeds the average figure of the Near East (141.9 kg/Year) in Algeria, Egypt, Iraq, Jordan, Libya, Morocco, Syria and Tunisia.

Rice

Rice availability increased in all the countries between 1961/63 and 1988/90 with the exception of Saudi Arabia. Rice availability in Yemen and Mauritania has increased by 5 fold, while it has doubled in Algeria, Somalia and Syria. Rice is an important cereal in Egypt, Iraq, Jordan, Mauritania and Saudi Arabia where the supply is in excess of 20 kg/head/year. These countries exceed the average figures of 16.4 kg./head/year for the Near East Region.

Pulses

There was no significant change in the consumption of pulses during the period from 1961/63 to 1988/90 with the exceptions of Lebanon, Libya, Morocco, Saudi Arabia, Somalia and Tunisia. High consumption of pulses was observed for Lebanon, Mauritania and Morocco where the supply exceeds 10 kg/head/year. Promotion of the consumption of pulses needs to be emphasized for the Arab Countries and especially for a country such as Somalia.

Sugar

The per capita sugar availability increased for all the countries of the Near East Region during the period from 1961/63 to 1988/90. Increases were by 100% for Algeria, Egypt, Libya and Syria. Very high increases (almost 300%) were observed for Saudi Arabia during the same period 1961/63 to 1988/90. With the exception of Somalia, per capita availability of sugar increased by more than 50% in all the Arab countries. Per capita availability exceeded 35 kg./head/year (more than the average figure for the Near East of 28 kg./head/year) in Algeria, Egypt, Jordan, Libya and Morocco.

Vegetable Oils

All the countries of the Arab Region showed a very high increase in per capita oil supply during the period from 1961/63 to 1988/90. The highest increases were seen in Yemen (almost 600%), Mauritania, Libya (more than 350%), Algeria (almost 300%), Tunisia (over 250%), and Morocco (over 200%). In countries such as Algeria, Iraq, Lebanon, Libya, Syria and Tunisia the per capita oil availability exceeded the average figure for the Near East Region. The highest vegetable oil availability was observed for Tunisia and Libya (20 kg/head/year) and the lowest in Yemen (4.7 kg/head/year).

Total Meat

The per caput meat availability increased for all the countries except Sudan, Somalia and Mauritania. A very high increase was noticed in

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both Saudi Arabia (7 fold) and Libya (4 fold). Algeria showed the lowest meat supply (10 kg/head/year) while the highest was in Saudi Arabia (43.7 kg/head/year).

Poultry

Comparing 1961-1963 with 1988-1990 values for the Near East Region, per caput poultry supply increased, on average, by over 300% during the last 30 years. The largest changes in per capita availability were noted for Saudi Arabia from, 0.8 kg/head/year to 32 kg/head/year, for Jordan from 0.8 kg/head/year to 20.3 kg/head/year, for Libya from 0.3 to 13.7 kg/head/year, for Iraq from 0.6 kg/head/year to 12.2 kg/head/year and for Yemen from 0.4 kg/head/year to 6.6 kg/head/year. In contrast the per capita availability of poultry in Somalia, Sudan and Mauritania has not changed significantly over the last 30 years. The per capita availability of poultry in such countries as Iraq, Jordan, Lebanon, Libya and Saudi Arabia exceeds, by far, the Near East average. The highest per capita supply of poultry was observed for Saudi Arabia, Jordan and Lebanon, while the lowest supply was seen in Sudan and Somalia.

Milk

The per capita availability of milk at the regional level did not significantly increase during the last 30 years. However, the per capita supply of milk doubled in Algeria, and almost tripled in Libya and Saudi Arabia. In contrast milk supply decreased in both Mauritania and Iraq. The highest per capita milk availability was observed in Somalia, Mauritania and Sudan while the lowest per capita supply was in Egypt and Morocco.

Vegetables

The average per capita availability of vegetables generally increased for the Arab Region over the last 30 years. A very high per capita availability was observed for Algeria (3 fold), Saudi Arabia and Libya (4 fold) with the supply almost doubling in both Tunisia and Lebanon.Vegetable availability decreased however in Jordan, Somalia and Sudan. The lowest availability for vegetables was noted for Somalia and Mauritania, while the highest was seen in Lebanon, Libya, Egypt and Syria.

Fruits

Only a slight increase in the per capita supply of fruits has occurred in the Arab Region during he last 30 years. The highest rate of increase in fruit availability has been in Morocco, Yemen and Saudi

Arabia. There were, however, no significant changes in fruit availability over the same period in either Algeria or Egypt. The highest per capita fruit supply, over 100 kg/head/year, was noted in Lebanon, Saudi Arabia and Syria, while the lowest was seen in Somalia, Sudan and Mauritania.

In summary, therefore, it can be concluded from the food availability data that :

- There has been an increase in the availability of all food groups at the Region level over the last 30 years.

- Cereals (especially wheat and rice), sugar, vegetable oils, meat and poultry showed significant increases in availability, while there were only slight increases in the per capita supply of pulses, milk, fruits and vegetables over the same period.

- There were large variations between countries in the food availability trends. High rates of increase were noted for Libya, Saudi Arabia and Yemen, while very low increases, even sometimes negative, were noted in Sudan, Somalia and Mauritania.

- Changes in per capita GNP have affected changes in food consumption patterns of several countries.

- The prevalence of under-nutrition (particularly micronutrient deficiencies) and of over-nutrition, in the different countries are associated with changes in the per capita average availability of different food groups.

TRENDS IN AVERAGE PER CAPUT/DAY CONSUMPTION OF FOOD ENERGY, PROTEINS AND FATS IN SELECTED COUNTRIES OF THE ARAB REGION

Food Balance Sheet data reflect national per capita food availabilities according to the sources of different food commodities as converted into food energy, proteins and micronutrients. Table 3 shows Food Balance Sheet data for countries in the Arab Region. Food energy, protein and fat availability per caput per day increased at different rates in most countries from 1961, 1971, 1981 and 1989 respectively. For example, the daily per caput food energy availability in Libya doubled from 1,654 Kcal in 1961 to 3,324 Kcal in 1989. For the same country, protein supply ranged from 39.2 g. in 1961 to 80 g. in 1989 which also doubled. In Saudi Arabia, food energy availability increased from 1,772 Kcal in 1961 to 2,874 Kcal in 1989, and protein supply increased from 48 g. in 1961 to 86 g. in 1989. Both the above countries also experienced a very high increase in fat availability. For

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Table 3
Average consumption of calories, protein and Fat per Caput/day according to the National Food Balance Sheets

COUNTRY	1961			1971			1981			1989		
	Calories	Protein (g)	Fat (g)	Calories	Protein (g)	Fat (g)	Calories	Protein (g)	Fat (g)	Calories	Protein (g)	Fat (g)
Algeria	1736	47.9	32.1	1834	48.1	35.9	2604	66.9	59.6	2966	76.6	61.2
Egypt	2272	61.3	45.2	2467	64.7	53.3	3206	79.4	73.3	3336	83.5	78.4
Iraq	2066	58.3	41.9	2291	61.3	43.6	2815	73.8	62.1	2887	71.8	75.3
Jordan	2218	56.3	48.1	2497	68.3	62.2	2629	68.9	56.5	2634	71.4	62.0
Kwait	2595	76.8	76.0	2640	74.6	71.3	2901	90.2	93.0	3195	95.3	101.9
Lebanon	2466	65.0	62.2	2474	64.2	61.9	2875	83.0	85.2	3274	86.2	97.1
Libya	1654	39.2	32.2	2506	60.5	73.8	3564	88.0	128.9	3324	80.5	108.3
Morocco	2141	57.3	35.3	2464	65.5	42.1	2697	71.2	49.6	3020	81.3	55.6
Mauritania	1939	77.3	49.0	1874	71.8	50.9	2095	71.8	57.3	2685	79.3	61.0
S. Arabia	1772	48.1	26.5	1886	48.3	33.9	2777	77.7	80.2	2874	86.5	82.5
Somalia	1699	59.0	56.4	1714	58.1	62.8	2075	62.0	78.5	1906	59.1	65.3
Sudan	1832	55.9	53.8	2209	61.6	68.2	2312	68.6	76.8	1974	57.2	63.7
Syria	2362	65.1	59.7	2412	61.2	65.0	3105	84.2	93.7	3003	78.6	82.7
Tunisia	2103	56.4	43.1	2368	63.1	57.6	2779	77.5	65.3	3119	83.3	85.7
UAE	2814	72.5	85.2	3208	78.2	76.1	3199	101.6	110.3	3309	101.6	111.5
Yemen	1808	58.9	36.4	1961	58.8	38.0	2070	61.8	39.1	2142	60.0	33.5
WORLD	2262	61.9	49.9	2455	65.2	56.0	2610	68.5	62.7	2710	71.0	68.5

Source : FAO/Agrostat (1992)

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example, in Saudi Arabia, fat availability per caput per day increased from 26.5 g. in 1961 to 82.5 g. in 1989, almost a 3 fold increase. In Libya, fat availability increased from 32.2 g. in 1961 to 108.3 g. in 1989. This represents an increase of more than three times. However, other countries in the Region, such as Egypt, Iraq, Jordan, Lebanon and Tunisia showed steady increases in food energy, protein and fat availability, but were not as high as those for Libya and Saudi Arabia (FAO, 1989).

Other countries in the Region such as Yemen showed a limited increase in food energy supply but still remained below the average daily requirement. For Sudan, Somalia and Mauritania there was no significant change in the availability of food energy, protein and fat during the same period.

It should be pointed out that while Food Balance Sheet data indicate the trend of availability for different food commodities in different years, they do not reflect the distribution of these foods among different socio-economic groups or illustrate intra-family distribution. Therefore, the Food Balance Sheet data should be supplemented with household food consumption survey data and household budget expenditure survey data of different socio-economic groups and at family level. Food Balance Sheets, by themselves, do not demonstrate differences that may exist in the diets consumed by different population groups or by different socio-economic groups, ecological zones and geographical areas within a country; neither do they provide information on seasonal variations in the available total food. Nevertheless, Food Balance Sheets constitute the main source of data used for the assessment and appraisal of the global food situation. High food energy intakes per caput per day coupled with large increases in fat consumption are known to be associated with the prevalence of non-communicable diseases of affluent societies such as cardiovascular diseases, hypertension, diabetes and cancer and hence, such data may be used to alert the countries involved to take the necessary action. On the other hand, low average per caput daily food energy availability reflects the prevalence of under-nutrition among large numbers of the population and is especially significant for the vulnerable groups.

CONCLUSIONS AND RECOMMENDATIONS

- The Arab Region has witnessed an enormous changes in its food consumption patterns during the last 30 years. Such changes for different food groups have not occurred previously throughout the long history of the Region. These changes were not only in the oil rich countries, but were also in the poor countries of the

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Region such as Sudan and Mauritania in which wheat and rice are replacing the traditional cereal sorghum.

- The greatest changes were seen in the consumption of cereals, sugar, vegetable oils and meat which are mostly imported. Changes for pulses, milk, fruits and vegetables were less significant than for the other food groups.

- The absence of a clear and well defined Food and Nutrition Policy, as well as the lack of nutritional awareness are both contributing to widening the production-import gap for food in the Arab Region which is increasing at an alarming rate. Food production is failing to meet the increasing demand for certain food commodities.

- In some countries present policies, especially regarding subsidies for wheat, rice, sugar and vegetable oils, are encouraging over consumption and in consequence increasing food waste.

- This is an urgent need to raise the level of awareness regarding food and nutrition issues to policy makers, planners, communities and even individuals. Food and nutrition awareness must be also expanded to cover all segments of the population including rich and poor, as well as those from urban and rural areas.

In view of the major health problems associated with diet in the Arab countries increased nutrition awareness will play a critical role in the future. This should include :

- Promotion of the concept of a balanced diet through use of the mass media.

- Emphasizing the need for energy dense foods such as cereals and pulses as well as increasing the use of vegetables and fruits among poor communities.

- Partial replacement of energy-rich foods such as cereals, sugar, fats and meat with foods such as low-fat milk, fruits and vegetables among the high income groups of population.

- Development of nutrition awareness messages formulated according to the socio-economic conditions and geographical location of the target groups.

- Consumer education on the quality and safety aspects of food. Special emphasis should be given to the promotion of hygienic

practices in the handling of foods at household level and in food establishments.

- Nutrition surveillance and food information systems should be established particularly, in drought-prone areas of the Region. Such surveillance activities should be linked to the decision-making process such that information is provided to the specialists who need it in a timely manner, so that food shortages and potential of famine may be averted.

To achieve the above food and nutrition goals, countries of the Arab Region are urged to formulate National Plans of Action for Nutrition, which should be guided by the International Conference on Nutrition (ICN) World Declaration and Plan of Action for Nutrition, which were adopted unanimously by all countries of the Arab Region in December 1992.

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NUTRITION AS A RISK FACTOR FOR CHRONIC DISEASE : LESSONS FROM THE UNITED STATES

P.L. PELLETT

Department of Nutrition, University of Massachusetts, Amherst, MA 01003, U.S.A.

ABSTRACT

The history of Federal nutrition initiatives, starting from the establishment of the USDA in 1862, is outlined and indicates that the foundations of present day national nutrition activities were firmly in place by the early years of this century. The changing nutrition-related disease patterns in the United States over recent years are discussed together with their associations with dietry intake. Selected diseases such as heart disease, hypertension, diabetes, cancer, obesity and osteoporosis are used as examples. Particular attention is given to dietary advice and the successful reductions in heart disease and stroke mortality. Although research and survey findings are discussed throughout, greater emphasis is given to public health nutrition education and intervention programmes in the United States rather than to current research results. Federal Programmes such as the new National Nutrition Monitoring System are described with consideration being given to the national food composition data base, the interpretation of food consumption surveys and the evaluation of nutritional status from dietary intake data. Particular attention is given to the National Cholesterol Education Progamme with its dual emphasis on population wide and risk-targeted programmes for adults as well as for adolescents and children. Finally, recommendations are made concerning the role of dietary guidelines for the Near East and the development of regional and/or national nutrition policies.

Key Words : Chronic diseases patterns, food consumption, dietary intake, nutrition programmes, USA.

I. INTRODUCTION

1. Historical Considerations

Despite the widespread rhetoric in the United States concerning the importance of private enterprise and individual initiative there has been, for over a century, a high level of central government involvement and leadership, especially in the areas of education and public health. As with most public activities the resulting programmes were not introduced for altruistic purposes alone but for hard headed developmental needs in a new and expanding country. Many of these early initiatives had direct relationships with nutrition and were first steps towards what can now be seen as a functional

National Nutrition Policy. Accepting the apparent reality of such a policy no single central document, labelled as such, is, however, in existence. Present policies are, in fact, a result of balances and interactions between a large number of health and nutrition related initiatives. These have generally developed separately from each other and depend heavily on mutual support between the public and private sectors.

In 1862 the US Department of Agriculture (USDA) was created and Land Grant Colleges were established. Agricultural Experimental Stations followed in 1887 and developed research activities in both agriculture and in home economics. The latter included food and nutrition. One of the Federal Research Laboratories specializing in health concerns became the precursor of the National Institutes of Health (NIH) a major research arm of the United States Department of Health and Human Services (USDHHS). The NIH are now responsible for 72% of the US$ 10,711 million Federal funds spent in 1991 on health research and development activities (USDHHS 1993).

The Pure Food and Drug Act was passed in 1906 and the Cooperative Extension Service was established in 1914. The first dietary recommendations by USDA - "The Five Food Groups" were promoted in 1917. It is of interest that underweight was then a major concern and increased fat consumption was recommended. Another early initiative, from which we still benefit, was the US Food and Nutrition Supply Series which began in 1909. From this still continuing series the major changes in the pattern of food supply have been followed and correlated with health and disease patterns.

While there had been earlier distribution of surplus foods, a Food Distribution Programme was established in 1935 and an experimental Food Stamp Programme was initiated in 1939. In the following year the National Defense Advisory Commission drew attention to malnutrition in the United States. As a consequence President Roosevelt called a National Nutrition Conference in 1941 where the first Recommended Dietary Allowances (RDA's) were announced by the Food and Nutrition Board. In the same year the Food and Drug Administration (FDA) issued standards for the enrichment of flour and bread with B-complex vitamins and iron. In the 1940's and 1950's a number of initiatives were passed involving surplus foods, research activities, and training programmes in Public Health Nutrition. In 1958 food additive regulations were strengthened and the Delaney Clause prohibiting carcinogenic additives was passed. Also in the same year The GRAS (Generally Recognized As Safe) list was established which allowed food components to be considered rationally within a legal framework. In 1965 the Food Stamp Act was passed and the first data on dietary intakes of individuals were collected in the Nationwide Food

Consumption Survey. The Child Nutrition Act was passed in 1966 and was followed by the not too successful "war on hunger".

The White House Conference on Food, Nutrition and Health in 1969 followed disquieting information on malnutrition in the U.S.A. observed in the Ten State Nutrition Surveys. The Conference called for more complete information and subsequently the National Center for Health Statistics conducted the first National Health and Nutrition Examination Survey (NHANES) in 1971-74 to measure the nutritional status of the US population. This was followed by NHANES II in 1976-80, Hispanic HANES in 1982-84 and the still ongoing NHANES III initiated in 1988. The WIC programme (Special Supplementary Food Programme for Women, Infants and Children) was established in 1972 while in 1974 the US Senate Select Committee issued Guidelines for a National Nutrition Policy. This was followed by "Dietary Goals for the United States" in 1977 which itself was succeeded in 1980 by "Nutrition and your Health : Dietary Guidelines for Americans" issued jointly by USDA and USDHHS. A second edition followed in 1985 and the third in 1990. The Food Guide Pyramid was issued in 1991-92 and replaces the old four food groups : the top of the pyramid is the fats, oils and sweets group, to be used sparingly while the base is the bread and cereals group to be consumed at levels from 6-11 servings per day. Also in 1992 the National Nutrition Monitoring System under the supervision of an interagency board (IBNMRR 1992) became the central body for providing information on the dietary, nutritional, and related health status of Americans; the relationships between diet and health; and the factors affecting dietary and nutritional status.

It can thus be seen that the foundations of preent day Federal nutrition activities were firmly in place by the early years of the century and that they have become increasingly more sophisticated and widespread in more recent years. Many of the initiatives, from the founding of the US Department of Agriculture (USDA) in 1862 until the recent introduction of the Interagency Board and the Food Guide Pyramid, are shown in Table 1.

In the private sphere the National Academy of Sciences was founded in 1863. This now includes, amongst a wide range of scientific activities, the Food and Nutrition Board which has been responsible for, not only the Recommended Dietary Allowances (NAS-NRC 1989), but also for several major publications relating diet and health such as Diet, Nutrition and Cancer (NRC 1982) and Diet and Health : Implications for reducing Chronic Disease Risk (NRC 1989). This was followed by a popular family-oriented Guide - "Eat for Life" in 1992 (Woteki and Thomas 1992).

Table 1
Selected Nutrition Policy Initiatives:
U.S.A., 1862-1992

1862	U.S. Department of Agriculture (USDA) created and Land Grant Colleges established.
1887	Agricultural Experimental Stations. Federal Research Labs. - one became the precursor of the National Institutes of Health.
1906	The Pure Food and Drug Act.
1914	Cooperative Extension Service
1917	The first dietary recommendations by USDA- "The Five Food Groups".
1927	The Food, Drug and Insecticide Administration; became the FDA.
1935	Federal Food Distribution Program and Mothers and Children Services
1939	Experimental Food Stamp Program
1940	National Defense Advisory Commission: Malnutrition in the United States.
1941	National Nutrition Conference where the first Recommended Dietary Allowances (RDA's) were announced by the Food and Nutrition Board.
1941	Food and Drug Administration (FDA) issued standards for the enrichment of flour and bread with B-complex vitamins and iron.
1943	RDA's 1st. Edition (first version 1941)
1946	School Lunch Program.
1958	Food additive regulations were strengthened and the Delaney Clause prohibiting carcinogenic additives was passed. The GRAS (Generally Recognized As Safe) list was established
1965	Food Stamp Act was passed and the first data on dietary intakes of individuals were collected in the Nationwide Food Consumption Survey and 1966 Child Nutrition Act, and the "War on Hunger".
1968	RDA's 7th Edition. Major enlargement
1969	White House Conference on Food Nutrition and Health.
1971-74	The National Center for Health Statistics conducted the first National Health and Nutrition Examination Survey (NHANES) to measure the nutritional status of the U.S. population.
1972	The WIC program (Special Supplementary Food Program for Women, Infants and Children) was established.
1974	U.S. Senate Select Committee issued Guidelines for a National Nutrition Policy
1976-80	NHANES II
1977	Dietary Goals for the United States.
1977-78	Nationwide Food Consumption Survey. Major reports 1983 onwards
1980	Nutrition and your Health: Dietary Guidelines for Americans issued jointly by USDA and USDHHS. New editions 1985 and 1990.
1982	Diet Nutrition and Cancer from NAS
1982-84	Hispanic HANES
1987-88	Nationwide Food Consumption Survey.
1988	NHANES III initiated. Ongoing.
1988	Surgeon General's Report: Nutrition and Health
1989	RDA's 10th edition
1989	NAS Diet and Health: Implications for reducing Chronic Disease Risk
1991	General Accounting Office (GAO) Report on shortcomings in the 1978-88 Nationwide Food Consumption Survey.
1992	Food Labelling Reform.
1992	The Food Guide Pyramid
1992	Interagency Board for Nutrition Monitoring

Adapted from USDHHS 1988.

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A whole series of other recommendations for specific chronic disease prevention have been issued by other national groups such as the American Diabetes Association, the American Heart Association, the American Cancer Society and the National Cancer Institute. Comparisons between the various recommendations will be found in USDHHS 1988, NRC 1989, WHO 1990, and USDHHS 1990a. The similarities, in the more recent of the various recommendations, far outweigh the differences. Early recommendations, however, could differ significantly. Sugar and fat were both recommended for inclusion in the diet rather than being restricted in several dietary recommendations before 1946. The 11 Federal dietary recommendations, however, issued since the 1977 Dietary Goals are broadly similar. Eat a variety of foods, maintain body weight, include starch and fiber in your diet and limit fat, salt and alcohol are central recommendations in all.

Many, if not all, of the major NAS initiatives in the area of food and health have been dependent on financial support from Federal sources such as the National Institutes of Health (NIH). These are further examples of the mutual support between public and private sectors as is the whole area of nutrition research where University based research is heavily dependent on funding from NIH and from USDA sometimes assisted by the food industry.

2.   International Considerations

In the past, food supply was often precarious and starvation frequent. While this remains true in a number of unfortunate areas, usually as a result of warfare and other man-made disasters, nonetheless dramatic and extremely rapid positive changes have occurred, in the quite recent past, in the food supply situation in most of the world. The immediate health benefit of this assured supply of food has been the near elimination of starvation and of many micro nutrient deficiency diseases in the rich and developed regions (WHO 1990). The general improvement in nutritional status with its associated increase in childhood growth rates has brought an increased resistance to infectious disease. The overall effect together with the greater availability of medical services has been to increase life expectancy substantially in many countries. Comparative data for a number of Near Eastern countries are shown in Table 2. Data are shown in relation to an average value for industrialized countries of 100. As is discussed in detail elsewhere, very significant changes have taken place since 1960 and many countries, notably the oil-rich, show values for life expectancy and under-five mortality rate close to industrialized countries. The United States, despite its wealth and the huge proportion of GDP (13.2% or US$ 2,868 per caput per year) spent on health (USDHHS 1993) remains below Japan and Canada in life expectancy. The "at birth"

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Table 2

Changes in Life Expectancy, Under 5 Mortality Rate
and Food Energy Availability: 1960-1990 for
Countries of the Near East

Country	Life Expectancy[1] 1960	1990	U5MR[2] 1960	1990	Food Energy/IId[3] 1960	1990
Algeria	68	87	78	92	58	84
Bahrain	80	95	84	100		95
Egypt	67	81	74	93	78	96
Iran	72	89	79	96	70	94
Iraq	70	87	82	93	72	88
Jordan	68	90	83	97	75	
Kuwait	86	98	92	100		
Lebanon	86	89	95	96	80	93
Libya	68	83	78	91	67	100
Mauritania	51	63	72	80	71	75
Oman	58	88	67	97		
Pakistan	62	78	77	86	61	69
Qatar	77	93	86	95		
Somalia	52	62	75	80	74	54
Sudan	56	68	75	85	64	59
Syria	72	89	83	96	72	95
Tunisia	70	90	79	96	76	91
Turkey	73	87	79	94	85	89
UAE	77	95	81	99		
Yemen	53	69				71

Source: UNDP 1993. Note: All values are expressed in relation to the
North (Industrialized Developed Countries) average which is indexed to
equal 100. Values shown as 100 include those where the country value may
exceed the North average.
[1] Life Expectancy at Birth
[2] Under Five Mortality Rate
[3] Food Energy Availability from Food Balance Sheet data.
Blank values indicate data are not available.

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data reflects the poorer Infant Mortality Rate for the USA than for many other developed countries but the gap is less when life expectancy at age 65 is compared.

The longer term adverse health effects of the affluent diet to which this workshop is devoted, are characterized, *inter alia*, by an excessive intake of energy dense foods. From diets which were heavily dependent on cereals and vegetables, more meat, milk and other animal foods have become available. This has resulted in more fat, especially saturated fat, and less dietary fibre in the diet. When this is combined with more total food being consumed together with lower physical activity the overall dietary patterns and energy balance of many Near East countries now resemble those of the industrialized regions of the world (Musaiger, 1987).

In the United States many of these changes started earlier and have been more rapid than in most other countries. Since trends, exemplified first in the USA often soon follow elsewhere, examination of the changing patterns of diet and disease and the public health responses that took place in the USA can be helpful in understanding what responses to these changes can and should be made in the Near East (Pellett 1989).

Consideration will first be given to the changes in disease patterns in the United States and to the major nutrition related diseases. This will be followed by discussion of the various nationwide food and nutrition surveys, clinical and epidemiological research, and the structures and institutions that exist in the United States which have permitted the examination and evaluation of research and survey results and their translation into Public Health policy and actions.

II   CURRENT HEALTH PROFILE IN THE UNITED STATES

1   Changing Disease Patterns

The estimated total deaths and percent of total deaths for the 10 leading causes of death in the United States in 1987 were reported by the US Surgeon General (USDHHS 1988). These are shown in Table 3 together with the most recent published data for 1990 (USDHHS 1993). In addition to the five causes that scientific studies have associated with diet (CHD, some cancers, stroke, diabetes, and atherosclerosis) another three (liver cirrhosis, accidents and suicides) have been associated with excessive alcohol consumption. As the Surgeon General remarks " together, these eight conditions accounted for nearly 1.5 million of the 2.1 million total deaths in 1987 and they continue to inflict a substantial burden of illness on Americans" (USDHHS 1988). The 10 leading causes of

Table 3

Estimated Total Deaths and Percent of Total Deaths for the
10 Leading Causes of Death: United States, 1987,1990

		1987		1990	
Rank	Cause of Death	Number	%	Number	%
1[a]	Heart Disease	759,400	35.7	720,058	33.5
2[a]	Cancers	476,700	22.4	505,322	23.5
3[a]	Strokes	148,700	7.0	144,088	6.7
4[b]	Unintentional Injuries	92,500	4.4	91,983	4.3
5	Chronic Lung Diseases	78,000	3.7	86,679	4.0
6	Pneumonia/Influenza	68,600	3.2	79,513	3.7
7[a]	Diabetes mellitus	37,800	1.8	47,644	2.2
8[b]	Suicide	29,600	1.4	30,906	1.4
9[b]	Chronic Liver Disease	26,000	1.2	25,815	1.2
10[a]	Atherosclerosis	23,100	1.1	(18,047	0.8[c])
10	Aids/HIV			25,188	1.2
	Total (1-10)	1,740,400	81.9	1,757,196	81.7
	All causes	2,125,100	100.0	2,148,463	100.0

[a] Diet can be involved
[b] Alcohol can be involved
[c] Ranked 14 for 1990
Source: Adapted from USDHHS 1988 and 1993.

death in the United States for 1990 now include Aids which has displaced atherosclerosis in tenth position. Even in the short 3 year period between these data the downward decline in heart disease and stroke continues but cancer mortality is slightly increased.

For heart disease and stroke the rates are higher for males than for females and for blacks than for whites. Since 1980 death rates have declined for both diseases for all groups in the order of 20% with the exception of blacks where the decline was only 9%. Cancer rates have remained either static or have slightly increased over this period. The changing pattern of disease is also discussed in the volume "Healthy People 2000" (USDHHS 1991). Here again public-private cooperation should be noted since the consortium that developed the document was facilitated by the Institute of Medicine together with the US Public Health Service. The report includes a profile of the current health situation and develops goals for the year 2000. The US population will then be about 270 million but this will have followed the slowest rate of growth ever. The population will be older and the number of children below 5 years will actually decline in stark contrast to most developing countries. There will also be 35 million aged above 65 years and nearly 5 million older than 85 years. These data indicate the need for new priorities in health care and disease prevention.

Over the last four decades infant mortality has decreased significantly (Table 4) but still remains higher than most other industrialized countries. It also shows an unacceptable difference between different population subgroups. Some three quarters of deaths in the first month and 60% of all infant deaths occurred among low-birth weight (LBW) infants. Low socio-economic and educational levels are associated with LBW and hence are well correlated with maternal nutrition. Black infants are nearly twice as likely as white babies to be born with low birth weight.

The major declines in heart disease and stroke mortality between 1977 and 1987 shown in Fig. 1 mainly reflect improvements in hypertension detection and control, a decline in smoking and increasing awareness in the population of the role of blood cholesterol and dietary fats. Some of the nationwide activities causing this increased awareness will be discussed in more detail in later sections.

For adults aged 25-64 cancer and heart disease are the two major causes of death. As deaths from CHD have declined cancer has become the leading cause of death for this age group. Of the various cancers lung cancer is the most common with smoking responsible for 85% of lung cancer deaths. Colorectal cancer is the second leading cause of death from cancer and seems to be associated with

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Table 4
Changes in the Infant Mortality Rate
USA 1950-1990

| | Year | | | | |
| | 1950 | 1960 | 1970 | 1980 | 1990 |
		Rates per 1000 live births			
All Infants	29.2	26.0	20.0	12.6	9.2
White Infants	26.8	22.9	17.8	11.0	7.7
Black Infants	43.9	44.3	32.6	21.4	17.0

Source: USDHHS 1993. Provisional overall value for 1991 = 8.9.

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Leading Causes of Death USA
Age adjusted data (USDHHS 1991)

Legend: 1987, 1977

Rate per 100,000

Categories (top to bottom): Atherosclerosis, Liver Disease, Diabetes, Suicide, Pneumonia/Influenza, Chronic Lung Disease, Stroke, Injuries, Cancer, Heart Disease
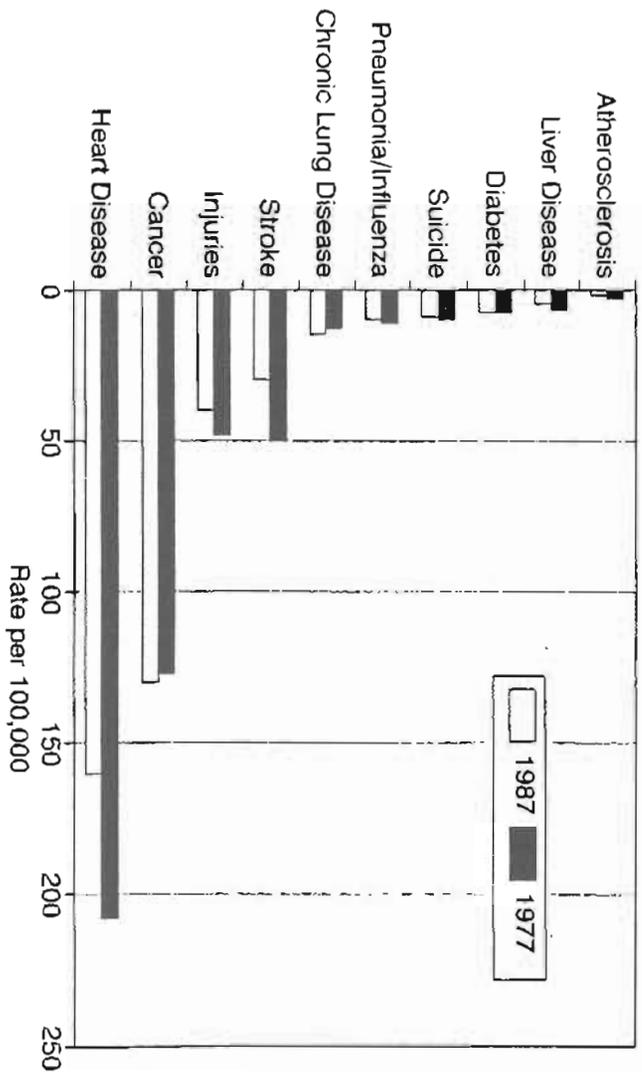
Figure 1

high fat and/or low fiber diets. For women, breast cancer is now second to lung cancer as a cause of death. Early diagnosis increases survival significantly. The role of dietary fat as a causative feature remains equivocal.

Epidemiological research has demonstrated a close and consistent relationship between the establishment of energy dense, high fat, low fiber diets and the emergence of a range of chronic non-infectious diseases such as, coronary heart disease, cerebral vascular disease, various cancers, diabetes mellitus, gall stones, dental caries, gastro-intestinal disorders and various bone and joint diseases including osteoporosis in the elderly (USDHHS 1988, 1991). Scientific evidence continues to accumulate in the United States supporting the important role of diet in the development of the most common causes of premature death in developed countries - cardiovascular disease and cancer. The affluent types of diet that often accompanies economic development are becoming more common worldwide, and are typically adopted first by the urban, upper middle class population.

The causes of these chronic diseases are, however, complex and dietary factors are clearly only part of the explanation. Individuals also differ in their susceptibility to the adverse health effects of specific dietary factors and a major debate has developed within the public health context as to the advantages and disadvantages of the individualized approach vis-a-vis the population-wide approach.

A further problem for both the United States and the Near East region which must be mentioned, although it will not be further discussed, concerns iron deficiency anaemia. An important recent review (INACG 1993) provides considerable background to the problem and some solutions for countries where high cereal diets are common.

2. The Association between dietary intake and some clinical disorders

1. Coronary Heart Disease

This disease remains the major cause of death in the United States. Some 60% of the half-million heart attack deaths that occur annually occur suddenly or outside of a hospital before treatment can be given. It has been estimated that illness and deaths from coronary heart disease cost Americans an estimated US$49 billion in direct health care expenditures and lost productivity. With similar pathogenesis, strokes occur in about 500,000 persons per year in the United States, resulting in about 150,000 deaths annually and long-

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term disability for many individuals. About two million suffer from stroke-related disabilities, at an estimated annual cost of more than US$11 billion (USDHHS 1988). Much attention has therefore been given to prevention of the disease syndrome and the identification of those at most risk. There has been considerable success and the death rate has declined significantly in recent years.

The relationships between diet, lipoproteins, the degree of atheroscolerosis, and the risk of CVD have been intensively investigated since the early years of this century and has resulted in an enormous literature. The primary conclusions of this research were summarized (USDHHS 1988) :

1)   The higher the total blood cholesterol level, the greater the severity of atherosclerosis and the greater the risk for CVD.

2)   Dietary saturated fat and dietary cholesterol raise total blood cholesterol and low density lipoprotein cholesterol levels.

3)   Polyunsaturated fat lowers total blood cholesterol and LDL-cholesterol levels. Monounsaturated fat also appears to lower blood cholesterol.

Much current research is concerned with the specfic role of fatty acids in influencing risk. Many of the earlier results obtained have led to problems in interpretation (USDHHS 1988, NRC 1989). The role of monounsaturated fatty acids now appears positive and seems reasonably clear-cut. This may be of special significance for several countries in the Near East since olive oil can be a major source of the monounsaturated oleic acid (Grundy 1987). Omega-3 fatty acids from fish oils may also be important in affecting risk (Kromhout et al. 1985, USDHHS 1988). Recent studies have, in addition, pointed to the significance of trans-fatty acids as are found in hydrogenated fats such as margarine. Mensink and Katan (1990) have demonstrated in clinical trials that trans-fatty acids are at least as unfavourable as saturated fats in that they not only raise LDL-cholesterol but also lower HDL-cholesterol levels. Furthermore in a long term epidemiological investigation, involving some 85,000 nurses who reported their diet (Willett et al. 1993), greater trans-fatty acid consumption was correlated with increased risk of CHD.

A recent theory (Salonen et al. 1992, Sullivan 1992) suggests that high levels of stored iron, as measured by serum ferritin, could be an additional important risk factor for coronary artery disease and may, in part, explain some of the observed male-female differences.

The dilemma continues as to the public health actions that should be taken (James and Ralph 1988). While dietary cholesterol is

positively correlated with plasma cholesterol for the population as a whole, some 20 to 30% exhibit a pronounced response while the majority 70 to 80% effectively can compensate for dietary cholesterol within the range of 250-800 mg/day. The ability to distinguish responders from non-responders remains elusive and arguments continue as to whether recommendations to reduce dietary cholesterol to about 250-300 mg/day are justified for a whole population or whether screening should be the approach so as to identify those in need of medical or dietary intervention. It is also important that public advice should be consistent and should not always reflect the latest research findings especially when these may be ephemeral. The current arguments concerning butter versus margarine and the role of iron as risk factors are a case in point. Too many changes in recommendations can cause public distrust for all nutritional advice.

It is now widely accepted that treatment should be targeted towards all of the risk factors for CVD such as cigarette smoking, high blood pressure, obesity, lack of physical exercise and not just elevated blood cholesterol. This approach in the USA towards cholesterol reduction through the National Cholesterol Education Program (USDHHS 1990ab, 1992) is enlarged upon elsewhere.

ii.   Hypertension

High blood pressure is responsible for a significant portion of CHD. It is believed by many that the large decline in CHD deaths that has occurred in Europe and the United States since the 1970's has been mainly due to increased public awareness of the risks involved and hence improved detection and treatment of high blood pressure. In the United States some 25% of the population could be classified as hypertensive to some degree. Prevalence increases with age and there appears to be a racial component since more black Americans are affected than white even when socio-economic variables are excluded (USDHHS 1988).

Data for the prevalence of hypertension in the United States are shown in Table 5. The Hispanic data originated from the Hispanic Health and Nutrition Survey 1982-84 while the non-Hispanic White and Black data were from HANES II 1976-80. For Mexican Americans, Cubans and Puerto Ricans the prevalence of hypertension amongst both males and females was lower than among non-Hispanic whites or blacks. Highest prevalence of hypertension was among non-Hispanic blacks for both sexes. Time trend data from 1960 to 1980 showed larger decreases for blacks. In all surveys mean diastolic blood pressure was higher in men than in women and higher in blacks than whites. Mean blood pressures were also higher in older age groups. Over the period 1960-80 the

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Table 5
Hypertension[1] percentages amongst persons 20-74 years
of age by sex and ethnic origin.

Group	Male Percentage	S.E.	Female[2] Percentage	S.E.
Hispanic				
Mexican American	17.6	1.1	15.5	0.8
Cuban	23.9	2.4	16.0	1.8
Puerto Rican	17.1	2.0	12.5	1.3
Non-Hispanic				
White	34.2	0.9	27.4	0.8
Black	40.3	2.5	41.8	2.4

[1] Persons were classified as hypertensive if the average of three
systolic blood pressure readings was greater than or equal to 140 mm
mercury, and/or the average of three diastolic blood pressure
readings was greater than or equal to 90 mm mercury, or if they were
already so diagnosed and were taking antihypertensive medication
[2] Excludes pregnant women.
Source: USDA/USDHHS 1989.

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Table 6
Age-adjusted percentages of persons aged 25-74 years defined as
overweight and with elevated blood pressure by race and sex
in 1960-62[1], 1971-74[2] and 1976-80[3].

Grouping	White			Black		
	1960-62	1971-74	1976-80	1960-62	1971-74	1976-80
Overweight[4]						
Male	25.1	26.0	26.7	24.1	27.6	30.9
Female	27.3	27.4	27.5	47.3	47.8	49.5
Elevated Blood Pressure[5]						
Male	19.0	21.7	22.3	36.3	35.8	29.7
Female	19.2	18.5	16.3	37.7	37.4	26.2

[1] National Health Examination Survey 1960-62
[2] First National Health and Nutrition Examination Survey 1971-74
[3] Second National Health and Nutrition Examination Survey 1976-80
[4] Overweight is defined for men as a Body Mass Index (BMI) of equal or
greater than 27.8 and for women greater than or equal to 27.3. These
values represent the sex-specific 85th percentiles in HANES II for those
aged 20-29 years. Excludes pregnant women.
[5] Elevated Blood Pressure is defined as either systolic pressure of at
least 160 mm mercury or diastolic pressure of at least 95 mm mercury or
both, based on a single measurement. Criteria for 'elevated blood
pressure' are not the same as for hypertension which require the average
of three measurements.
Source: USDHHS/USDA 1989

prevalence of elevated blood pressure has increased slightly for white males but has fallen for the other groups (Table 6). Relationships with overweight are also illustrated. The changes that have occurred are believed due to a combination of factors including prevention and improved treatment and control.

While a large number of components are involved in the development of hypertension, obesity, sodium intake and alcohol consumption are the most important (MacMahon 1987, Joint National Committee 1988). There is also strong evidence that not only can weight loss lead to a reduction in blood pressure but that the reverse is also true. Many individuals are, however, able to maintain normal blood pressures over a large range of sodium intakes while other individuals show significant increases in blood pressure as intake rises. Should dietary recommendations be made for the whole population, which includes both responders and non-responders, or should the population be screened and recommendations made only for those who are known to be affected by excessive sodium intake ? Since sodium intakes in North America appear to be several times (5-10 fold) daily requirement and there is no evidence of any harm from moderate restriction, recommendations are made for the whole population. In view of the often extreme temperatures in the Near East region and the importance of maintaining electrolyte balance considerable discussion is required before any recommendations are made concerning salt intake for countries in the region.

iii.   Diabetes Mellitus

More than 11 million Americans have diabetes, but almost half of them have not been diagnosed (USDHHS 1988). In addition to the nearly 50,000 deaths in 1990 the disease also contributes to double that number from associated cadiovascular and kidney complications. Estimated costs exceed US$14 billion per year. Diabetes is a chronic metabolic condition characterized by derangements in the metabolism of glucose as well as abnormalities in the metabolism of fat and protein. Elevated excretion of glucose in the urine (hyperglycemia) is its hallmark. Pathological changes of the small blood vessels of the eyes, kidneys, and other tissues as well as degeneration of peripheral nerves develop as the disease progresses. In North America (Anderson 1988), 90% of individuals with primary diabetes have the Type II variety and about 80% are obese. This form of the disease develops usually above 40 years of age. Management or control involves diet, exercise and treatment with antidiabetic drugs or insulin. Mortality rates associated with diabetes increase with age. Twelve percent of Type I patients die within 20 years of onset with either acute or renal complications. Survival of Type II diabetics is less than 80% of that expected for the general population 25 years

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after diagnosis (USDHHS 1988). Clinical complications of diabetes are CHD and stroke, kidney disease and blindness.

iv.   Cancer

Cancer is a group of conditions involving uncontrolled growth of cells originating from almost any tissue of the body. Diet has been suspected as being involved in the development of cancer since the earliest recognition of the disease but it is only in this century that proof has been presented that the suspicion was based on fact (WHO 1964).

In 1982 a committee of the United States National Academy of Sciences (NRC 1982) reviewed the epidemiological and experimental relationships between diet, nutrition, and cancer and made recommendtions for further research. The report of this committee was somewhat controversial in that the extent of the relationships claimed was beyond what some could accept. All however were agreed that much of the evidence for strong connections between nutrition and the incidence of certain types of cancer was compelling. It has been suggested (Doll and Peto 1981) that diet (35%) and tobacco (30%) are the two major factors to which cancer deaths can be attributed. Cancer may arise in any organ of the body. The most common sites for tumours are however : lung, colon-rectum, breast, prostate, pancreas, leukemias, stomach, ovary, bladder, and the liver-biliary system. Both positive associations (i.e. increased cancers with increased intakes) and negative associations have been reported. The negative associations have generally been related with consumption of fruits, vegetables (Colditz et al. 1985), and fibre containing foods while the positive relationships have been with fat and excess body weight (Pariza and Simopoulos 1987). Of considerable recent interest is the possible relationship between soy consumption and cancer risk (Messina et al. 1994).

Both animal studies and international epidemiological comparisons give strong support to the concept that differences in dietary fat consumption are the key to being able to prevent certain types of cancer. It has been demonstrated that death rates from cancers of the breast, colon, and prostate are directly proportional to estimated dietary fat intakes (Wynder et al. 1981). In addition there is substantial evidence linking the incidence of breast (Willett et al. 1987) and colon cancers (Wynder et al. 1981) also to fat consumption. Other cancers linked to fat intake are those of the rectum, ovaries, and endometrium. At present only fat as such has been implicated in carcingogenesis in the majority of human epidemiological studies since the various types of fat have not been separated into the fatty acids present or even into saturated and unsaturated categories. There is also much evidence to indicate that

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Vitamin A and some of its near chemical relatives may have a protective role against certain cancers especially of the epithelial variety.

The annual costs of cancer were estimated by USDHHS (1988) to exceed US$22 billion for direct health care, US$9 billion in lost productivity due to treatment or disability, and US$41 billion in lost productivity due to premature mortality for a total cost of US$72 billion.

v.   Obesity

Obesity affects 30-40 million adults aged 20 to 74 years in the United States with the highest rates observed among the poor and minority groups. Obesity is a risk factor for coronary heart disease, high blood pressure, diabetes, and possibly some forms of cancer as well as other chronic diseases. The exact definition of obesity to fit all circumstances is difficult, perhaps the simplest definition is excess body fat. It is easy for individuals to accumulate excess fat as soon as a society has reached a stage where both food and leisure have become more widely available. It is far more difficult to lose the fat once it has accumulated. Excess body fat results from an imbalance between energy intake and energy expenditure. Very small differences may take place over a very long period and the techniques presently available are not sufficiently precise to measure the changes involved. Excess of intake over expenditure of only 125 kcal/day, 250 ml. of a soft drink or two biscuits, is equivalent to 7 kg. over a year or the weight gain of another whole body over ten years. With this degree of precision of normal regulation in mind, it is more surprising that so many can manage to maintain weight over long periods rather than to be amazed at the numbers that fail (Garrow 1974).

Nevertheless, even if exact definitions remain elusive, excessive fat contributes to premature mortality, especially when associated with elevated blood cholesterol, diabetes or hypertension. Relative body weights above 100-109 percent of desirable are associated with increased mortality for several diseases with an especially severe effect for diabetes (Lew and Garfinkel 1979, USDHHS 1988). A similar effect was also reported by Pi-Sunyer (1988) where comparison was made for men who were 20% and 40% overweight (BMI values of about 27 and 32); all-causes death rates increased by some 20% and 55%, heart disease death rates were some 25% to 70% greater respectively while diabetes death rates increased by the greatest amount and were from two to five times greater than for those of standard weight. In the Framingham Heart Study (Hubert et al. 1983) where individuals were followed for 26 years there was an adverse effect on mortality at as little as 10% over weight.

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Even when not associated with a specific disease, to be overweight increases the severity of problems arising from accidents or surgery. It is therefore important to be able to prevent obesity but as indicated in the USDHHS (1988) report : - "despite rapid advances in the definition and epidemiology of obesity, of adipose cell metabolism, and on the causes and consequences of obesity, disagreements still prevail on almost every key issue." Morbidity is also affected; from the NHANES II data, rates of hypertension and diabetes were nearly tripled for persons 20 percent or more overweight and hypercholesterolemia was 50 percent more common.

For adults, current considerations involve not only the amount of body fat but also where it is distributed (Krotkiewski et al. 1983). In males excess fat is more often distributed around the central abdominal area and is termed upper body obesity or excess waist-to-hip ratio. This is associated with increased cardiovascular risk factors such as hypertriglyceridemia and impaired glucose tolerance and also with increased risk of diabetes and hypertension. In contrast, excess fat distributed in the lower extremities around the hips and in the gluteal regions, as is more common in females, does not seem to increase cardiovascular risk.

vi.   Osteoporosis

Osteoporosis is a group of diseases with low bone mass but with the remaining bone being chemically normal. Osteomalacia, in contrast, is characterized by bone that is abnormal due to impaired mineralization. Because of the generally longer life expectancy in females in industrialized societies, osteoporosis is more common in women than in men. Approximately 15 to 20 million Americans are affected by osteoporosis, which contributes to some 1.3 million bone fractures per year in persons 45 years and older. One-third of women 65 years and older have vertebral fractures. On the basis of x-ray evidence, by age 90 one-third of women and one-sixth of men will have suffered hip fractures, leading to death in 12 to 20% of those cases and to long-term nursing care for many who survive. The total costs of osteoporosis to the US economy were estimated to be US$7 to US$10 billion (USDHHS 1988). Prevalence increases with age and as life expectancy continues to increase in the Near East region it would be expected that osteoporosis would increase. Some of the possible risk factors for osteoporosis in the United States are tabulated in Table 7.

Table 7
Risk Factors for Osteoporosis

Well Established Factor	Effect on Risk	Moderate evidence Factor	Effect on Risk
Obesity	Increase	Alcohol	Increase
Age	Increase	Cigarette smoking	Increase
Black	Decrease	Heavy Exercise	Decrease
Age	Increase	Low Calcium Intake	Increase
Corticosteroid Use	Increase		
Estrogen Use	Decrease		
Extreme Immobility	Increase		

Source: USDHHS 1988. Amongst the investigated factors there is inconclusive or inadequate evidence for the role of moderate physical activity, diabetes, progestin use, caffeine intake or drinking water fluoride as influencing risk.

III.   SURVEYS AND PROGRAMS

1.   The National Nutrition Monitoring System

Nutrition monitoring in the United States is a complex system of coordinated activities that provides information about the dietary, nutritional, and related health status of Americans; the relationships between diet and health; and the factors affecting dietary and nutritional status (USDHHS/USDA 1989, IBNMRR 1992). Surveys, surveillance systems, and other monitoring activities comprise the measurement component areas of the National Nutrition Monitoring and Related Research Programme (NNMRRP). This was recently strengthened by an Act of Congress which required the development of a 10-Year Comprehensive Plan for Nutrition Monitoring and Related Research. This was to establish a comprehensive national nutrition monitoring and related research program by :

1)   Collecting quality data that are continuous, coordinated, timely, and reliable

2)   Using comparable methods for data collection and reporting of results

3)   Conducting relevant research

4)   Disseminating and exchanging information with data users in an efficient and effective manner.

The Interagency Board for Nutrition Monitoring and Related Research (IBNMRR), co-chaired by the Assistant Secretary for Health, Department of Health and Human Services and the Assistant Secretary for Food and Consumer Services, Department of Agriculture, is responsible for overseeing implementation of this 10-Year Plan. A very large number of nutrition related activities are now taking place in association with the Board. There are five measurement component areas :

1)   Nutrition and related health measurements,

2)   Food and nutrient consumption,

3)   Knowledge, attitudes, and behavior assessments,

4)   Food composition and nutrient data bases, and

5)   Food supply determinations.

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A listing of the various activities from the Directory of Activities (IBNMRR 1992) is tabulated in Appendix II and illustrates the wide scope of nutrition monitoring activities being undertaken.

The National Nutrition Monitoring System thus encompasses all data collection and analysis activities of the Federal Government associated with health and nutrition status, food consumption, food composition, dietary knowledge, food attitudes, and surveillance of the food supply. A number of selected surveys from the various series are shown in Table 8. These show in summary form the name and date of the survey, the purpose, the target groups, the sample size and the major variables collected. General conclusions are that the supply of food is abundant (USDHHS/USDA 1989) but that there are certain omissions in data availability. Significant gaps exist for population subgroups whose nutritional status may reasonably be suspected to differ from that of the general population, such as the homeless, institutionalized persons, migrant workers, and Native Americans living on reservations. There is, in addition, very little information on the dietary and nutritional status of the elderly.

Changes appear to be occurring in eating patterns consistent with recommendd dietary guidelines for Americans to avoid too much fat, saturated fat, and cholesterol and to consume adequate amounts of starch and dietary fiber. Data from the US Food Supply Series show recent shifts from animal sources to vegetable sources of fat, consistent with dietary guidance to avoid too much saturated fat. There have also been shifts from whole milk to low-fatmilks, an increased consumption of leaner types and cuts of meat, and an increase in the use of margarine with a concomitant decrease in the use of butter. Such major changes in animal food availability over a period of 75 years are illustrated in Fig. 2. Changes in food consumption patterns can also be observed over a much shorter time period (less than 10 years) as is shown in Table 9. Of special note are the continuing increases of consumption of low fat milk, low calorie soft drinks and the decreases in consumption of whole milk and of beef. All are reflections of health concerns by the public and of the infleuence of the health and dietary guidelines. Criteria of an adequate diet have been discussed by Beaton (1988).

Major nutrition-related health problems experienced include the over consumption of food energy, fat, saturated fatty acids, cholesterol, sodium, and alcohol. More than one-quarter of the adult US population was overweight, based on data in NHANES II. Data collected since then in the NHANES (1982-84) also indicate a high prevalence of overweight (26-42%) in three Hispanic groups not previously studied.

Table 8
Selected Food and Nutrition Surveys

Name and Date	Purpose of Survey	Target Groups	Type and Design	Sample Size (Individuals)	Major Variables
Food Supply Series from 1909	Annual changes in food availability	Civilian Population	Disappearance of 350 foods at or before retail level	Not Applicable	Calculated Nutrients from Food Data
NHANES I 1971-74	Direct Physical Examination Nutrition & Health	Civilian. not institutions Age 1-74yrs.	Interview. Examination. Probability-Clustered	28,043	Dietary, Anthropometric Blood. Urine Blood Pressure
HANES II 1976-80	Ditto	Civilian.not institutions. Age 6m-74yrs	Interview. Examination. Probability-Clustered	27,801	Dietary, Anthropometric, Blood. Urine. Blood Pressure
HHANES 1982-84	Ditto plus unmet health care needs	Ditto but Hispanic from selected States	Clusters of Defined Population	15,294[1]	Dietary, Anthropometric. Blood, Urine. Blood Pressure
NHANES III 1988-94	Nutrition &. Health. Risk Factors	Civilian, not Institutions, Age > 2 m.	Interview. Examination. Probability-Clustered	40,000 proposed	Dietary, Anthropometric, Blood. Urine. Blood Pressure
NFCS 10 yearly, last done 1987-88[2]	Food Consump Behaviour Nutr. value of diets	Households Individuals All incomes Low incomes	Probability in area for defined population	15,000 main 10.100 low. income.	Food used for one week: food ingested home and away for 3 days
CSFII 1985 and 1986	Changes from main NFCS	Population Groups of concern	Stratified Probability sampling frame	4,069 1985 3,108 1986	Six 24 hr. recalls at 2 m. intervals
CSFII 1989-96	Following change in society factors	Population Groups of concern	Stratified Probability sampling frame	2,250 using moving averages	Food at home and away for 3 conseq. days. recall and diary
Cholesterol Awareness Survey, 1983,1986, 1989	Changes in Public attitudes and knowledge	Civilian Population > 18 years	Random Digit Telephone Interviews. one adult per household	About 4.000 per survey	Public Knowledge and personal behaviour
Consumer Expenditure Survey; continuous	To revise market basket costs	Civilian population	Interviews and Diaries	6,760 Interview 6,050 diary	Annual food expenditure and food stamp use

Figure 2

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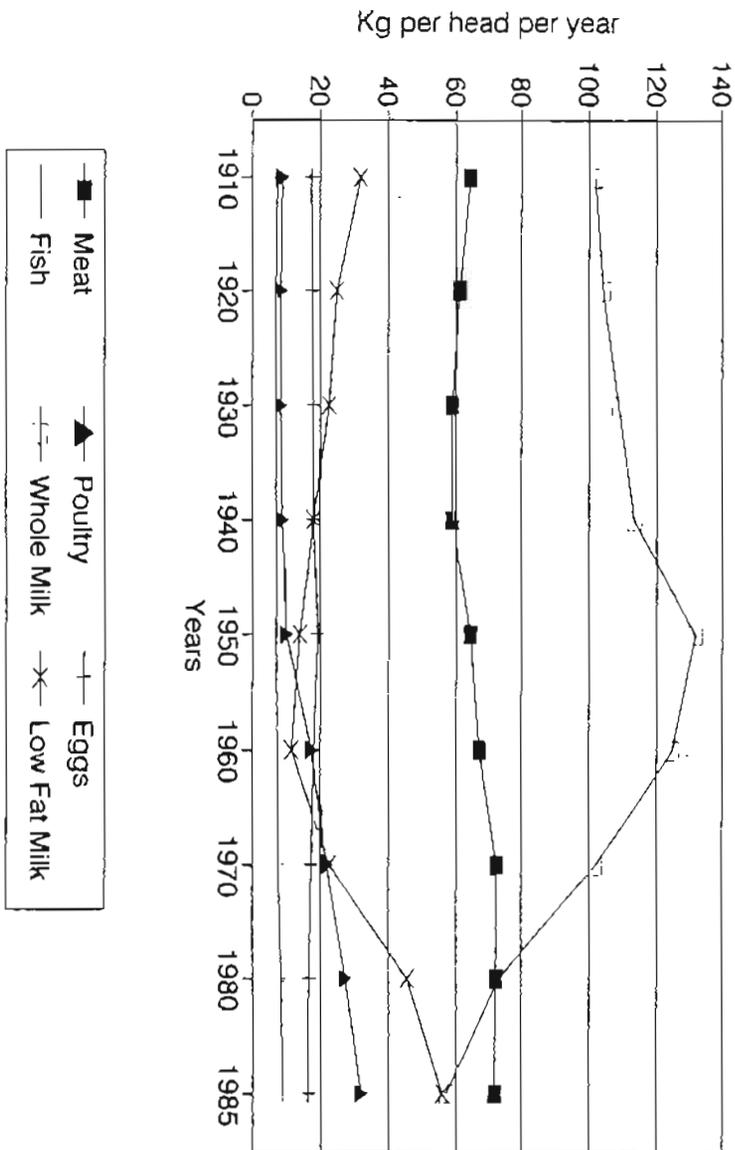
Table 9
Mean Daily Intakes for Selected Foods and
Changes in Food Use: United States 1977-85

Food Group	MEN		WOMEN	
	Intake 1985 grams	Change[1] %	Intake 1985 grams	Change[1] %
Total Meat and Fish	268	-9	181	-3
Meat Mixtures	110	+5	88	+35
Beef	52	-35	27	-45
Pork	26	-7	14	-22
Poultry	25	-22	22	-8
Fish/Shellfish	21	+50	13	+18
Total Milk	205	-5	141	-5
Whole Milk	117	-25	64	-35
Lowfat Milk	87	+53	77	+60
Cheese	17	+6	18	+6
Eggs	26	-26	18	-28
Total vegetables	272	+3	173	-8
Total Grains	278	+8	209	+29
Total Soft Drinks	433	+74	287	+53
Regular	332	+43	179	+28
Low-calorie	101	+494	105	+123

Source: USDA/USDHHS 1989
[1] Percentage change 1977-85

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High intakes of total fat and saturated fat, especially for adult men, are reflected in the high prevalence (11-22%) of elevated levels of total serum cholesterol found in nearly all adult groups aged 20-74 years in the US population. Intakes of fat and cholesterol for women and children (Table 10) illustrate that while mean intakes may be approaching the National Academy guidelines (NRC 1989) the range of intakes can be very large. Cholesterol intakes, for example can range from 97 mg/day at the 5th to 544 mg at the 95th percentile. Reported intakes of alcohol are high in a large number of Americans and the serious nature of the health and social consequences of such intakes justifies public health concern. Iron deficiency continues to be the most common single nutrient deficiency, but its prevalence has declined in children aged 1-5 years. Women of childbearing years and young children are at greatest risk for iron deficiency. The calcium status of women is also a concern and the high prevalence of osteoporosis in later life is suggestive that the calcium intake of many women may be inadequate to permit the accretion of maximal bone mass in early adulthood and/or to maintain bone mass later in life. The risk of nutrition-related disorders is income-related and the prevalence of both overweight and iron deficiency are greater in women below poverty than in women above poverty. In general, however, those that participated in the Food Stamp Programme had improved status.

A number of limitations still remain in interpretation of the data relating diet to cardiovascular diseases. Sodium intake is underestimated since it excludes sodium from salt added at the table. Alcohol intake is also underestimated since most data on alcohol consumption are as a result of self reporting. Furthermore the nutrient composition data bases remain inadequate concerning the contents in food of the individual fatty acids and some of the more recent survey data involve only women and children. Finally HANES data is of limited use since only 1 day of dietary data was collected.

Certain conclusions have, however, been drawn (USDHHS/USDA 1989) on understanding the dietary and nutritional factors as they relate to cardiovascular diseases and the various sub-populations at risk within the overall US population. As examples, blacks are at greater risk of hypertension than whites; women of low socioeconomic status are at greater risk of obesity than women of high socioeconomic status, and persons above poverty are at greater risk of hypercholesterolemia than persons below poverty. The characteristics of individuals with multiple risk factors have also been examined : black males have a higher prevalence of multiple risk factors than white males and black or white females. In women, high fat intake is associated with being white, having more than a high school education, and smoking. However, a composite model that quantitates the relative

Table 10
Fat and Cholesterol Intakes: Continuing Survey
of Food Intakes by Individuals 1985-86

| | Mean Intakes | | Intakes at Percentiles | |
	Mean	+SEM	5th	95th
Women 20-49 years				
Total Fat g/d	62	0.7	27	107
%kcal	37	0.2	26	47
Saturated Fat g/d	23	0.3	9	41
%kcal	13	0.1	9	18
Monounsat Fat g/d	23	0.3	10	40
%kcal	13	0.1	9	18
Polyunsat Fat g/d	12	0.1	5	23
%kcal	7	0.1	4	11
Cholesterol mg/d	277	4.3	97	544
Children 1-5 yrs				
Total Fat g/d	55	1.2	33	87
%kcal	35	0.3	27	43
Saturated Fat g/d	22	0.5	12	35
%kcal	14	0.2	10	18
Monounsat fat g/d	20	0.4	11	33
%kcal	13	0.1	9	16
Polyunsat. Fat g/d	9	0.2	5	16
%kcal	6	0.1	4	9
Cholesterol mg/d	228	5.7	87	445

Source: USDA/USDHHS 1989

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contribution of all risk factors, including genetic predisposition does not yet exist.

Changes in food availability that contribute to a decrease in the content of saturated fat have been observed to precede the decline in coronary heart disease mortality. Changes in mean serum cholesterol levels consistent with changes in mean dietary intake of fats and cholesterol were detected between the first and second NHANES.

Men are at higher risk than women for coronary heart disease and hypertension. Although serum cholesterol levels do not vary dramatically with sex, elevated levels constitute a greater risk for men than for pre-menopausal women. The dietary intakes of fat, saturated fat, and cholesterol are higher in males than in females. More black women are significantly overweight than white women or men of either race. Socioeconomic risk factors are not always consistent. Indicators of high socioeconomic status tend to be associated with hypercholesterolemia and higher intakes of fat, but with lower prevalence of hypertension and, for women, overweight. Survey results do, however, indicate trends for increasing knowledge and for changing diet-related practices.

2.   Nutrient Composition Data Bases

A fundamental need, before any conclusions can be drawn from dietary intake data, is for accurate food composition data. The nutrient composition databases used in the United States for dietary assessment are based on pooling of data from many sources. The present USDA database (USDA 1976-1994) comprises some 6,500 food items with more than 70 nutrients or food components including fatty acids, amino acids, fiber constituents and micronutrients being listed. Not all are present for all foods. Data are lacking for some nutrients because accurate, precise, and affordable analytical methodologies are not always available (Beecher and Vanderslice 1984). Information is not as complete for less studied nutrients as for those nutrients for which a requirement or disease relationship has long been recognized. formation also is less comprehensive for the wide variety and increasing numbers of commercially prepared foods than for traditional food commodities. For all foods in the database, the proportion of analytical values, as opposed to imputed values, equaled or exceeded 90 percent for the more familiar nutrients that have been assessed for many years, whereas the proportion of analytical data for components newly added to the survey, such as dietary fiber and alpha-tocopherol, was less than 30 percent. For foods, however, that represented the major sources of the various food components analytical data were in excess of 70% for most nutrients.

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An ideal nutrient database would be current, reliable, and valid; be responsive to changes in the food supply; contain information on all the nutrients of interest; have complete data but should use extrapolated values for unavailable data until new analytical values are obtained; be expandable as new data become available; and be in a physical form that facilitates coding and analysis (NRC 1981). The Human Nutrition Information Service (HNIS) of the USDA attempts to emulate these aims and continuously maintains the National Nutrient Data Bank.

3. Food Consumption Surveys

Individual intake data can be divided into two categories based upon the methods by which they are collected : quantitative daily comsumption and semi-quantitative food frequency methods (LSRO 1986). Quantitative daily consumption methods attempt to measure the nature and quantity of individual foods consumed in a defined period of time, in contrast to food frequency methods which attempt to measure patterns of food use and implied nutrient intake across longer and often less precisely defined periods of time. Both types have been used in the national surveys : the HANES (NHANES I, II and HHANES) each employed a single 24-hour recall, the NFCS 1977-78 employed a 24-hour recall followed by two consecutive days of food records, and the CSFII 1985-86 employed an initial 24-hour recall conducted in person followed on non-consecutive days by up to five additional 24-hour recalls administered by telephone (or in person, when necessary) over the period of one year.

The major difficulty in the interpretation of data derived by these methods is the large variation in day-to-day intake of food and nutrients within individuals. The number of days for which dietary recalls or records are obtained also affects the appropriate use of the data, with greater restrictions placed on the interpretation of data obtained for a single day than on data obtained over multiple days. Data collected by food frequency methods are regarded as more representative of the usual intakes of subjects than quantitative intake data collected for a single day or for only a few days and are less affected by intra-individual variation (LSRO, 1986). However, the accuracy of estimates of actual intake obtained with these methods is not as great as the accuracy of those obtained with quantitative daily methods. A combination of food frequency and quantitative daily consumption data may provide a more comprehensive assessment of food consumption and nutrient intake than either method alone. Food frequency methods have been used less often in the US national surveys but a food frequency questionnaire was included in the HANES. The methods used and procedures followed in the large scale USDA dietary intake surveys between 1975 and

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1988 are described in USDA (1989) and general criteria for the assessment of nutritional adequacy have been reviewed by NRC (1986).

The most recent USDA Nationwide Food Consumption Survey conducted in 1987-88 has been questioned as to its methodological soundness and the effectiveness of the contractor hired to conduct the survey (GAO 1991). The GAO report noted deviations from the original design and lax controls over the collection and processing of the data and hence questioned both the quality and the usefulness of the data. In addition the results were not considered to be representative of the US population because of low response rates - only 34% of the households in the basic sample provided individual intake data. An expert panel convened by HNIS concluded that the data were probably biased estimates of the nation's dietary intake and did not recommend use of the data unless users employed the greatest caution. It was recommended further that the design flaws be corrected before HNIS conducts another nationwide survey. Because of these limitations many are not using the results obtained in the 1987-88 survey.

4. Evaluation of Nutritional Status from Dietary Intake Data

Recommended Dietary Allowances (RDA) are the levels of essential nutrients considered, on the basis of available scientific knowledge, to meet the known nutritional needs of practically all healthy persons (NAS-NRC 1989). Exceptions are that for food energy the allowance is set to meet the average needs of most of the population while for vitamins and minerals that are less well studied, estimated ranges of Safe and Adequate Daily Dietary Intakes have been recommended. The RDA's are not intended to represent individual requirements although such implications are commonly made and the RDA's have often been used as standards to evaluate the adequacy of nutrient intake. Because the RDA include a margin of safety, intakes below the RDA are not necessarily inadequate, but the risk of inadequate intake increases as the mean intake of a population falls to lower percentages of the RDA. Recent Federal Surveys have chosen not to express dietary intake data as percentages of the RDA or to apply the RDA or any proportion of the RDA as the major criterion for assessing whether a nutrient constitutes a public health problem because of inadequacy. The limitations, when countries other than the USA use the United States RDA's as a basis of comparison, are considerably greater. Hence such comparisons are generally contraindicated; even comparisons with international standards are also severely limited. However, mean intakes of population groups falling well below the

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RDA can be taken as rough indicators that further examination of the status of that population group is needed.

5.   Nutrition Related Health Indicators

In the various Federal Nutrition Surveys the following indicators have been used :

1)   Haematological tests (haemoglobin, haematocrit, mean corpuscular volume, mean corpuscular haemoglobin, mean corpuscular haemoglobin concentration, red blood cell counts, white blood cell counts).

2)   Biochemical tests (serum iron, total iron-binding capacity, erthrocyte protoporphyrin, serum ferritin; serum and red blood cell folate; serum vitamin A or retinol; serum vitamin C; serum alpha-tocopherol; serum total and HDL cholesterol).

3)   Body measurements (height, weight, skinfold thicknesses, circumferences, breadths).

4)   Clinical signs of nutritional deficiency (physical evidence of wasting, edema, classical signs of vitamin deficiencies).

5)   Tests for conditions associated with diet (high blood pressure, overweight).

6)   Assessments of nutrition knowledge and attitudes (e.g. public understanding of the relationship of diet and nutrition to disease).

There are major problems in defining cut-off values for the various indicators (Habicht et al. 1982). These have been related to functional outcome (wt/ht and mortality) or based on nutritional determinants following increases or decreases in intake of the nutrient (e.g. haemoglobin concentration and iron depletion). Alternatively they may be derived by statistical means from the normal distribution of values for the indicator in an apparently healthy population. The potential for minimizing the effects of misclassifications has been discussed by USDHHS/USDA (1989).

While the major supervisory role for nutrition monitoring has been assumed by the IBNMRR many activities still remain centered in USDA. These concern the nutritional value of foods, human nutritional needs, the kinds of foods consumed relative to needs, and strategies for improving diets and the food supply. The major role of

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the USDA is seen to be the provision of help to individual consumers so that they can understand the relationship of food and its nutrients to the maintenance of health and the prevention of diet-related disorders during the different stages of life. Much of this activity is provided through the experimental stations and the Nutrition Extension services in the various States. The total amount of human nutrition research increased from US$60.7 million in 1986 to US$82.3 million in 1992. In the same period USDA support for human nutrition information and education has increased from US$ 132.1 million to US$ 196.6 million. The total support for human nutrition was US$250.4 million in 1991 and was expected to be US$278.9 million in 1992 (USDA 1992). Continued progress was made in coordinating activities with other departments, with international agencies and with the private sector. Future needs include the development of new information to fill knowledge gaps, as well more effective application of existing knowledge.

6.   The National Cholesterol Education Programme (NCEP)

i.   Adults

Many factors influence not only whether a person will develop CHD but also how rapidly atherosclerosis progresses. Genetic predisposition, gender, and advancing age are factors over which an individual has little control. High blood cholesterol, cigarette smoking, high blood pressure, excessive body weight and long term physical inactivity are, in contrast, key risk factors over which there can be considerable personal control and management of all of these factors is important in the prevention of CHD. For those with diabetes controlling other risk factors may, in addition, avoid or delay vascular disease.

Both a population approach and an individualized high risk approach to blood cholesterol have been advocated (USDHHS 1990a). Justification comes from epidemiological, clinical and experimental evidence which clearly demonstrate that the likelihood for a person developing CHD or dying from the disease is directly related to the level of blood cholesterol. This relationship was well illustrated by the 10 year follow-up experience of men, initially aged 35 to 57 years, screened for the multiple risk factor intervention trial (MRFIT). The relationship was continuous and the risk increased with rising cholesterol levels. The risk of dying from CHD increased slowly between 150 mg per 100 ml (3.88 mmol/L)and 200mg per 100 ml (5.17 mmol/L) but then more rapidly when cholesterol level exceeded about 200 g per 100 ml (5.17 mmol/L). For those individuals with cholesterol levels between 240 mg per 100 ml (6.21 mmol/L) and 300 mg per 100 ml (7.76 mmol/L), the likelihood of CHD increased up to four fold above that for those with levels below

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200 mg per 100 ml (5.17 mmol/L). In the United States, a majority of people have blood cholesterol levels high enough to increase significantly the likelihood of CHD. Nevertheless, the risk of CHD is by no means restricted to those with high blood cholesterol level and supports the need for both population and high risk approaches to CHD prevention.

The National Cholesterol Education Programme (NCEP), backed by several of the technical arms (Public Health Service, National Institutes of Health and the National Heart, Lung and Blood Institute) of the US Department of Health and Human services, coordinates activities and produces "Expert Panel Reports" (USDHHS 1990ab, 1992) on national strategies for the reduction of serum cholesterol and hence reduce the risk of mortality from coronary heart disease (CHD) in the US population. These reports are designed to influence both health professionals and the public. Such an approach would appear to be an excellent model on which to base programmes for cholesterol reduction in some of the countries of the Near East.

Risk levels (Table 11) have been identified. High CHD rates occur among people with high blood cholesterol levels of 240 mg/dl (6.21 mol/L). However an even larger number of cases occur with blood cholesterol levels below 240 mg/dl. The average level for the adult US population is about 210mg/dl (5.43 mol/L). Recommendations generally emphasize that dietary therapy should be the most usual treatment when cholesterol is elevated and drug therapy should only be involved if the LDL-cholesterol remains significantly elevated after 6 months of intensive dietary therapy reinforced with special nutrition expertise.

The population approach aims both to lower the blood cholesterol level of individuals and also to reduce the average cholesterol level throughout the population. Risk factors, other than LDL-cholesterol, have been identified. These include: male sex, family history of premature CHD, cigarette smoking, hypertension, low HDL-cholesterol, diabetes, history of cerebrovascular or occlusive peripheral vascular disease and severe obesity.

Precise and accurate cholesterol measurements are required to identify and treat individuals with high blood cholesterol levels. Nevertheless, although considerable progress in analytical precision has been made, deficiencies and inaccuracies remain. In order to improve the situation a special panel (USDHHS 1990b) has made extensive recommendations to improve the situation.

Strategies for action include recommendations concerning diet addressed to individuals, to special population groups, to health

professionals, to the food industry, to government agencies and to the education system. These are more explicit than the Dietary Guidelines and are :

1) Less than 10 percent of total calories from saturated fatty acids.

2) An average of 30 per cent of total calories, or less, from all fat.

3) Dietary energy inakes only at levels needed to reach or maintain a desirable body weight.

4) Less than 300 mg of cholesterol per day.

Each is intended to be achieved by an individual as an average of nutrient intakes over several days. They are considered as appropriate for the general population including those older than 65 years of age. Although special considerations (USDHHS 1992) are given to children and adolescents and are discussed below, the above recommendations are also considered broadly appropriate for healthy childen as they join the family eating pattern. This would normally occur at about 2 years of age.

For those at higher risk dietary change is recommended as the mainstay of treatment. Drug therapy should generally be considered only after 6 months after intensive dietary therapy reinforced with the help of special nutrition expertise and then only if the LDL-cholesterol remains significantly elevated. The conservative approach to drug therapy was recommended since drugs may also have serious deleterious side effects (USDHHS 1990a).

Research and surveillance activities are, however, still required to develop new information concerning the relationships between diet, blood lipids and CHD. together with the development of better data bases concerning food composition, food consumption patterns, morbidity rates, food product development and nutrition education and communication. The panel concluded that implementation of these recommendations could reduce the average blood cholesterol in the United States by approximately 10 per cent which could lead to an overall reduction in the rate of coronary heart disease by some 20 per cent and therefore lead to a significant improvement in the health and quality of life for Americans. The development of similar recommendations for countries of the Near East together with their vigorous endorsement and dissemination at high levels could be expected to bring similar benefits for the population.

Table 11

Recommendations of the Adult Treatment Panel of the
National Cholesterol Education Program for
Classification of Patients

Classification based on Total Cholesterol	Classification based on LDL-Cholesterol
<200 mg/dl(5.17 mmol/L) Desirable Blood Cholesterol	<130 mg/dl (3.36 mmol/L) Desirable LDL-Cholesterol
200-239 mg/dl (5.17-6.18 mmol/L) Borderline-High Blood Cholesterol	130-159 mg/dl (3.36-4.11 mmol/L) Borderline-High Risk LDL-Cholesterol
>240 mg/dl(6.21 mmol/L) High Blood Cholesterol	>160 mg/dl (4.13 mmol/L) High Risk LDL-Cholesterol

Source: USDHHS 1990a.

ii.   Children and Adolescents

Elevated cholesterol levels early in life play a role in the development of adult atherosclerosis thus lowering levels in children and adolescents will reduce risk. Considerable emphasis is now being given to evaluating the significance of blood cholesterol levels in children and adolescents (USDHHS 1992). While blood cholesterol is the major focus of this report it is noted that other risk factors for atherosclerosis and CHD may also originate early in life. Specifically, cigarette smoking should be discouraged; hypertension should be identified and treated; obesity should be avoided or reduced; regular aerobic exercise should be encouraged; and diabetes mellitus should be diagnosed and treated.

A variety of studies have indicated that the process of atherosclerosis begins in childhood, that this processis related to elevated levels of blood cholesterol, and that these levels are often predictive of elevated blood cholesterol in adulthood. Preventing or slowing the atherosclerotic process in childhood and adolescence could extend the years of healthy life for many. The evidence for the United States (USDHHS 1992) was summarized as follows :

1)   Compared to their counterparts in many other countries, US children and adolescents have higher blood cholesterol levels and higher intakes of saturated fatty acids and cholesterol. In addition, US adults have higher blood cholesterol levels and higher rates of CHD morbidity and mortality.

2)   Autopsy studies have demonstrated that early coronary atherosclerosis or precursors of atherosclerosis often begin in childhood and adolescence.

3)   High levels of serum total cholesterol, low-density lipoprotein (LDL) cholesterol, and very-low-density-lipoprotein (VLDL) cholesterol levels, and low levels of high-density lipoprotein (HDL) cholesterol levels, are correlated with the extent of early atherosclerotic lesions in adolescents and adults.

4)   Children and adolescents with elevated serum cholesterol, particularly LDL-cholesterol levels, frequently come from families in which there is a high incidence of CHD amongst adult members.

5)   High blood cholesterol aggregates in families as a result of both shared environments and genetic factors.

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6) Children and adolescents with high cholesterol levels are more likely than the general population to have high levels when they become adults.

To lower blood cholesterol levels in children and adolescents, the panel, as with adults, recommended a strategy that combined the two complementary approaches of a population strategy and an individualized strategy.

The aim of the population strategy is to lower the average levels of blood cholesterol among all American children and adolescents through population-wide changes in nutrient intake and eating patterns. The recommendations are intended for all healthy children and adolescents over the age of about 2 years :

1) Nutritional adequacy should be achieved by eating a wide variety of foods.

2) Food energy should be adequate to support growth and development and to reach or maintain desirable body weight.

3) Recommended nutrient intakes are :

- saturated fatty acids, less than 10% of total food energy calories;
- total fat, an average of not more than 30% of total food energy calories; and
- dietary cholesterol, to be less than 300 mg per day.

To achieve this nutrient intake, the panel recommended an eating pattern in which families select, prepare, and consume foods low in saturated fatty acids, total fat and cholesterol; choose a variety of foods to ensure an adequate intake of carbohydrates, protein and other nutrients; and consume only enough food energy to maintain desirable weight. Such an eating pattern will support normal growth and development and will provide enough total energy. It will also meet, or exceed, the recommended dietary allowances (RDA) for all nutrients for children and adolescents including iron and calcium. The recommendations were not intended for infants from birth to two years since the fast rate of growth at this age requires a higher percentage of food energy from fat. Toddlers of two to three years of age, however, may safely make the transition to the recommended eating pattern as they begin to eat with the family.

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Recommendations were also made to groups that influence the eating patterns of children and adolescents. These include schools, health professionals and government agencies who should help in developing healthful eating patterns. In addition the food industry should increase efforts to design, modify, prepare, promote label and distribute foods low in saturated fatty acids, total fat and cholesterol that are good tasting, safe, and appealing to children. Further, the mass media, through their news, educational and entertainment programing should provide information on dietaries that will maintain health.

The individualized strategy requires selective screening, in the context of regular health care of children and adolescents who have a family history of premature cardiovascular disease or at least one parent with high blood cholesterol. The categories classifying the total and low density lipoprotein values for children and adolescents are shown in Table 12. Recommended treatment and follow-up procedures are :

1) Acceptable LDL-cholesterol (less than 110 mg per 100 ml). Education should be provided on the eating pattern recommended for all children and adolescents and on CHD risk factors. Lipoprotein analysis should be repeated in 5 years.

2) Borderline LDL-cholesterol (110 to 129 mg per 100 ml). Risk factor advice should be provided and dietary treatment should be started. The patient's status should be re-evaluated in one year.

3) High LDL-cholesterol levels (greater than 130 mg per 100 ml). Evaluation for secondary causes and familial disorders should be undertaken. All family members should be screened, dietary treatment should be initiated, followed in extreme cases by drug therapy.

7.   Role of Health and Education Services

While a major part of disease prevention is dependent on individual decisions, as for example with smoking or fat consumption, a very significant role is played by patient education and counseling. It was concluded by the US Preventive Services Task Force (USPSTF 1989) that counseling may be even more effective overall than conventional clinical activities such as screening tests. The latter, however, when appropriately tailored to an individuals age and risk are central current preventive procedures. Important examples are for hypertension and elevated cholesterol as well as those used in screening for the various cancers. An important

Table 12

Classification of Total and LDL-Cholesterol levels in
Children and Adolescents from Families with
Hypercholesterolemia or Premature Cadiovascular Disease

Classification based on Total Cholesterol	Classification based on LDL-Cholesterol
<170 mg/dl(4.40 mmol/L) Acceptable Blood Cholesterol	<110 mg/dl (2.84 mmol/L) Acceptable LDL-Cholesterol
170-199 mg/dl (4.40-5.15 mmol/L) Borderline Blood Cholesterol	110-129 mg/dl (2.84-3.34 mmol/L) Borderline LDL-Cholesterol
≥200 mg/dl(5.17 mmol/L) High Blood Cholesterol	≥130 mg/dl (3.36 mmol/L) High LDL-Cholesterol

Source: USDHHS 1992.

proviso within the United States requires more extensive insurance coverage to include counseling and screening services so that they can gain greater overall effectiveness.

Major efforts are needed to modify lifestyles since once they are established they are difficult to change. Key features of all plans must be : smoking cessation, stress management, nutrition and exercise, screening for blood pressure and serum cholesterol accompanied by hospital and/or community based education and health promotion programs (USDHHS 1991).

Nutrition education at the nationwide level can only be seen to be successful if the public understands the messages received and acts accordingly. In health and diet surveys of both the general public and practicing physicians, Schucker et al. (1987ab) observed increases in the percentages of persons in both groups who believed that reducing high blood cholesterol would have a significant effect on heart disease. Among adults in the general public, 46% reported having their serum cholesterol checked in 1986 compared to 35% in 1983. More than 60% also identified eating less cholesterol and fat as a way to reduce serum cholesterol. In 1986, physicians reported initiating dietary intervention at lower levels of blood cholesterol in their patients than they had reported in 1983. In another study (Heimbach 1987), fat and cholesterol were named in 1982 by 29% and 26%, respectively, as the cause of heart disease; this had increased to 43% and 40% by 1986. In general, therefore, the surveys do indicate gains in public awareness and consequent actions as well as in physician beliefs and therapeutic interventions in relation to high blood cholesterol risk. These conclusions are important since the criteria used for funding and continuation of such programs must include considerations as to their effectiveness.

IV.   CONCLUSION AND RECOMMENDATIONS

On an international basis the work of many scientists has shown that atherosclerosis and CHD constitute a major health problem that is increasingly afflicting numerous nations of the world. The linkage of CHD to national eating patterns has been established. There is widespread international consensus, based upon repeated reviews of the scientific evidence, that the average population intakes of total fat, saturated fatty acids, dietary cholesterol, and food energy are excessive in many countries and should be reduced. As a result, since 1973 more than 40 groups of scientists and health policy makers have recommended changes in population eating patterns with the purpose o reducing blood cholesterol. Major reviews of the linkage of diet and health include the Surgeon General's report in the United States (USDHHS 1988), the National Research Council

Report - Diet and Health : Implications for Reducing Chronic Disease Risk (NRC 1989) as well as Diet, Nutrition and the Prevention of Chronic Diseases (WHO 1990) who proposed population nutrient goals to control non-communicable disease and suggest that these be introduced as part of ntrition policy in all countries.

Many reports linking CHD and diet have appeared in the United States from other organizations and have been tabulated on a comparative basis by the population panel of the US National Cholesterol Education Program (USDHHS 1990a). All guidelines are remarkably similar although some groups are more specific [e.g. NRC (1989)] in their recommendations than others [e.g. USDHHS (1988)]. Arguments continue as to whether guidelines should be general - 'eat less fat and cholesterol' or explicit - 'do not exceed an intake of 300 mg cholesterol daily'. The latter type may be counterproductive as they can be viewed by many as too complex and are hence ignored. My own inclinations are towards general recommendations for the population as a whole. The Surgeon General's (USDHHS 1988) recommendations are of this type and shown in Table 13. More specific recommendations are appropriate for high risk groups and are used in the NCEP (USDHHS 1990a, 1992).

The recommendations in Table 13 generally are similar to those described earlier and include lower intakes of saturated fatty acids and total fat, a reduction in dietary cholesterol, an increased intake of complex carbohydrates and the control of obesity. Such recommendations could be applicable to many countries of the Near East. Ironically,these would be a return to previous dietary patterns before the rapid Americanization (westernization) of the diet had begun. Nevertheless such changes are necessary. Dietary traditions may be sufficiently strong, in some countries, that further changes towards the US pattern of diet will not take place as far and as fast as now seems likely. Warnings however must be provided. The recommendations for a prudent diet in the US are remarkably similar to many traditional dietary patterns where diets based on cereals with fruit, vegetables, beans and low amounts of meat and animal products are common. The retention of traditional dietary patterns should be encouraged wherever possible, especially with the cooperation of the Food Industry, who should be encouraged to make versions of traditional foods available in the market place that require much less preparation time. Unless changes can be made in both food habits and in lifestyles it is highly probable that there will be further significant increases in morbidity and mortality from the diseases of affluence. These require personal decisions but public health programmes to provide information and to encourage such decisions are also essential. Many of the programmes and public initiatives that have been described have shown success in reducing

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Table 13
Dietary Recommendations by the
United States Surgeon General: 1988

Issues for Most People:

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* Fats and cholesterol: Reduce consumption of fat (especially saturated fat) and cholesterol. Choose foods relatively low in these substances, such as vegetables, fruits, whole grain foods, fish, poultry, lean meats, and low-fat dairy products. Use food preparation methods that add little or no fat.

* Energy and weight control: Achieve and maintain a desirable body weight. To do so, choose dietary pattern in which energy (caloric) intake is consistent with energy expenditure. To reduce energy intake, limit consumption of foods relatively high in calories, fats, and sugars, and minimize alcohol consumption. Increase energy expenditure through regular and sustained physical activity.

* Complex carbohydrates and fiber: Increase consumption of whole grain foods and cereal products, vegetables (including dried beans and pear), and fruits.

* Sodium: Reduce intake of sodium by choosing foods relatively low in sodium and limiting the amount of salt added in food preparation and at the table.

* Alcohol: To reduce the risk for chronic disease, take alcohol only in moderation (no more than two drinks a day), if at all. Avoid drinking any alcohol before or while driving, operating machinery, taking medications, or engaging in any other activity requiring judgment. Avoid drinking alcohol while pregnant.

Other Issues for Some People:

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* Fluoride: Community water systems should contain fluoride at optimal levels for prevention of tooth decay. If such water is not available, use other appropriate sources of fluoride.

* Sugars: Those who are particularly vulnerable to dental caries (cavities), especially children, should limit their consumption and frequency of use of foods high in sugars.

* Calcium: Adolescent girls and adult women should increase consumption of foods high in calcium, including low-fat dairy products.

* Iron: Children, adolescents, and women of childbearing age should be sure to consume foods that are good sources of iron, such as lean red meats, fish, certain beans, and iron-enriched cereals and whole grain products. This issue is of special concern for low-income families.

Source: USDHHS 1988.

mortality in the United States. Similar initiatives could also be successful in the Near East region.

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Changes In Death Rates for Heart Disease, Stroke and Cancers
Race and Sex groupings, USA 1980-1990

Group	Disease	1980-82	1985-87 Rates per 100,000[2]	1988-90	Decline[1] %
All	Heart Disease	702.2	631.0	569.6	19
	Stroke	136.3	111.6	101.6	25
	Cancers	455.3	465.0	467.3	+3
White	Heart Disease	691.5	616.8	553.6	20
	Stroke	128.2	104.4	94.5	26
	Cancers	445.1	454.4	456.4	+3
Black	Heart Disease	856.0	825.2	779.3	9
	Stroke	222.6	185.8	174.0	22
	Cancers	589.0	610.9	621.1	+5
Male	Heart Disease	973.2	862.3	772.3	21
	Stroke	150.0	121.7	111.3	26
	Cancers	577.6	584.5	585.6	+1
Female	Heart Disease	491.8	451.4	411.6	16
	Stroke	125.8	103.5	94.0	25
	Cancers	367.4	379.5	382.4	+4

Source: USDHHS 1993
Note: white and black data are for combined sexes, male and female data
are for both whites and blacks combined.
[1] Percentage decline 1980-82 to 1988-90.
[2] Age adjusted rates for ages above 45 years.

Appendex

CARDIOVASCULAR DISEASE IN U.A.E. : AN OVERVIEW

A.O. MUSAIGER[1], A. BENER[2], S.A.M. BIN-ISHAQ[3] and
H. AL-HOSANI[3]

[1] Department of Food Sciences and Nutrition, Faculty of Agricultural
Sciences; [2] Faculty of Medicine and Health Sciences, UAE University;
[3] Preventive Medicine Department, Ministry of Health, Abu Dhabi, UAE.

ABSTRACT

The current situation on morbidity and mortality, due to cardiovascular
diseases (CVD) in UAE, is reviewed based on statistics of the Ministry of
Health for the period 1988-1992. CVD is the leading cause of death in
UAE over the last five years and constitutes 20% of total deaths. Acute
myocardial infarction is the main type of CVD (37%), followed by
cerebrovascular disease (24.5%), ischaemic heart disease (18%) and
hypertensive disease (12%). The prevalence of CVD is higher among males
than females, and about 75% of all CVD deaths occurred in the age group
45 years and above. Factors contributing to CVD in the UAE have not been
investigated. However, indicators from several preliminary studies show
that obesity, diabetes, hypertension and high cholesterol blood levels are
highly prevalent in adults. The prevalence of obesity was 70% and 56% in
adult married females and males,respectively. In a study among Emirati
women aged 20-80 years, it was found that 17% had diabetes and 20%
had hypertension. About 9% of these women were current smokers. A
comprehensive and well designed study on CVD risk factors in UAE
community is urgently needed. Strategies to prevent CVD should be given
a high priority.

Key Words : Cardiovascular disease, diabetes, hypertension,
smoking, obesity, UAE.

INTRODUCTION

The epidemiological transition phenomenon has been well identified
in many Middle East countries including the United Arab Emirates.
Economic development and improved health care have played an
important role in increasing in life expectancy. Lifestyle changes have
also occurred and accidents and chronic diseases have become more
common. In the United Arab Emirates, the leading causes of death
are cardiovascular diseases (20%), accidents and injuries (15%),
cancer (5.5%) and congenital anomalies (5.3%) (MOH, 1993). There
has been no clear strategy to prevent these diseases in the UAE
community. This is mainly due to lack of reliable information on the
magnitude of chronic disease incidence as well as absence of
epidemiological community-based studies.

The objective of this paper is to highlight the current situation of morbidity and mortality due to CVD in UAE and to discuss the possible risk factors for CVD based on the few preliminary studies that have been carried out in the country. Such information should be of great value for any future studies on the prevalence of chronic diseases in UAE in general and CVD in particular.

CVD MORBIDITY

Data on morbidity from CVD in UAE is scarce and inconsistent. The only information available is that related to numbers of patients attending primary health care centers (PHC). These data revealed that 40 and 1.9 per 1000 population had morbidity due to hypertensive disease and ischaemic heart disease, respectively (MOH, 1993). It is not clear whether these figures reflect the total number of attendances at PHC or the number of new cases. The rate provided by Ministry of Health for hypertensive disease is relatively high when compared to other Middle East countries (Alwan, 1993). The morbidity due to hypertensive diseases was more common among females in UAE citizens, whereas it was higher among males in non-UAE citizens. This may be attributed to high percentage of male expatriates in UAE compared to female (ratio is 3:1).

CVD MORTALITY

Death registration in UAE has improved remarkably during the past 5 years and therefore, more information on CVD mortality has become available. Acute myocardial infarction (AMI) is the main type of CVD leading to death in UAE (37%), followed by cerebrovascular disease (24.5%) and ischaemic heart disease (18%) (Table 1). No significant differences were reported between males and females in death due to various types of CVD except for rheumatic heart disease and hypertensive disease. Deaths due to rheumatic heart disease occurred more in males (17.8%) than females (6.6%). In contrast, deaths due hypertensive disease occurred more in females than males (17.6% and 9.7%, respectively). The proportions of deaths due to several types of CVD indicated no difference between Emiratis and non-Emirati females, whereas the Emirati males were more susceptible to deaths due to cerebrovascular and hypertensive diseases. The non-Emirati males were more likely to die due to acute myocardial infarction and rheumatic heart disease (Tables 2 and 3).

There is no obvious explanation for the difference in CVD between Emiratis and non-Emiratis. It could be related to different age and sex distribution. The non-Emiratis living in UAE are composed of many nationalities each with various ethnic groups and

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TABLE 1

Distribution of CVD deaths in UAE by types during 1989-1992

Causes of death	1989 No.	1989 %	1990 No.	1990 %	1991 No.	1991 %	1992 No.	1992 %
Acute Myocardial Infarction	198	37.8	208	35.3	255	31.0	309	36.9
Cerebrovascular Disease	102	19.5	120	20.3	214	26.0	205	24.5
Ischaemic Heart Disease	89	17.0	123	20.8	204	24.8	151	18.0
Hypertensive Disease	75	14.3	70	11.9	68	8.3	100	11.9
Chronic Rheumatic Heart Disease	37	7.1	52	8.8	52	6.3	48	5.7
Artherosclerosis	23	4.4	15	2.5	29	3.5	24	2.9
Other CVD	0	0.0	2	0.3	1	0.1	0	0.0
T o t a l								

Source : Ministry of Health (1993)

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TABLE 2

Distribution of CVD deaths in UAE among males by type and nationality (1992)

Type of CVD	UAE		Non-UAE		Total	
	No.	%	No.	%	No.	%
Rheumatic Heart Disease	5	2.3	33	15.4	38	17.8
Hypertensive Disease	27	12.6	31	8.1	58	9.7
Ischaemic Heart Disease	37	17.3	76	19.7	113	18.9
Acute Myocardial Infarction	67	31.3	161	41.8	228	38.1
Cerebrovascular Disease	71	33.2	76	19.7	147	24.5
Artherosclerosis	7	3.3	8	2.1	15	2.5
T o t a l	214	100.0	385	100.0	599	100.0

Source : Ministry of Health (1993)

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TABLE 3

Distribution of CVD deaths in UAE among females by type and nationality (1992)

Type of CVD	UAE		Non-UAE		Total	
	No.	%	No.	%	No.	%
Rheumatic Heart Disease	2	1.3	8	5.3	10	6.6
Hypertensive Disease	29	19.1	13	15.1	42	17.6
Ischaemic Heart Disease	23	15.1	15	17.4	38	16.0
Acute Myocardial Infarction	53	34.9	28	32.6	81	34.0
Cerebrovascular Disease	38	25.0	20	23.3	58	24.4
Artheroselerosis	7	4.6	2	2.3	9	3.8
T o t a l	152	100.0	86	100.0	238	100.0

Source : Ministry of Health (1993)

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this could make any explanation a difficult task. WHO (1990) reported that there are sharp contrasts among countries or among social or ethnic groups within a country and these special or environmental conditions can well place a population at risk for CVD.

The distribution of CVD deaths by age and sex is presented in Table 4. By age 15-44 years, 25% of males died due to CVD compared to only 9% females. At age 45-59 years, the death rate increased to 36% in males and 15% in females. No significant increase in death has been found in males aged above 59 years, but among females the rate increase dramatically to reach 70%. It is well documented that the incidence of CVD increase with age, and men have higher rates than women. Some reports show that an increase in the incidence of CVD has been observed in post-menopausal women (Isles and Holes, 1992).

Geographically, the distribution of common CVD deaths by sex is similar throughout the main areas in UAE (Table 5). Exceptions are Umm Al-Qwain and Fujairah where the deaths due to CVD were higher among women compared to other geographical areas. Numbers are small but these two areas are mostly rural and are inhabited by more UAE citizens than in other ares.

RISK FACTORS FOR CVD

Little information exists on the prevalence of risk factors for CVD in UAE. Diabetes and hypertension are the most common risk factors which may contribute to the high incidence of CVD in the country. Smoking is another important risk factor,especially among men. The prevalence of obesity has been shown to be high among both males and females in the UAE.

Diabetes Mellitus

The incidence of diabetes mellitus in UAE is increasing, and makes a high demand on the existing health services. Diabetic patients occupied 8% of available day-bed units in Al Ain Hospital and the average stay of a diabetic was 14.6 days (Omar et al., 1985). The Ministry of Health (MOH, 1993) reported that 3.5% of deaths in 1992 in UAE were due to diabetes mellitus. About 55% of deaths due to diabetes were among citizens, and the rest among non-citizens. Omar et al. (1985) found that 41% of hospitalized diabetics were nationals, while the rest were expatriates. Most of the nationals were females (62%), but the expatriates showed a greater proportion of males (67%). Type II diabetes mellitus featured predominantly (71.7%)

TABLE 4

Distribution of common CVD deaths in UAE by age and sex for 1992 (only death records include age)

Age (Years)		SEX				Total	
		Male		Female			
		No.	%	No.	%	No.	%
0 – 1		3	0.7	5	3.0	8	1.4
1 – 4		0	0.0	2	1.2	2	0.3
5 – 14		4	1.0	2	1.2	6	1.0
15 – 44		107	25.1	15	9.0	122	20.6
45 – 59		154	36.0	25	15.1	179	30.2
> 60		159	37.2	117	70.5	276	46.5
T o t a l	427	100.0	166	100.0	593	100.0	

Source : Ministry of Health (1993)

TABLE 5

Distribution of common CVD deaths in UAE by geographical areas and sex

Geographical Area	SEX				Total	
	Male		Female			
	No.	%	No.	%	No.	%
Abu Dhabi	134	77.5	39	22.5	173	100.0
Western	12	80.0	3	20.0	15	100.0
Al-Ain	78	70.2	33	29.8	111	100.0
Dubai	170	70.2	72	29.8	242	100.0
Sharjah	98	71.0	40	29.0	138	100.0
Ajman	27	73.0	10	27.0	37	100.0
Umm Al Qwain	15	62.5	9	37.5	24	100.0
Ras Al Khalmah	47	74.6	16	25.4	63	100.0
Fujairah	18	52.9	16	47.1	34	100.0
T o t a l	599	71.6	238	28.4	837	100.0

Source : Ministry of Health (1993)

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in the national group, but was only 57% for non-nationals. The remaining patients in each group were type I diabetes mellitus.

A recent study on the nutritional status of Emirati women aged 20-60 years showed that 17.1% of these women had a history of diabetes (Musaiger and Hanaya, unpublished). This figure is higher than that reported in other Middle Eastern countries (King and Alwan 1992), and indicates that diabetes in the UAE is a major public health problem among women, especially after 45 years of age.

Hypertension

It is well documented that hypertension is one of the major risk factors for CVD (NDC, 1991). The statistics of the Ministry of Health (1993) showed that deaths due to hypertensive disease occurred more among men aged over than 59 years (86%), while 50% of women died due to this disease at age 45-59 years, and 32% at age over than 59 years. Musaiger and Hanaya (unpublished) found that the prevalence of hypertension among Emirati women aged 20-80 years was high (20%), and may be the highest in the region. Alwan (1993) reported that the prevalence rates of hypertension in Eastern Mediteranean Region have been found to range from 10% to over 17% of the adult population. The prevalence of hypertension in this region appears to parallel affluence. In many of the countries in the region, including the UAE, the present epidemiological and clinical patterns of hypertension do not appear to differ markedly from those in Western countries.

Smoking

Cigarette smoking is the most preventable cause of CVD morbidity and mortality. Smoking has been associated with a two to fourfold increased risk of coronary heart disease, a greater than 70% excess rate of death from coronary heart disease, and an elevated risk of sudden death (Lakier, 1992). Little attention has been given to studies on prevalence of smoking in UAE. In a preliminary study (unpublished) it was found that 9% of women aged 20-80 years were current smokers; however, 37% of these women were exposed to a smoking environment at home, making them passive smokers. Leone (1993) reported that both active and passive smoking seem to act negatively on the heart causing atherosclerotic coronary alterations, focal myocardial lesions and arrhythmias. Acute exposure to passive smoking impairs cardiac performance in healthy people and subjects who survived a first acute myocardial infarction.

A recent study (Bener, Gomes and Anderson, 1993) demonstrates that smoking is highly prevalent among physicians in the UAE, although the majority (91%) agreed that smoking was

hazardous to health. Of 275 physicians studied, 36% were current smokers, and 12.7% were ex-smokers. This is a source of worry as physicians should have good health behaviour to be examples for others and anti-smoking campaigns should start with physicians.

Hypercholesterolemia

The relationship between elevated serum cholesterol and cardiovascular disease, especially CHD has been well documented in a number of studies, both within and between countries (La Rosa, 1992). A preliminary study in UAE showed that the prevalence of hypercholesterolemia varied from 47% to 53% in the Arab nationals in UAE and from 22.7% to 44.5% in the non-Arabs. There was no statistical difference in the distribution of cholesterol levels among Emiratis and other nationalities which indicates that hypercholesterolemia is a problem in most nationalities living in the UAE. Overall, it afflicts nearly 50% of the adult population (Agarwal, et al. 1994).

Overweight and Obesity

Across the Emirati population, over recent years there has been a steady increase in food-energy consumption : a lack of physical exercise is also apparent (Musaiger, 1987). Overweight and obesity, therefore, have risen dramatically in UAE over the past decade. The recent data from National Nutrition Survey (1992) revealed that 33% of married women were overweight and 38% were obese, based on Body Mass Index criteria (Table 6). The prevalence of obesity increased rapidly with age, and reached its peak at age 30-39 years. The prevalence declined slightly at age 40 years and above (40.5%) (Musaiger, 1992).

The prevalence of obesity for married men was much less when compared with women. Of men studied, 40.3% were overweight, but only 15.8% were obese. The prevalence of overweight increased slightly with age. However, it fluctuated with age, it was 18.8% at age 20-29 years, decreased to 15.0% at age 30-39, then increased to 18.2% at age 40-49 years, and decreased again to 13.9% at age 50 years and over (Table 7). In general, the prevalence of obesity in UAE is similar to that reported in other Gulf countries (Al-Awadi and Amine, 1989; Musaiger and Al-Ansari, 1992), but it is higher than that reported in most Western countries for the same age group (Bray, 1990). Obesity is a major public health problem in the UAE community, and may play an important role in increasing the occurrence of other chronic diseases. It is debatable whether obesity is an independent risk factor for CVD, but it is associated with an increased prevalence of risk factors such as hypertension

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TABLE 6

Obesity among married women in the UAE y age (N = 927)

Age (years)		Underweight BMI < 20 %	Acceptable weight BMI 20-24.9 %	Overweight BMI 25-29.9 %	Obese BMI > 30 %	Total %
17 - 19.9		5.9	35.3	47.1	11.8	100.0
20 - 29.9		6.7	34.6	31.7	26.9	100.0
30 - 39.9		3.3	19.2	33.9	43.6	100.0
> 40		2.7	24.9	31.5	40.8	100.0
Total	%	3.9	25.0	32.8	38.3	100.0
	No.	(36)	(232)	(304)	(355)	(927)

Source : Ministry of Health (1993)

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TABLE 7

Obesity among married men in the UAE y age (N = 799)

Age (years)	Underweight BMI < 20 %	Acceptable weight BMI 20-24.9 %	Overweight BMI 25-29.9 %	Obese BMI > 30 %	Total %
20 - 29.9	7.8	37.5	35.9	18.8	100.0
30 - 39.9	1.5	47.0	36.5	15.0	100.0
40 - 49.9	3.1	34.7	44.0	18.2	100.0
> 50	4.5	40.6	41.0	13.9	100.0
Total %	3.6	40.3	40.3	15.8	100.0
No.	(29)	(322)	(322)	(126)	(799)

Source : Ministry of Health (1993)

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and diabetes. Overweight and obese subjects also tend to be less active and may have lower glucose tolerance (NDC, 1992).

CONCLUSION

Cardiovascular diseases are the major cause of death among the adult population in UAE. Indicators from several small scale studies suggest that the standard international risk factors such as hypertension, diabetes and high blood cholesterol level are widely present in the UAE. It is essential, therefore, to conduct a community-based study to determine the prevalence of non-communicable diseases, and the risk factors involved. Such a study should not be done without a well designed plan and fully agreed coordination among several sectors especially involving the Ministry of Health and the UAE University.

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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 magnitude 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

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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,

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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.

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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

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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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TRENDS IN CHRONIC DISEASES IN KUWAIT

Z. AL-MOUSSA

Nutrition Unit. Ministry of Public Health, Kuwait

ABSTRACT

Kuwait has experienced a rapid change in economic and social status during the past 30 years. This change has brought alteration in life style of the Kuwaiti population particularly in their food habits and dietary intake patterns. Increased food consumption, specially fat and protein, reflects on increased calorie intake together with decrease in physical activity. These lead to the emergence of diet related non-communicable diseases such as obesity, diabetes, hypertension and heart disease. Changes in the eating patterns have also impacted the mortality patterns, resulting in the predominance of degenerative over infectious diseases. Studies showed that obesity is of a high prevalence among all age groups and more in females than males and is now considered a major public health problem in Kuwait. There is a progressive increase in the number of newly diagnosed diabetic cases every year. Heart diseases are among the major causes of death in Kuwait. The incidence of cancer increases annually and breast cancer is the most common one among females, while lung cancer is more common among males. Programmes to control these chronic diseases should be given a high priority.

Key Words : Anaemia, cancer, cardiovascular disease, diabetes, hypertension, Kuwait, obesity.

INTRODUCTION

Anthropological studies show that the diets of our ancestors were low in fat, very low in sugar and high in fibre and other complex carbohydrates. It was only some 200 years ago that agricultural and industrial evolution brought radical improvements in methods of food production, processing, storage and distribution of food. People then started to indulge in preferred foods and these dietary preferences have influenced the development of several major chronic diseases.

Chronic diseases including coronary heart disease, stroke, various cancers, diabetes mellitus, obesity and gallstones are linked to the affluent diet. This involves high consumption of energy-dense foods prepared with added fat, sugar and salt.

In virtually every developing country in the world diet-related chronic diseases are becoming the new health problem as the population abandons traditional healthy diets in favour of affluent

foods. This is due, not only to the increased availability of foods rich in fat, sugar and salt, but also to inappropriate public perception of what constitutes an appropriate diet and by a tendency to equate "good" food with "rich" food.

Dietary changes from tradition high fibre diets to those containing refined flour and sugar have coincided with the adoption of sedentary life styles. This has led to increased obesity and diabetes followed by higher incidence rates of hypertension and coronary heart disease. The increase in chronic diseases which occurs in middle and later adult life has been attributed to an improved food supply and to the control of infectious diseases. Even a modest increase in prosperity can induce the considerable burden of chronic disease.

Thus changes in the dietary pattern towards the affluent diet have increased the incidence of diet-related disease even in developing countries. If such trends continue, cardiovascular disease and cancer will be major health problems in every country in the world. There is a need for population wide approach to the prevention of diet-related chronic diseases. The entire population of most affluent countries is at high risk and intervention is needed to change dietary patterns towards a safer range of intakes. In undertaking such mass interventions, governments are challenged to develop policies that will allow consumers to make healthy food choices (WHO, 1991).

In the last two decades the State of Kuwait has witnessed a dramatic increase in income due to immense oil revenues. This has resulted in a rapid economic and social development and has put pressure on people to adapt to industrialization and urbanization. An unprecedented opportunity occured for indulging in fat and sugar rich foods with a consequent rapid change in the life style for many.

According to Food and Agricultural Organization Food Balance Sheets for Kuwait (1977-1979) versus (1987-1989), food availability data showed a general increase in all food groups with an overall increase food energy availability by 220 kcal, protein by 5.5 grams. and total fats by 18.5 grams. per capita per day. (FAO, 1990).

These changes in food availability together with decreased physical activity have led to the emergence of nutrition related chronic diseases. This paper reviews studies on the increased prevalence of obesity, hypertension, diabetes, and ischemic heart disease and cancer in Kuwait together with the rather paradoxical increased incidence of anaemia.

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Assessment of nutritional problems

Birth Weight

Low birth weight (below 2.5 Kg) was 6.7% in 1977 and decreased to 3.3% in 1990. High birth weight of > 4.0 Kg. had increased to 10.0% in 1990 (Al-Awadi et al, 1977; Nutrition Unit, 1990).

Anaemia

Iron deficiency anaemia is prevalent amongst all age groups. The most affected age groups were pre-school children and pregnant women. Iron deficiency anaemia amounted to 46.9% among pre-school children (Mostafa and Nuwayhed, 1979). In school children it was 26% among girls and 11% among boys (Eid et al., 1986a). Among pregnant women 39.7% were anaemic (Dawood et al., 1990), in adult women 42% (Hb. < 12 g.) and in adult men 34% (Hb. < 14 g.) were anaemic (MOH, 1985). Dietary studies showed that women in particular had low intakes of iron. (Al-Awadi et al. 1976, Mustafa and Nuwayhed 1981, Dawood et al. 1990).

Obesity

The major diseases linked to obesity include hypertension, coronary heart disease, diabetes, gallstones, osteoarthritis, and other gastrointestinal disorders. In addition obese women face increased risk of cancers of the gall bladder, breast (after the menopause) and uterus. In men obesity increases the risk of cancers of prostate and kidney. The importance of these health risks increases according to the severity of obesity (WHO, 1991).

Obesity is a public health problem in Kuwait (Table 1). It occurs in all age groups and is more prevalent in females than in males. Obesity (120% or more than standard weight for height median (WHO, 1983) was found to be prevalent among school children being 18.1 % among boys and 26.8 % among girls (Eid et al., 1986b). Obesity among Kuwaiti adults was reported to be 24.6% among males and 47.9% among females (Mustafa and Nuwayhed, 1981). The Kuwait Health Survey (MOH 1985) showed that the prevalence of obesity was 49% among adult males and 59% among adult females. A recent study on Kuwaiti students (7-18 years) showed that 20% of males and 23.1% of females were obese (Nutrition Unit, 1992).

TABLE 1

Prevalence of obesity by age groups and sex

Age Group (years)	Sex	Prevalence %	Name of the study
18 - 60	M F	24.6 47.9	Mustafa and Nuwayhed (1981)
13 +	M F	49.0 59.0	Kuwait Health Survey MOH (1985)
6 - 17	M F	18.1 26.8	Eid et. al. (1986b)
6 - 14	M F	20.0 23.1	Nutrition Unit (1992)

Diabetes

Non insulin dependent diabetes mellitus is a chronic metabolic disorder involving impairment in the body's capacity to utilize glucose derived from carbohydrate foods, from body stores of glycogen or from body and dietary protein. The disease usually starts in middle adulthood and is strongly associated with increased risk of coronary heart disease as well as a range of renal and neurological and ocular disorders. A major risk factor is obesity, with risk increasing according to both duration and degree of obesity. The occurrence of diabetes within a community appears to be triggered by a number of environmental factors such as sedentary lifestyle, stress, urbanization and socio-economic status as well as by dietary factors. The prevention of obesity through both exercise and diet is the most promising approach to the prevention of this disease. Glucose tolerance improves as weight is reduced. Exercise, apart from helping to reduce weight, has its own beneficial effect on insulin metabolism.

A study on Diabetes mellitus (MOH/CDC, 1980) showed that it is more prevalent among Kuwaiti than Non-Kuwaiti and more among Kuwaiti females than males (Table 2). The highest prevalence for both Kuwaiti males and females were found to be in the age group 50-59 years (Table 3). The increasing rate of prevalence of diabetes specially among females in Kuwait may be related to fact that obesity alters the body response to insulin.

The number of new cases of diabetes and of the out patient visits to the diabetic clinics have shown an overall increase in number from 6,999 cases in 1985 to 14,723 cases in 1992, an increase of 110%.

Hypertension

Excessive weight can affect blood pressure while salt intake has a significant relationship to the gradual increase of blood pressure that accompanies aging. The prevalence of hypertension among Kuwaiti adults as defined by a diastolic blood pressure in excess of 90 mm Hg indicates that about one fifth of the adults suffer from hypertension (Al-Awadi and Desuki, 1980). A later study (MOH, 1985) as part of the Kuwait Health Survey showed slightly higher values for males but somewhat lower percentages for females. These data are shown in Table 4. It was also shown by the latter survey (Table 5) that the percentage of adults with hypertension was greater among diabetics and the obese than among nondiabetics and normal weight adults.

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TABLE 2

Prevalence of diabetes in Kuwait by sex and nationality

	Prevalence rate / 1000		
	Kuwaiti	Non-Kuwaiti	Total
Males	17.0	13.9	15.3
Females	18.7	12.5	15.7
Total	17.8	13.3	15.5

(MOH/CDC 1980)

TABLE 3

Age specific prevalence of diabetes for Kuwaiti

	Prevalence rate / 1000	
Age group (years)	Males	Females
< 20	0.6	0.2
20 -	2.2	5.2
30 -	23.3	29.6
40 -	77.4	69.0
50 -	124.1	160.6
60 -	115.9	128.3
70 +	71.8	124.0

(MOH/CDC, 1980)

TABLE 4

Prevalence of hypertension among adults (20 year and above) in 1980 and 1985

Study and year	Male	Female	Total
	%	%	%
Al-Awadi and Desuki (1980)	20.3	23.9	21.8
MOH. (1985)	22.6	16.1	19.3

TABLE 5

Percentage of hypertension among diabetics and obese

Hypertension	%
Hypertensive diabetic	42
Hypertensive nondiabetic	15
Hypertensive obese (excessive)	32
Hypertensive obese (light)	19
Hypertensive normal weight	7

(MOH, 1985)

Cardiovascular Disease

The risk of developing heart disease is increased by three major factors, high serum cholesterol, high blood pressure and cigarette smoking. Diet is known to have a direct impact on both serum cholesterol and on blood pressure. As the population has changed its former life style to that characterised by western countries, mortality from ischemic heart disease has increased.

Chronic ischemic heart diseases, acute myocardial infarction, essential hypertension, atherosclerosis and hypertensive heart diseases are among the ten leading causes of death in Kuwait. These data are shown in Table 6. Chronic ischemic heart diseases, essential hypertension and hypertensive heart disease have all increased as percentages of total deaths since 1985. It can also be seen that heart diseases as a group are the leading cause of death amounting to 19-26% of all deaths depending on the grouping used.

Cancer

Dietary factors have a significant overall impact on global cancer rates. In developed countries where the cancer rates are highest and can account for approximately one-quarter of deaths, some 30-40% of cancer in men and up to 60% in women have been attributed to dietary factors. Cancers that have been linked to dietary factors in different populations are cancers of oral cavity, pharynx, larynx, oesophagus, stomach, large bowel, liver, pancreas, lung, breast, endometrium and prostate. (WHO, 1991).

Data for cancer cases by the Kuwait Cancer Control Center (MOH, Health Statistics : 1985-1989) are shown in Table 7. Breast cancer occupied the first rank during the whole period. Trachea and lung cancer occupied the second rank. Cigarette smoking is an important risk factor for lung cancer and the Kuwait Health Survey (MOH, 1985) showed that 27.3% of males above 12 years of age were smokers. Cancers of the female reproductive system are also among the ten most common cancers. A report on the incidence of cancer in Kuwait (Table 8) showed that, except for lung cancer, the incidence of cancer was higher among non-Kuwatis and this was attributed to difference in ethnic backgrounds, religion and food habits (Mansi, 1982).

Analysis of the available data on breast cancer showed that the incidence rate of breast cancer among Kuwaiti women showed an overall increase through the period from 1970's to the 1980's. This also applies for other types of female reproductive system cancers (Table 9). These changes could well be linked with dietary changes that has taken place over the same period (Gjorgov, 1986).

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TABLE 6

The ten leading causes of death in Kuwait (B.T.L.; ICD-9 : 1975)*

Code	Disease	1985 (%)	R**	1986 (%)	R**	1987 (%)	R**	1988 (%)	R**	1989 (%)	R**
414	Chronic ischaemic heart disease	3.9	(5)	5.4	(4)	6.4	(4)	6.7	(3)	9.6	(1)
410	Acute myocardial infarction	10.0	(1)	8.9	(1)	9.1	(1)	9.1	(1)	6.5	(2)
819	Traffic Accidents	8.6	(2)	7.2	(2)	6.7	(2)	7.2	(2)	6.4	(3)
765	Short Gestation	7.2	(3)	6.4	(3)	6.5	(3)	5.8	(4)	5.0	(4)
401	Essential hypertension	3.6	(6)	4.0	(6)	4.4	(6)	4.7	(5)	4.7	(5)
797	Senility	4.4	(4)	5.2	(5)	3.8	(7)	4.1	(6)	4.3	(6)
486	Pneumonia	3.3	(7)	3.2	(7)	4.5	(5)	4.0	(7)	3.5	(7)
440	Atherosclerosis			3.1	(8)	3.2	(8)	2.4	(9)	3.0	(8)
402	Hypertensive heart diseases	2.0	(9)	2.5	(10)	2.0	(10)	2.1	(10)	2.9	(9)
250	Diabetes Mellitus	2.1	(8)	3.0	(9)	2.6	(9)	3.5	(8)	2.5	(10)
746	Cong. anomalies of heart	1.9	(10)								

* (Basic Tabulation List; International Code of Death 9th Revision 1975)

** (R = Rank)

(MOH. Vital & Health Statistics Abstract : 1985 - 1989)

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TABLE 7
The first ten diagnosis for Kuwait Cancer Center (1985 - 1988)

Code	Diagnosis	1985 (%)	R*	1986 (%)	R*	1987 (%)	R*	1988 (%)	R*
174	Breast cancer	14.6	[1]	8.2	[1]	10.6	[1]	10.5	[1]
162	Trachea & Lung	4.3	[4]	1.4	[8]	4.3	[5]	6.9	[2]
200	Lymphosarcoma	4.7	[3]	2.7	[3]	6.8	[2]	5.6	[3]
201	Hodgkin disease	3.5	[8]	1.4	[10]	4.8	[3]	4.7	[4]
183	Ovary & adnexia	3.9	[7]	1.8	[5]			4.4	[5]
188	Bladder			1.9	[4]	3.8	[7]	4.2	[6]
205	Myeloid leukemia	4.1	[6]					3.9	[7]
193	Thyroid			1.5	[7]	4.2	[6]	3.8	[8]
203	Multiple myeloma							3.4	[9]
204	Lymphoid leukemia					3.2	[10]	3.1	[10]
147	Nasophyarynx	3.2	[9]			4.3	[4]		
161	Larynx	7.5	[2]	5.3	[2]	3.5	[8]		
180	Uterus, unspe.	4.2	[5]	1.8	[6]	3.5	[9]		
202	Other lymphotic	3.1	[10]						
141	Tongue			1.4	[9]				
Total of all Diag.	No.	942		1060		864		955	
	%	53.0		56.7		47.8		50.6	
Total of ten Diag.	No.	1776		1868		1807		1888	
	%	(100.0)		(100.0)		(100.0)		(100.0)	

(MOH. Health Statistics : 1985 - 1992)

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TABLE 8

Cancer incidence and mortality rates in Kuwait (1982) by nationality

Primary site	Incidence rate (per 100,000)		Mortality rate (per 100,000)	
	K*	NK**	K	NK
Digestive Syst.	2.47	4.16	4.74	5.37
Lung & Bronchus	2.47	1.21	4.33	2.77
Kidney & Urin. Blad.	1.44	5.02	1.85	2.94
Breast	7.93	9.67	5.43	3.78
Ovary	1.25	2.94	1.67	0.42
Uterus	0.83	5.04	0.83	0.84

* Kuwaiti
** Non-Kuwaiti

TABLE 9

Cancer of female reproductive system in Kuwait (1974-1983)

Site	(Crude incidence rate / 100,000 female population)		
	(1974 - 1978)	(1979 - 1983)	(Total)
Breast	7.9	10.9	10.2
Ovary	2.2	2.4	2.3
Cervix	1.7	2.8	2.3

(Gjorgov. 1986)

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TRENDS IN NUTRITION RELATED CHRONIC DISEASES IN QATAR : A CALL FOR ACTION

A. S. HASSAN

Dietetics & Nutrition Section, Hamad Medical Corporation, Doha, Qatar.

ABSTRACT

Vital statistics and hospital records were used to evaluate trends in Nutritional Related Chronic Diseases (NRCD) in Qatar. The leading causes of deaths were found to be diseases of circulatory system (34% of total deaths), neoplasm (12%) and transport accidents (12%). Deaths due to NRCD were all found to be significantly increased in 1992 compared to 1982. Percentage of deaths due to NRCD was higher among the Qatari as compared to Non-Qatari and was higher among males in general. Among the registered deaths due to diseases of the circulatory system, the leading cause of deaths were ischaemic heart disease (40%), cerebrovascular disease (24%), and diseases of pulmonary circulation (23%). All three diseases caused more deaths in males in general than in females and in Qatari than in Non-Qatari. The highest percentage of deaths due to malignant neoplasm were those due to neoplasm of digestive organs and peritoneum (31% of total deaths due to neoplasm), lymphatic and haematopoietic (20%) and respiratory and entrathoraxic (15%). The relation-ship of these trends in NRCD in Qatar to the diet may be conservatively associated with high intake of rice, meat, salt and sugar among the Qatari population as reported in a recent household expenditure survey (1988). The association of change in life style and increase of NRCD need to be studied. In view of data reviewed, it is concluded that NRCD are becoming a major public health problem in Qatar that need immediate attention. Assessing community prevalence of NRCD and drawing realistic plans of action aimed at reducing morbidity and mortality of these diseases should be of high priority in health planning in Qatar.

Key Words : Cancer, heart disease, hypertension, lifestyle, Qatar.

INTRODUCTION

The role of the diet in the development of the most common causes of premature death is now well documented in developed industrialized countries. Coronary heart disease (CHD) and cancers are the most prevalent chronic diseases leading to premature death in these countries. Both diseases are strongly associated with dietary factors such as excess intakes of fat, salt, refined carbohydrates and alcohol. Obesity has been identified as major risk factor for CHD and diabetes mellitus (DM). Many developed countries have been implementing

nutrition intervention programs based on prevention-oriented health policies. In some developed countries such as North America, these policies have actually resulted in reduced mortality from CHD and reduction in the prevalence of hypertension over the past 20 years. On the other hand there have been considerable increases in the prevalence of chronic disease in some developing countries. For example in the countries of tropical South America mortality from chronic disease underwent a relative increase of 105% during the 1970s (WHO, 1990). During recent decades the populations of many developing countries have gone through rapid changes in lifestyles and dietary and health patterns. This transition, i.e. increase in mortality from chronic diseases, is being witnessed currently in the Arabian Gulf countries.

Recent reports on public health in many of Arabian Gulf countries have identified nutrition related chronic disease (NRCD) as major health problems in the region (WHO/EMRO, 1989). There is, however, a considerable lack of well documented information pertaining to trends in mortality and morbidity of these disease in the countries of the region. This observation is very true when considering reported information related to trends in chronic diseases in Qatar. This article reviews available information on trends in diet related chronic diseases in Qatar. Information was drawn from three sources, namely, vital statistics, hospital records and Household Expenditure Survey.

The state of Qatar occupies a peninsula along the western coast of the Arabian Gulf, bordered by Saudi Arabia to the South, the United Arab Emirates to the south east and Bahrain to the west. The state holds a population of 486,473 persons according to the 1990 official figures. A characteristic feature of the population pyramid is the domination of the male population in the age group 20-25 years. This reflects the large number of expatriate workers who migrated to Qatar in the mid 1970's to mid1980's period for the purpose of implementing development plans. Oil is the mainstay of the economy with recent investment to develop natural gas fields. Revenues from oil are the basis of socioeconomic development.

Trends in Mortality from NRCD

Trends in leading causes of deaths in Qatar (MPH, 1993) at present resembles those reported for developed countries. The leading cause of death is diseases of circulatory system followed by neoplasms. Table 1 shows that deaths from these two diseases as percentages of total deaths (34%, 12%, respectively), are much higher than values for developing countries (19%, 5% respectively). At the same time, deaths from infection and parasitic disease have declined considerably in Qatar (3% of total deaths), a figure well below that of

TABLE 1

Leading causes of deaths in Qatar (1992)

Cause of Death	% Total[1]	% Total[2] Disease	Developed[1] Countries	Developing[1] Countries
Circulatory System	34	42	54	19
Neoplasm	12	16	19	5
Endo.- Nutr.- Met.-Imm. [4]	4	5	-	-
Respiratory System	4	5	-	-
Infection & Parasitic	2	3	8	40
Injury & Poisoning[3]	19	-	6	5
All Others	25	-	12	21

Adapted from : MPH, (1993)
  1 = Percent of total deaths
  2 = % of total deaths due to disease only
  3 = 12% Transport Accident & 7% other Injury
            and Poisoning.
  4 = Endocrine, Nutritional, metabolic and
            Immune Diseases

developing countries (40%) and below that of developed countries (8%). The latter observation reflects advances in health and medical services established in the State in the last decade. Deaths from injury and poisoning (19% of total deaths) are mainly due to transport accidents (12%). This is common in most of the Arabian Gulf States, and in fact the figure for Qatar may be relatively low compared to other countries in region.

Deaths due to different types of neoplasm and diseases of the circulatory system have shown marked increases in the last decade. Between 1982 and 1992 the percentage of deaths due to different neoplasms has increased from 8.8% to 12% and that of the diseases of the circulatory system has increased from 21.4% to 34% as shown in Table 2. The incidence of all leading causes of deaths in Qatar, except that of injury and poisoning is more among the Qatari nationals than among non-Qatari (Table 3). This observation should be interpreted with caution since non-Qatari usually leave the country before the age of sixty. Data presented here are not age-adjusted. Incidence of all leading causes of death is greater among the male population in general, whether Qatari or non-Qatari. The high incidence of leading causes of deaths among the non-Qatari male may, however, reflect domination of male population over the female population rather than a true distribution between the non-Qatari male and female population.

Registered deaths due to diseases of the circulatory system in the year 1992 in Qatar show high incidences of ischaemic heart disease (IHD) and cerebrovascular disease (Table 4). Both disease are well known to be diet-related. The incidence of both diseases is high among the Qatari male. Data presented in Table 5 indicate that deaths due to neoplasm of digestive organs and peritoneum accounts for about one third of all deaths due to different types of neoplasm followed by deaths due to neoplasm of lymphatic and haematopoietic organs. The incidence of deaths due to neoplasm of bones, connective tissues and genitourinary organs is higher among Qatari and non-Qatari females compared to Qatari and non-Qatari males.

Trends in Morbidity of NRCD

Very limited data are available on morbidity of NRCD. Outpatients attendance of clinics in the only general hospital in Qatar are shown in Table 6. An increase in attendance of cardiology clinics (58%), oncology-hematology clinics (47%) and hypertension clinics (200%) between 1988 and 1992 may reflect increase in morbidity of the three diseases. However, since these are hospital-based records they cannot be related to the prevalence of these diseases. The decrease in outpatient attendance of the diabetic ophthalmology clinic may reflect improved medical management and

TABLE 2

Percentage of deaths due to some nutrition related chronic diseases in 1982 and 1992 (% of total deaths)

Disease	1982	1992
Neoplasm	8.8	12
Endo-Nutr-Met-Imm	2.8	4
Circulatory System	21.4	34

Source : MPH (1983)

TABLE 3

Distribution of leading causes of deaths by Nationality and Gender (1992)

Cause of Death	% Q[1]	% Male	% Q.M.[2]	% NQ.M.[3]
Circulatory System	60	72	64	84
Neoplasm	63	55	54	57
Endo.-Nutr.-Met.-Imm.	72	56	64	45
Respiratory System	60	70	63	81
Infection & Parasitic	56	61	60	63
Injury & Poisoning	31	82	75	85
All Deaths	54	66	61	73

Source : MPH (1993)

1 = Qatari
2 = % Qatari Male of Total Qatari
3 = % Non-Qatari Males of Total Non-Qatari

control in patients with diabetes mellitus. Nutrition management of NRCD patients has been emphasized in recent years by upgrading hospital dietetic and clinical nutrition services. This may be seen from the 75% increase in outpatient attendance of dietetic clinics.

Changes in Life Style and Emergence of NRCD

Like other countries of Arabian Gulf the econimic progress due to large oil revenues has produced rapid changes in life style in Qatar. These include reduced physical activities and changes from traditional dietary habits due to Western and Asian influences. There are no data on the prevalence of obesity in Qatar at present. We have recently studied changes in physical activity and dietary habits during the fast of the month of Ramadan. Our unpublished data indicates low levels of physical activity amongst the subjects studied. Decrease in physical activity induced by modernization and urbanization seems, unfortunately, not to be counterbalanced by increases in leisure time activity.

Before the discovery of oil, fish, rice and dates were the most commonly consumed food in coastal areas in Qatar. In the desert, rice, dates, milk and milk products (sour milk and yoghurt) were the most consumed foods among the Bedouins. Meat tended to be consumed only when guests were invited or by the upper social classes (Musaiger, 1987). The economic development resulted in increased purchasing power and introduction of wide variety of foods. In Qatar 22.3% of the family income is spent on food purchases (CSO, 1989). Food availability depends predominantly on imports since the domestic agricultural production is low (MPH, 1993). Food habits of immigrant populations from Middle Eastern and Asian countries have become integrated into the Qatari food habits. The consumption of meat has increased over the consumption of fish. Compared to non-Qataris, the Qataris consume higher amounts of meat (Table 7).

Consumption of rice among Qataris is very high. Qataris also consume high levels of salt and sugar and sweets and apparently adequate quantities of vegetable and fruits. Food consumption data presented in Table 7 are based on household expenditure and do not reflect true intakes. However, it can be concluded from these data that consumption of rice, meat, salt and sugar is relatively high among Qataris. Similar trends in food consumption have also been reported in other Arabian Gulf countries (Kamel & Martinez, 1984, Aziz, 1985).

The Qatari population is undergoing rapid transition towards affluence. Chronic diseases develop as countries become more affluent. With affluence there is a progressive increase in

TABLE 4

Registered deaths due to the Circulatory System Disease in Qatar

Disease	% Total	% Q[1]	% Male	% Q.M.[2]	% NQ.M.[3]
Hypertensive	10	55	55	53	57
Ischaemic Heart	40	64	72	64	87
Pulmonary Circulation	23	37	90	81	95
Cerebro-vascular	24	71	63	59	73
Other	3	73	73	62	100

Source : Adapted from MPH (1993)

1 = Qatari
2 = % Qatari Males of Total Qatari
3 = % Non-Qatari Male of Total Non-Qatari

TABLE 5

Registered deaths due to malignant Neoplasm in Qatar (1992)

Disease	% Total[1]	% Q[2]	% M	% Q.M.[3]	% NQ.M.[4]
Lip, oral cavity & pharynx	2	100	50	50	0
Digestive organs & peritoneum	31	60	60	62	57
Respiratory & Intrathoracic	15	76	70	69	75
Bone & Connective Tissues	9	40	20	0	33
Genitourinary Organs	11	69	31	33	25
Lymphatic & Haematopoietic	20	56	61	54	70
Unspecified	12	71	64	60	75

Source : Adapted from MPH (1993).
1 = % of total deaths due to malignant neoplasm.
2 = Qatari
3 = % Qatari male of total Qatar
4 = % Non-Qatari male of total Non-Qatari

TABLE 6

Outpatient Attendance of Selected Clinics at Hamad General
Hospital (X 1000)

Clinic	1988	1992	% Change
Cardiology	12	19	+ 58%
Diabetes	12	12	-
Oncology/Hematology	2.3	3.4	+ 48%
Hypertension	0.3	0.9	+ 200%
Cardiac Surgery	2.2	2.2	-
Diabetic Opthalmology	0.2	0.1	- 50%
Dietetics	2	3.5	+ 75%

Source : MPH (1993)

TABLE 7

Estimated per caput consumption of various foodstuffs in Qatar - Grams per person per day (1988)

Foodstuffs	Qatari	Non-Qatari
Rice	313	120
Wheat Flour	60	73
Meat	173	113
Fish/Shellfish	57	60
Fresh Milk (ml)	30	60
Eggs (each)	0.5	0.5
Citrus Fruits	125	110
Other Fruits	242	197
Fresh Vegetables	276	281
Legumes & Pulses	9	13
Salt	23	17
Sugar & Sweets	127	97

Source : CSO (1989).

consumption of animal fat and free sugars. Based on epidemiological data from developing and developed countries (Burkitt and Trowell, 1975) concluded that with westernization of the diet, chronic diseases emerge first as diabetes, followed by CHD and cancer of the digestive system. Changes in life style in Qatar have led to emergence of diet-related chronic disease in patterns typical for those observed in developed countries.

Health Policies

Problems of increased mortality and morbidity from chronic diseases in Qatar have not been dealt with systematically. Especially lacking is any attempt to study the prevalence of chronic diseases. Medical care of patients suffering from these diseases has become a burden on health expenditure. There are no prevention - oriented activities in the State. Despite the increase in these diseases there has been no increase in the Government sector of certain health professionals, i.e. specialists in preventive health, nutrition, and biostatistics, needed in collecting information on the incidence of chronic diseases in the community and in planning and executing intervention programs. There is no regular system to monitor nutritional and health status of the population.

No programs of formal instruction in nutrition have been established yet in Qatar. Medical professionals and other health workers are not trained in the field of nutrition in general and in the role of diet in prevention of chronic disease in particular.

Conclusions and Recommendation

With the recently introduced changes in life style, nutrition related chronic diseases are becoming major health problems in Qatar accounting for most of the mortality and morbidity and incurring substantial health care costs. The trends in chronic diseases observed in Qatar are very similar to those identified in developed countries and countries undergoing transition towards affluence.

In line with the WHO study group recommendations to national governments on nutrition and prevention of chronic disease (WHO, 1990), it may be recommended that the Ministry of Health in Qatar ensures the availability of experts in the field of monitoring nutrition and health status, who can develop a nutrition-health surveillance system. Health authorities should take the initiative to establish a national board for food and nutrition to formulate policies in field of food and nutrition, to advise the council of Ministers in related matters, and to coordinate between different

government sectors in implementing programmes in nutrition and health based on information obtained through community surveys.

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NUTRITION AND CHRONIC DISEASES IN JORDAN

H.R.H. TAKRURI

Department of Nutrition and Food Technology, Faculty of Agriculture, University of Jordan, Amman, Jordan.

ABSTRACT

The prevalence of communicable diseases and diseases of undernutrition has decreased in Jordan whereas the malnutrition of affluence and the chronic diseases associated with it are of higher incidence than before. Available data indicate an increase in the incidence of obeisty, diabetes mellitus, colon and breast cancer, hypertension and coronary heart diseases, dental caries and the uremic syndrome. The risk factors for these diseases in Jordan, as in many developing countries, include : changes in dietary habits with increases in food energy intake, and modern lifestyles with less physical activity. Subsidies for high-carbohydrate food commodities, particularly sugar, together with ignorance of health risks related to obesity are also important factors. Nutrition surveys and long-term nutritional surveillance are required to determine prevalence of these diseases. Accurate sources of food and nutrition data including evaluation of environmental pollution and food-born contaminants such as pesticide residues in locally produced vegetables and their impact on human health are also necessary.

Key Words : Mortality, chronic disease, nutrition, Jordan.

INTRODUCTION

The affluent diet prevalent in industrialized countries and characterized by energy-rich foods that are high in fats and free sugars but low in complex carbohydrates and fibre, has by now become common in many developing countries. It has been demonstrated through epidemiological research that there is a close association of this type of diet and many chronic non-communicable diseases (WHO, 1990a). Cardiovascular diseases, diabetes mellitus and cancer top the list of such diseases. Hence the pattern of mortality is changing in the developing countries because of the increasing incidence of these diseases and as a result of the change in lifestyle and food habits (Alwan, 1993; WHO, 1990 b).

Jordan one of the Middle East Region countries has good primary health-care system and high level of education, though of relatively low Gross National Product (GNP). It has one of the lowest infant and child mortality rates and incidence of infectious diseases in the region (Faqih and Hijazi, 1993), yet it has an increasing

incidence of chronic non-infectious diseases. The following is a general view of the trend in the prevalence of such diseases, associated with changes in dietary patterns.

DEMOGRAPHIC AND HEALTH INDICATORS

Jordan is relatively a poor country with a very low GNP. A good percentage (21.3%) of Jordanian families are below the poverty line. Recently the Gulf War had a heavy impact on the severity of poverty and thus in the nutritional status of people (UNICEF, 1991). The unemployment rate increased from 10.3% in 1988 to 18.8% in 1991 (HKJ, 1993; KHJ/MDSA, 1989; Faqih et al., 1992).

The crude birth rate and population growth are relatively high being 34.6 per 1000 and 3.4% respectively. However, Jordan occupies an intermediate position among developing and developed countries regarding infant mortality and life expectancy. Although the infant mortality generally correlates well with GNP in Middle East countries, Jordan is an exception as the infant mortality is low with very low GNP. Infant and children mortality rate in Jordan has dropped from 275 deaths per 1000 living children in 1961 to 47 per 1000 in 1990 (Faqih et al., 1992). The relatively low mortality rate with the decrease in mortality due to infectious and malnutrition could be explained by the high educational level and the advances in the primary health care system. Improved health services have been developed with 96% of people in Jordan having access to a potable water supply through municipal pipelines in 1990 as compared with only 70% in 1970 (KHJ/MOH, 1992). Mother-childhood (MCH) centers have increased from 29 in 1970 to 229 in 1992.

These factors together with the changes in lifestyle and dietary patterns resulted in a reduction in mortality due to infectious diseases (Table 1) and to nutritional deficiencies. The situations for protein-energy malnutrition (PEM), anaemia, vitamin A and B_2 deficiencies have now improved (Faqih et al., 1992), whereas the mortality due to chronic diseases has increased.

CHANGE IN DIETARY PATTERN AND LIFESTYLE OF THE JORDANIAN COMMUNITY

Change in lifestyle which are taking place all over the world, the availability of imported processed foods, the improvement in transport facilities and international trade, the decrease in walking and hence in physical activity together with urbanization and better services have all contributed to changes in dietary pattern of the people.

TABLE 1

Main Causes of Death in Jordan Distributed by Sex (1991)

Cause of death	Sex	
	Male	Female
	%	%
Diseases of Cardiovascular system	44.2	34.5
Pneumonia	5.0	4.0
Malignant Neoplasm	2.2	3.1
Diseases of Urinary Tract	1.9	3.3
Diseases of the Liver	1.2	1.4
Accidents	15.4	6.7
Other Non-Specified Causes	29.8	46.7
Infectious Diseases	0.3	0.3
Total %	100	100
Cases	6758	4510

Source : HKJ/MOH (1992)

Government subsidies for many food commodities such as sugar, flour, rice and milk have helped in the availability of food energy particularly the cheap sources of energy which are not accompanied with a high nutrient content. In other words, energy malnutrition is not a problem despite poverty and low income. A comparison of food consumption patterns in 1987 and 5 years later in 1992 clarifies this point (Table 2) and shows that the consumption of subsidized foods has not changed. Sugar consumption, for example has increased in the 1980's and 1990's (Table 3) to contribute more than 15% of the energy intake (HKJ/DOS, 1992). Estimated energy intake (Table 4) increased from 2299 in the 1960's to reach about 3100 kcal in 1992. (HKJ/MOH, 1992).

CHANGE IN DISEASES PREVALENCE AND CAUSES OF MORTALITY

Diseases of affluence (chronic diseases) now top the list of mortality causes (Table 1). Cardiovascular diseases are the leading cause of death in Jordan; other chronic diseases such as tumours, kidney failure, diabetes mellitus have been increasing in occurrence (HKJ/MOH, 1992). The following is a brief review of these diseases.

Cardiovascular Diseases

Morality due to cardiovascular disease has increased from 4.2% of total mortalities in 1961 to 39.7% in 1992 (Table 5). In males the figure is higher than in females (43.1% vs. 34.5%). Because of the paucity of vital registration data (Lopez, 1993) in developing countries the figures obtained are only approximate but still indicate prevalence trends.

The etiology of cardiovascular diseases is multifactorial and complicated. Overweight, less physical activity, the nature of the diet, especially the high fat and total food energy in the diet, smoking and alcohol consumption are contributing factors (Alwan, 1993; Williams, 1985).

Cancer

The trend in the prevalence of tumours is shown in Table 5. These increased from 1.6% of total mortalities in 1961 to 3.0% in 1992 (HKJ/MOH, 1992). Leukemia, colon, breast and lung cancers are the most common types of cancer. The dietry contribution to tumour development is considered high (Williams, 1985). There is now greater appreciation of the problem and a cancer treatment center has been recently established. Environmental pollution and the excessive use of pesticides in vegetable production should be evaluated as possible

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TABLE 2

Food consumption Pattern in Jordan in 1987 and 1992
(g/capita/day)

Foods & Food Groups	1987	1992
Wheat products	443	478
Rice	96	95
Red Meat	56	25
Poultry Meat	92	70
Fish	20	17
Dairy Products	105	158
Eggs	26	25
Oils & Fats	67	56
Fruits	212	125
Vegetables	318	296
Legumes	19	16
Sugar	138	111

Source : HKJ/DOS (1992)

TABLE3

Sugar Consumption in Jordan and its Percentage Contribution to
Dietary Energy 1972-1992.

	1972-74	1980-83	1985-87	1992
Sugar g/d	71	106	110	111
Carbohydrate g/d	--	--	515	507
Dietary Energy Kcal/d	2366	2900	3177	2915
Sugar Cal. as % Dietary Energy	12%	14.6%	13.9%	15.2%

Source : HKJ/DOS (1992)

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TABLE 4

Nutrient Intakes in Jordan in Selected years

Nutrients & Energy	1964-1966	1969-1971	1975	1980-1983	1987	1990
Protein (g)	68	64	76	56	86	79
%	11.8%	9.8%	-	13.5%	10.5%	10.2%
Fat (g)	--	--	65	--	97.6	83.8
%					26.7	24.4
Carbohydrates (g)	--	--	399	--	515	507
%			--		62.7%	65.5
Energy (kcal)	2299	2617	2366	2900	3285	3099

Source : HKJ/DOS (1992)

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TABLE 5

Percent mortality from cardiovascular diseases and tumours in Jordan from 1961-92

Year	Cardiovascular diseases			Tumours*		
	M	F	Total	M	F	Total
1961	5.0	2.9	4.2	1.9	1.1	1.6
1965	13.3	11.7	12.5	2.5	2.0	2.3
1970	12.6	13.0	12.8	3.1	2.1	2.8
1975	18.9	15.9	17.7	4.6	3.3	4.1
1979	22.2	18.5	21.0	5.0	4.2	4.7
1985	39.1	27.2	35.6	4.7	6.4	5.5
1992	43.1	34.5	39.7	3.0	3.1	3.0

Source : MOH (1992)

* Malignant tumours only

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etiological factor in cancer development. The consumption of proceed and canned foods with food additives has increased and may also be a contributing factor that should be investigated.

Obesity

Obesity seems to be increasing in all age groups. Table 6 presents the prevalence of obesity in pre-adolescent boys and girls in Irbed. There is an increase in obesity with age. The incidence of obesity among school children is probably higher, particularly in urban areas and is expected to rise due to the increase in fast foods intake and food advertising.

In adults, the extent of the problem has not been evaluated. However, preliminary studies and observations show an increase in the number of obese people (Takruri, 1989). Although the prevalence of obesity is not as high as it is in some neighbouring countries (Alwan, 1993; Musaiger, 1990; Musaiger, 1993), further investigation and evaluation is required. Obesity is a major health problem and associated with increasing risk for many diseases (Neiman, et al., 1992; Williams, 1985). The association between obesity and diabetes mellitus is well established; it is estimated that the risk for diabetes mellitus is doubled with an increase in weight of 20% (Kause and Mahan, 1984).

Diabetes mellitus

Accurate studies on the prevalence of diabetes mellitus in Jordan have not been conducted. However, an indirect indicator of the high occurrence of the disease has come from a study on hospital diets conducted by Takruri et al., (1990). It was found that 8.5% of diets served in the 11 main hospitals, responsible for 51% of total hospital beds in Jordan, were diabetic diets.

A recent study in diabetes mellitus in Palestinian refugees in Jordan and four other counries was conducted by the medical services of UNRWA in 1993. The prevalence of diabetes mellitus in the 5 countries was 2.8% and in Jordan 3.4%. It is estimated that only 50% of patients visit the UNRWA clinics; thus the real figure for diabetes prevalence is probably at least twice this figure (Mabrouk, 1994). The UNRWA study concluded that the most important risk factor in diabetes mellitus causation was obesity (Table 7) which was present in 56.3% of patients.

Renal Failure

No data are available concerning renal failure and the uremia problem in Jordan. However, indicators come from a study on

hemodialysis (HD) units in the country. The total number treated in these units throughout the country was 456 patients in April, 1992. This is equivalent to 114 HD patients per 1 million population distributed mainly in the age group 40-59 years indicating that end stage renal disease (ESRD) occurs at relatively early age in Jordanians as compared with developed countries. In USA, for example, ESRD seems to be concentrated in the age group above 60 years (55.5% of HD patients vs. 17.3% only in this age group in Jordan) (Raine, 1992). The Jordan figure for HD patients is relatively high when compared with other developing countries. This may, however, reflect the status of health care facilities rather than renal failure.

The distribution of HD patients on different districts indicates that there is a higher prevalence of renal failure in Zarqa district where the environmental pollution and low living standards could be contributing factors (Howard and Spelzer, 1994). Chronic glomerulonephritis was found to be responsible for 29.4% of cases whereas diabetes mellitus complications were reported in 10.5% of these patients.

Other Chronic Diseases

Iodine deficiency and goiter have been recently reported to be widespread in different parts of the country with an incidence of 6.8% in children and 15.7% in adults (Osman, 1993). The prevalence in females over 15 years of age was 6 times the rate in males. However, in a study by UNICEF (1990) on preschool children in the Jerash area, no goiter cases were detected. Similarly, Jilani et al., (1991) did not report high figures in their study on patients visiting health centres. The problem appears to need re-evaluation and further investigation.

Dental caries incidence is increasing. A study on school childrenshowed that about 75% had dental caries. In preschool children (0-5 years of age), dental caries incidence was 13.2% showing that it is a problem in this age group (HKJ/MOH & UNICEF, 1993). The fluorine content in the water supply, the change in dietary habits with the consumption of high amount of sugar, host susceptibility, and poor dental hygiene are all suggested as contributing factors.

CONCLUSIONS

Present trends in the prevalence of chronic diseases related to the affluent diet should be evaluated using comprehensive nutrition surveys and long-term nutritional surveillance. Environmental

TABLE 6

Obesity Among Pre-adolescent Jordanians
(Weight for Height = > 2 SD above Median)

| | Males | | Females | |
Age (Years)	No	%	No.	%
4 - 5	122	0.82	92	1.26
5 - 6	216	1.82	244	2.29
6 - 7	561	2.60	568	2.92
7 - 8	507	2.37	530	4.34
8 - 9	413	3.10	396	5.56

Source : Faqih et al. (1992)

TABLE 7

Some Statistical Data on Diabetes mellitus from UNRWA (1993)

Field	Jordan	Gaza	West Bank	S.A.R.	Lebanon	All Fields
1. Prevalence (Rate/100,000)	861	1210	816	866	802	922
2. Type of Diabetes						
% IDDM	13.2	5.5	16.5	6.8	9.6	10.5
% NIDDM	86.8	94.5	83.5	93.2	90.4	89.5
3. Risk factors (%)						
a. Blood rel.	51.4	44	38.2	56.2	38.3	46.5
b. Obesity	6.3	59	54.5	64	30.7	55.1
c. Vascular ds.	9.7	10.4	10.4	21.4	8.2	11.1
d. Obstetric histort	3.4	3.1	2.5	1.0	1.9	2.8
4. Complications (%)						
a. Retinopathy	11.0	19.6	10.8	10.5	15.7	13.8
b. Nephropathy	7.7	8.8	5.1	3.6	.4	7.1
c. Neuropathy	24.1	35.3	10.3	13.0	20.0	23.6
d. C.V.D.	18.9	18.3	22.0	16.4	23.7	19.4
e. Others	9.1	9.3	7.7	9.9	5.6	8.6
- Total	70.7	91.3	55.9	53.4	72.5	72.6

Source : UNRWA (1993)

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pollution from pesticide residues, as a causative factor should also be evaluated.

Nutrition education at all levels is necessary to reduce these problems. Policies regarding food subsidies, food processing and food advertising require to be established.

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TRENDS IN CANCER MORTALITY DURING 1989-1992 IN UAE

A. BENER[1], A.O. MUSAIGER[2], M.Y. CHEEMA[1], A. SHALABI[3] and M.S. HUSSEIN[3]

[1] Dept. of Community Medicine, Faculty of Medicine & Health Sciences, [2] Dept. of Food Sciences and Nutrition, Faculty of Agricultural Sciences, UAE University, [3] Dept. of Preventive Medicine, Al-Ain Medical Health District, Ministry of Health, Al Ain, UAE.

ABSTRACT

Although cancer registration is still incomplete, data provided by the Ministry of Health regarding deaths due to cancer can be a valuable indicator to examine the trend in cancer mortality in UAE. Cancer emerged as a third leading cause of death in the UAE during 1989-1992. The distribution of reported deaths showed that digestive organs and peritoneum (29.2%), trachea, bronchus and lung (24.1%), female breast cancer (9.9%) and cervix uteri (7%) were the leading types of cancer during this period. The mortality rate increased from 20.6% in 1988 to 23.8% in 1992. In general, men (63%) were more susceptible to cancer than women (47%). The data revealed that Non-UAE nationals (54.4%) were more suspectable to cancer than the UAE nationals (45.6%) and the incidence rates for cancer seem to increase with age. The most common cancers which led to death among males were cancer of the trachea, bronchus and lung (30.3%). Also, the most common cancers in females were cancer of the trachea, bronchus and lung (27.3%). There was no significant difference in the distribution of cancers by site, age and gender between UAE and non-UAE males. Several factors are associated with various types of cancer. These factors have not, however, been studied in detail but the change in dietary patterns, smoking habits and environmental pollution may be responsible in part for the prevalence of some types of cancer in UAE. Reliable registration of cancer morbidity and mortality, as well as epidemiological studies on the risk factors for cancer in UAE are essential steps to control the incidence of cancer in the country.

Key Words : Cancer, risk factors, UAE.

INTRODUCTION

Cancer has become one of the major causes of death in most developed countries (Boffetta et al., 1993, Davis et al., 1993 and Waldron 1993). Almost all these developed countries have organized research programmes to learn more about the causes and treatments of cancer. This had led to systematic collection and analysis of vast

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quantities of cancer data. In addition to research data generated through special studies designed to measure cancer incidence in small populations exposed to carcinogens in a controlled manner, the developed countries have obtained data through cancer registry recording the incidence of different types of cancer by sex and age in large populations (Boffetta et al., 1993 and Simon et al., 1993). Reasons for the changing pattern and the increasing rates for cancer mortality have been controversial. Questions have been raised concerning whether these increases are real or simply the result of changing diagnoses and death certificates reporting (Hoel et al. 1993).

Although cancer registration is still incomplete in UAE, data provided by the Ministry of Health regarding deaths due to cancer can be a valuable indicator to examine the trend in cancer mortality in the country. Therefore, the aim of this paper is to determine the proportional mortality due to different types of cancer and identify the relationship between cancer mortality and some demographic data such as sex, age and nationality.

The data used in this paper were taken from the Annual Reports by the Department of Preventive Medicine (1994) and Department of Planning and Research (1994) at the Ministry of Health in Abu Dhabi. These annual reports include information on socio-demographic characteristics and types of cancer according to the WHO ICD-10 classification of diseases. All cancer mortalities with actual or associated causes underlying deaths which had occurred during the period between 1st January 1989 to 31st December 1992 have been studied. The total number of deaths due to cancer during this period was 788 which represented about 8% of total deaths for the same period.

Cancer mortality

The distribtion of deaths due to various types of cancer in the UAE during 1989-1992 is presented in Table 1. The most common cancer which led to death was cancer of the digestive organs and peritoneum (29.2%), followed by cancer of trachea, bronchus and lung (24.1%). Female breast cancer represented 9% of total cancer deaths during this period.

The reported deaths from cancer increased from 145 to 234 deaths during same period, an increase of 38%. This increase may be due to the improvement in diagnosis of cancer since health care has focused recently on early detecting of cancer and providing advanced treatment. The proportion of deaths from cancer of digestive organs and peritoneum decreased significantly in 1992 compared to previous years. While the proportion of deaths due to cancer of trachea, bronchus and lung decreased by 6% each year the percentages of

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TABLE 1
Distribution of deaths due to various types of cancer in the UAE during 1989-1992

Cancer by Site	1989 No.	1989 %	1990 No.	1990 %	1991 No.	1991 %	1992 No.	1992 %	Total [1988-1992] No.	Total [1988-1992] %
Digestive Organs & Peritoneum	52	35.9	65	36.7	73	32.3	48	20.5	238	30.4
Trachea, Bronchus & Lung	52	35.9	53	29.9	55	24.3	44	18.8	204	26.1
Female Breast	11	7.5	15	8.5	19	8.4	24	10.3	69	8.8
Cervix Uteri	10	6.9	9	5.1	12	5.3	12	5.1	43	5.5
Other Malignant Neoplasms	20	13.8	35	19.8	67	29.6	106	45.3	228	29.2
Total	145	100.0	177	100.0	226	100.0	234	100.0	782	100.0

Source : Ministry of Health (1993)

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deaths from other types of cancer rose steeply from 13.8% in 1989 to 45.3% in 1992. With the absence of data on causes of cancer in this country, it is difficult to explain these trends in cancer deaths.

Males were more susceptible to cancers of stomach and trachea, bronchus and lung than females. Breast and cervix uteri cancers accounted for 36% of deaths from cancer in females (Table 2). There was a slight decline in proportion of deaths due to stomach cancer among both males and females. However, the decline became more apparent in 1992, especially in females, where the percentage of decrease reached 14.3% during the period 1989-1992, compared to 10% in males. The rate differences between males and females in trachea, bronchus and lung cancer fluctuated from year to year, but the gap became clear in 1992 as 28% of deaths in males were due to this type of cancer compared to only 7% in females.

One of the unique demographic phenomena in the UAE is that the proportion of expatriates exceeds the national population (3:1). These expatriates have come from all over the world, making a rare composition of nationalities. In addition, the majority of expatriates are in an active economic age group (20-50 years), and are dominated by males. These demographic characteristics have affected the disease patterns in the community. The health statistics, in consequence, show a significant difference between nationals and non-nationals in some types of diseases, such as infectious diseases, which are more prevalent among non-nationals (Ministry of Health, 1993). Data on cancer deaths indicate that the deaths due to stomach cancer was higher among Emirati (26.1%) than non-Emirati (14.3%). This can be partially attributed to the differences in dietary habits between these two groups. There was, however, no difference between Emirati and non-Emirati in deaths due to other types of cancer for the average of the four years (1988-1992) but there was some differences between these two groups in some types of cancer from year to year (Table 3).

Statistics on cancer deaths by age were only available for 1992, and the age was not registered in 20% of total cancer deaths. Based on available data, there was generally no significant difference between those aged less than 60 and those aged 60 years and over for most types of cancer. The proportion of breast cancer, however, was 25% among women aged less than 60 years and decreased to 16.1% among those aged over 60 years. This again may be due to early detection of this kind of cancer. However, the difference between these two age groups was more apparent for other types of cancer (54% and 61%, for those aged less than 60 years and those aged 60 years and over, respectively).

TABLE 2
Distribution of deaths from various types of cancer among males and females, 1989-1992

Cancer by Site	1989 M %	1989 F %	1990 M %	1990 F %	1991 M %	1991 F %	1992 M %	1992 F %	Total M %	Total F %
Malignant Neoplasm of Stomach	28.6	24.1	24.6	18.8	23.9	13.1	18.2	9.8	23.4	15.2
Malignant Neoplasm of Colon	4.4	3.7	8.8	5.8	9.2	7.1	3.8	2.9	6.7	4.9
Malignant Neoplasm of Rectum	6.6	1.9	7.0	2.9	4.2	3.6	2.3	2.9	4.8	2.9
Malignant Neoplasm of Trachea, Bronchus & Lung	44.0	22.2	30.7	26.1	30.3	14.3	28.0	6.9	32.4	15.9
Malignant Neoplasm of Female Breast	-	20.4	1.8	18.8	-	22.6	-	23.5	0.4	21.7
Malignant Neoplasm of Cervix Uteri	-	18.5	0.0	13.0	-	14.3	-	11.8	-	13.9
Other Malignant Neoplasm	16.4	9.2	27.2	14.5	32.4	25.0	47.7	42.2	32.3	25.5
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total No.	(91)	(54)	(114)	(69)	(142)	(84)	(132)	(102)	(479)	(309)

Source : Ministry of Health (1993)

TABLE 3
Distribution of deaths from various types of cancer among UAE and non-UAE nationals, 1989-1992

Cancer by Site	1989 UAE %	1989 Non-UAE %	1990 UAE %	1990 Non-UAE %	1991 UAE %	1991 Non-UAE %	1992 UAE %	1992 Non-UAE %	Total UAE %	Total Non-UAE %
Malignant Neoplasm of Stomach	28.7	24.6	27.6	16.5	27.2	13.8	22.0	8.0	26.1	14.3
Malignant Neoplasm of Colon	3.7	4.6	3.1	13.0	9.7	7.3	2.8	4.0	4.9	7.0
Malignant Neoplasm of Rectum	3.7	6.2	7.1	3.5	1.0	6.5	3.7	1.6	3.9	4.3
Malignant Neoplasm of Trachea, Bronchus & Lung	33.8	38.5	27.6	30.6	25.2	23.6	17.4	20.0	25.4	26.4
Malignant Neoplasm of Female Breast	6.3	9.2	7.1	9.4	3.9	12.2	11.0	9.6	7.1	10.3
Malignant Neoplasm of Cervix Uteri	7.5	6.1	6.1	3.5	6.8	4.1	5.5	4.8	6.4	4.5
Other Malignant Neoplasm	16.3	10.8	21.4	23.5	26.2	32.5	37.6	52.0	26.2	33.2
%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No.	(80)	(65)	(98)	(85)	(103)	(123)	(109)	(125)	(290)	(398)

Source : Ministry of Health (1993)

Some Factors Associated With Cancer in UAE.

There have been no studies on factors associated with various types of cancer in the UAE. Indicators from some community and hospital-based studies can be helpful for explanation of risk factors for cancer. Based on current smoking patterns, the public health burden of smoking-related-cancers such as oral cavity, pharynx and lung cancers is expected to continue during the next decades. The proportion of deaths for smoking-related cancers varies by sex, age and nationality. A small scale community-based study in the UAE showed that about 9% of women were current smokers, and 39% of husbands of these women were current smokers (Musaiger and Hanaya, unpublished). This indicates a high prevalence of smoking among men, as well as a high prevalence of passive smoking among married women. According to the American Cancer Society (1986) cigarette smoking is responsible for 83% of all lung cancers and smoking accounts for about 30% of all cancer deaths.

The relationships between specific dietary components and cancer are much less well established than those between diet and cardiovascular diseases. Epidemiological studies indicate that a diet that is low in total and saturated fat, high in plant foods, especially green and yellow vegetables and citrus fruits, and low in alcohol, salt-pickled, smoked and salt-preserved foods is consistent with a low risk of some cancers such as those of the colon, prostate, breast, stomach, lung and oesophagus (WHO, 1990). Food Balance Sheet data for UAE (FAO, 1992) reveal substantial changes in food availability over the past 30 years for the country as a whole. Food energy availability increased by 30% during 1961-1990. This increase was associated with a gradual decrease in the proportion of food energy and protein derived from cereals.

Cancer of the digestive organs, especially stomach cancer, is the leading cause of cancer deaths in the UAE. A high incidence of stomach cancer is found in Japan and other parts of Asia, but not in North America or Western Europe where the incidence is low (WHO, 1990). It seems that this kind of cancer is mostly associated with food habits. The high consumption of salt-preserved foods and low intake of fresh vegetables and fruits, may be responsible in part for the high incidence of this type of cancer in the UAE population. Nevertheless, investigations are needed to determine the relationship between food consumption patterns and the high rate of stomach cancer in this population. There may well be other dietary factors that are responsible for the relatively high incidence of stomach cancer in the U.A.E.

Breast cancer is the leading cause of death from cancer for women in the UAE. Several epidemiological studies have associated

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breast cancer risk with fiber and fat intake (National Cancer Institute, 1985). Obesity, especially when severe (40% or more above ideal weight for height), is correlated with increased risk of breast, ovarian and uterine cancers (American Cancer Society, 1986). The intake of fat is relatively high among both women and men in the UAE, however, since most women are less active and not working outside home, their energy expenditure is diminished and this lead to a higher incidence of obesity among them compared to men (Musaiger, 1992). Obesity, therefore, may be one of the important factors associated with breast cancer in women in the UAE, though further studies are needed to confirm this conclusion.

CONCLUSION

Cancer deaths in UAE account for about 8% of total deaths and they were ranked as the third leading cause of death in 1992. The problem concerning trends in cancer mortality is that the patients present their complaints at very late stages of the disease. Unfortunately, health education, and the public awarenes about cancer is poor. In addition, the expatriates come from many different countries and backgrounds and they ignore the signs and symptoms of cancer which may help in its detection.

The validation, elaboration and updating of cancer data have become issues that need urgent attention in order that prospective strategies for the prevention and control of cancer problems in the UAE can be developed on a sound and scientific basis. The overall long-term objectives of cancer control programmes aim at reducing morbidity and mortality due to cancer in addition to improving the quality of life for cancer patients. The intermediate objectives are related to reducing exposure to risk factors, lowering the incidence of cancer and providing the necessary treatment to prolong disease-free intervals. Reliable morbidity and mortality statistics are essential for the planning, implementation and evaluation of Cancer Control Programmes. Studies on the prevalence of several types of cancer, as well as risk factors for the incidence of cancer in the community should be given a high priority.

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AN EXPLORATORY REVIEW ON THE ATTITUDES AND PERCEPTION OF KEY HEALTH WORKERS ON HEALTH PROMOTION AND HEALTH EDUCATION IN U.A.E.

S.A.M. BIN ISHAQ

Director of Primary Health Care, Al Ain Medical District, Al Ain, United Arab Emirates

ABSTRACT

This descriptive study was designed to review the attitudes and perceptions of key health personnel toward health promotion and health education in UAE. The respondents were from four different professional sub-groups at Central and District levels, as well as heads of department and from primary health care staff. A total of 41 respondents took part in the survey. The results showed a good level of knowledge about the health issues currently affecting the UAE, but also showed wide differences in attitudes and perceptions of key health personnel towards health promotion and health education. There was a perception that though health was improving there was a new threat through appearance of diseases of affluence, like cardiovascular disease, stroke, cancer and road traffic accidents. There was widespread agreement on the cost effectiveness of prevention and health promotion. Many of the respondents showed a lack of awareness of the contribution of health promotion and health education, but there was a consensus in favour of the need for health promotion and the employment of health education officers. The key decision makers who were questionned gave differing suggestions as to how to deal with the vrious health issues they had identified. Recommendations based on the findings of the study will be passed to the Ministry of Health, which will include a proposal for a more comprehensive and detailed survey.

Key Words : Health attitudes, health education, UAE.

INTRODUCTION

Throughout the United Arab Emirates there have been substantial improvements in health in the last two decades, as a result of improvements in health care and social conditions. But life style induced hazards and new diseases seem to be taking their place. Major current problems are cardiovascular diseases, accidents and cancer. These mostly have a preventable component but require, not just medical action, but also intervention involving the non-medical sector.

For many years, the major contribution to decline in mortality was considered to have been due to medical advances. However, from the 1960's this view has been challenged vigorously (McKeown 1976 a,b). Mortality from infectious disease declined before the introduction of relevant medical measures. In the UAE, much of the improvement in health which took place over the last two decades is due to measures taken outside the medical field, e.g. food, sanitation, housing and water. Ever since the inception of the UAE health services only a very small proportion of funding has been provided for the promotion of good health and the prevention of disease. A significant improvement in health of a nation can come through primary and secondary prevention of ill health. It is time for the UAE Government to accept the need to review its current approach to health promotion, and to conduct a fundamental review of the public health function in the light of the life style induced diseases and environmental health monitoring and weaknesses in the relationships between the medical and other sectors of public health ativities. But how aware are key officials in Ministry of Health of such needs ? What are their views about current philosophies and approaches toward aspects of health service planning with emphasis towards health education and health promotion ? Do they accept the need for health promotion ?

United Arab Emirates is typical of several Arabian Gulf countries in which there is a good infrastructure and high quality health related facilities but which lack proper integration and co-ordination. Consequently, there is an urgent need for reviewing health promotion within the context of health development in UAE.

This exploratory review will consist of a study of the perception and attitude of senior health personnel towards health promotion and health education in an attempt to explore the possibility for the development of a comprehensive health promotion strategy in UAE.

This is in the context of :

1) A review of the annual reports and other existing documents in the UAE.
2) A general review of health promotion literature.
3) Recommendations for the future development of health promotion and health education.

Due to the different concepts of health and varying definition of health promotion and education, the literature review has highlighted how much work has to be done to develop a strategy for the UAE. If the UAE is to develop a health promotion programme, then it must take into account (Tones et al. 1990) the "new health promotion of the WHO which acknowledges that (a) health

promotion is an intersectoral activity, (b) the programme should be "demedicalized" and lay involvement and community participation should be increased, (c) Physical, socio-economic and environmental criteria are also important in determining health and illness.

This approach is reinforced by the WHO which seeks to attain a "new public health" through political action (Kickbush 1981). The Ottowa Charter for Health Promotion, is also concerned with building "new health public policy" and "creating supportive environments".

Consequently, the pilot questionnaire is an attempt to discover the attitudes and perceptions of the key health personnel in various levels of health care departments in UAE on what they currently think about health promotion and health education.

Methods

Attitudes are as a result of belief and values, and may be reflected in "feeling and behaviour" attitudes which are relatively stable but can be changed (Downie et al. 1992). Identification of attitudes and perception can be carried out by direct questioning or by observation. Questionnaires have some disadvantages since it is difficult to translate complex concepts such as health promotion and health education into questions. The questionnaire survey can, however, be a practical and economic method especially when time is limited.

Study Design

A semi-structured interview technique was used to assess the views on general aspects of health service planning, health education and health promotion held by a range of key personnel involved in health policy within the UAE.

The survey involved various hierachical levels of the Ministry of Health. The questionnaire was semi-structured because of the inflexibility of structured questionnaire which would limit the opportunity for respondents to add more information which they felt that was important. Semi-structured questionnaires also reveal issues that are not necessarily asked but are relevant to the issues under investigation. It was considered that the semi-structured questionnaire would lead to the development of a more structured format in the future as was recommended for attitude research by Berrera (1981).

The questionnaire was designed to consider the following issues : health and its determinants, health trends, socio-economic

influences, role of health promotion, role of health education, current health problems facing the UAE, priorities in health promotion and health education, manpower requirements for health promotion in the UAE, and the potential role of a Health Promotion and Health Education Officer.

Pilot Questionnaire

A pilot group was selected as a sub-group representing the sample population from central, district and primary health care levels. Results showed the questions were broad based and could be ambiguous. Although discussions took place as to whether the approach should be modified, it was advised at a senior level that the questionnaire should not be altered because of the opportunity to add any information which was felt to be important and relevant to the study especially since this was only an initial phase toward developing a more structured questionnaire.

Selection of population

Key personnel in the Ministry of Health were selected from the central office, Ministry of Health and four medical Districts - Al Ain, Dubai, Sharjah and Abu Dhabi.

Sample Size

Since data were descriptive and of qualitative nature, no statistical analysis was planned. The size of the sample was based on available time and existing resources. It was considered that those approached should be six Directors at the Central level, four Medical District Directors, four Administrative Directors of Hospitals, four Directors of Primary Health Care Departments, four Directors of School Health and four Directors of Public Health Departments from the four different districts. Five in-charge doctors, five in-charge nurses and five in-charge administrators from one district (Al Ain) were also approached. This ensured that the views of key staff in different sections and areas would be obtained.

Limitations

The sample was small and not randomly selected. As the questions were general the interpretation could vary although it was accepted that this also allowed respondents to express their view and uncertainties freely. The questionnaire did serve to provide a basic set of data in an area where there was no information and will also serve as a preliminary study in preparing a more detailed and structured study.

Results

The first three questions were to determine the level of knowledge about current health, social and economic issues in the UAE. The respondents expressed different views about these issues, some showing great insight, but others showing a definite lack of knowledge. The majority of the respondents stated that the most important trends affecting health in the UAE were a marked decline in infectious diseases, with a corresponding increase in non-communicable diseases such as cardiovascular diseases, cancer and road traffic accidents. The professionals with medical and nursing backgrounds were more aware of the real trends in health relating to the emergence of diseases of affluence and life style.

The majority of respondents thought that social and economic changes had led to improvements in housing, increases in the amount of food available and in consequence to bad eating habits. Dramatic changes toward urbanization and changed life styles (especially diet and exercise), decline in breast feeding, increases in obesity and related problems, metabolic disorders and hypertension were also noted.

When asked what influence the standard of living had on the health of the citizens of UAE, the respondents generally stated that the standard of living had had marked influences both beneficial and detrimental. Changes in life style, diet and culture were noted and if preventive measure are not used adequately health problems associated with affluence will assume greater importance. Health problems had essentially changed from those of a developing country to those of the developed.

Respondents appreciated that the decline in communicable disease was due to the provision of better health facilities. These changes were perceived as positive. The increases in noncommunicable disease were identified as major negative effects due to socio-economic change. The current health promotion activities appeared unable to deal with such life style induced problems.

Health Problems

Chronic diseases such as cardiovascular diseases, cancer and diabetes along with road traffic accidents and dental caries were perceived to be the most important health problems (Table 1). Infectious diseases were considered as a new health problem, especially hepatitis and tuberculosis, resulting from the increase in foreign labourers from endemic area.

Table 1

Perceptions as to Major Health Problems

Opinion of Respondent	Directors (26)	PHC Staff (15)	Total (41)
Chronic Disease	12	7	19
Infectious Disease	7	3	10
Smoking, Drinking & Drug Abuse	7	5	12

In attempting to deal with these health problems, 27 respondents (Table 2) felt that developing primary health care with an emphasis on health promotion was the most appropriate strategy, while 10 subjects said that the answer was to develop specific preventive programmes. Four subjects, all directors, thought that an increase in curative services would be appropriate.

Table 2

Perceptions as to most appropriate Health Strategies

Opinion of Respondent	Directors (26)	PHC (15)	Total (41)
Increase curative health services	4	0	4
Develop specific programme of Disease Prevention	7	3	10
Develop PHC services with emphasis on prevention	15	12	27

Views on Health Promotion

Respondents were asked what they understood by the term "Health Promotion". Opinions showed a wide variation with no clear consensus.

Differences were observed between directors and primary health care staff concerning the role of health promotion. The most important difference was that primary health care workers equated health promotion with health education while most directors perceived health promotion in the broader context of health prevention such as mass immunization and screening. Thus directors and primary health care staff have different conceptions of what health promotion and health education is all about. There is no clear understanding of it, which implies that there is a need for clarification and provision of information on the nature of health promotion.

The role and scope of health promotion and health education

Many different opinions were expressed concerning the role of health promotion and health education in general. Specific statements included "reduce road traffic accidents", "reduce cardiovascular disease and cancer", "is the role by which health promotion is achieved and it is about making people maintain health by avoiding known hazards".

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This suggests that there is recognition that health promotion and health education have a role in the health care service.

Priority to be given to health promotion and health education

Answers on this question included recommendations that, in order to make the public more aware of health problems, health promotion should be given as a subject in school for the higher age groups.

The respondents were asked what priority should health education/health promotion be given within the health service. Twenty six respondents (64%) gave this the highest priority while 12 (29%) gave it a high priority. Even though 93% of respondents gave high priority to health promotion and health education, it was obvious from the answers that they clearly did not understand how to give priorities for health promotion activities according to need. This no doubt reflects on the current medical model of care and is reinforced by their experience of the largely curative care previously available.

DISCUSSION

The questionnaire provided insights into the attitudes and perception of key officials on health promotion and health education and demonstrated broad consensus on health and health transition. Economic and social growth transformation have profound consequences for the pattern of health and disease. The majority of respondents also recognized that the increasing standards of living were correlated with diseases of affluence and an emphasis on curative care. It appears from their observations that this was at the expense of preventive health care.

There was marked variation in their perceptions concerning health promotion and health education. Tones et al. (1990) have recognised that whilst there is considerable variation in people's definitions and perceptions, the idea that health promotion is an amalgam of all aspects of preventive work including health education is widely accepted.

All respondents were in favour of health promotion and health education. They were, however, less certain as to which professional discipline was the most appropriate to deliver a health promotion and health education service.

The single most important factor that was demonstrated was the commitment of the respondents towards health promotion and health education. In contrast, however, the majority of these key

professionals were neither actively involved nor had they enhanced the development of health promotion. They placed the responsibility for health promotion/health education on various disciplines but none from medical, nursing or administrative backgrounds wished to take responsibility for developing a health promotion progamme.

Despite the fact that UAE made a commitment towards Health For All (WHO 1979) in 1979, it was only in 1986 that the Ministry of Health decided to adopt a strategy for Primary Health Care (Ministry of Health, 1987). During the intervening six years health promotion was neglected in the overall strategy of health care. There appears to be a misconception by Health Department that health promotion is only an intensive health "activity" to be run by health professionals. There is no emphasis on multi-sectorial and multidisciplinary approaches towards health promotion. This misunderstanding has resulted in a virtual absence of any strategic developed plan for health promotion activities.

The role of the private sector in health promotion strategies has yet to be defined and methods for including the private sector in co-ordination of the health service need to be developed. Numerous voluntary and private organisations concerned with health issues should be involved.

This study has confirmed suspicions that there is no clear understanding of health promotion and health education. There is however, a willingness on the part of the key professionals interviewed, to develop health promotion and health education. Health cannot be imposed on people, it has to be developed in partnership. It is hoped that this study will provide the impetus.

Recommendations

1. A more detailed and comprehensive study of the views and opinions of health workers and key decision makers based on the findings of this preliminary report is required.

2. A clear commitment from the government on the role of health promotion and health education through intersectoral involvement.

3. A training programme for different level of health workers at Central, Distric and Primary Care level is recommended.

4. Grafting a health system from another country on to the UAE without regard to its cultural, religious and demographic character needs would certainly lead to difficulty in application. Sensitivities and needs must be considered.

5.   In order to facilitate this programme there is a need to involve
        Public Health and Primary Care experts not only from UAE
        but also key experts from the international scene.

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PREVALENCE OF CARDIOVASCULAR DISEASE RISK FACTORS AMONG BAHRAINI ADULTS : A PILOT STUDY

A.O. MUSAIGER[1] and K.A. AL-ROOMI[2]

[1] *Department of Food Sciences and Nutrition, Faculty of Agricultural Sciences, U.A.E. University, Al-Ain, U.A.E.* [2] *College of Medicine and Medical Sciences, Arabian Gulf University, Bahrain*

ABSTRACT

In Bahrain, circulatory system diseases are now the leading cause of death averaging 32% of all causes of death since 1982. An epidemiological survey comprising a random sample of 185 Bahraini adults (94 men and 91 women) aged 30-77 years was conducted as a first step to examine the current level of cardiovascular disease (CVD) risk factors. It was found that 15% and 10% of the subjects had a history of hypertension and diabetes, respectively. The prevalence of smoking was relatively high (31%), and more men were current smokers (39%) than women (23%). About 40% of subjects did not practice physical exercise (walking). The prevalence of obesity (BMI > 30) was high (32%) and women had a higher rate of obesity (49%) than men (29%). Of the subjects, 12% and 6.5% did not or rarely consumed fresh fruits and vegetables, respectively. It would appear that the prevalence of the known risk factors of CVD among the adult Bahrainin population is high. This is a source of great concern and indicates the need for a comprehensive community survey to confirm these findings.

Key Words : Bahrain, diabetes, food frequency intake, hypertension, lifestyle, obesity, smoking.

INTRODUCTION

The rapid socio-economic, demographic and behavioural changes in Bahrain over the last two decades have had a marked influence on health patterns in the community. While the incidence of infectious diseases have decreased remarkably, the incidence of non-communicable diseases have increased and have become the main public health problem in the country. Circulatory system diseases are the leading cause of morbidity and mortality in Bahrain (MOH, 1992). The death rates from diseases of the circulatory system, for those aged 50 years and older, have increased from 77 per 1000 in 1976 to 120 per 1000 in 1986. Deaths from these diseases occur as early as the 20-34 years age group and rise sharply thereafter (Musaiger, 1990).

There is no specific programme to prevent and control cardiovascular diseases (CVD) in Bahrain. This is mainly due to the

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lack of information about risk factors affecting CVD in the country. Sharp contrasts among countries or among social groups within a country are often evident in the special or environmental conditions known to place population at risk for CVD (WHO, 1990). Investigation of such differences among populations or groups can be important information for determination of risk factors in childhood and adult population. Studies on risk factors for CVD are urgently needed to increase understanding of the known differences among various population.

The aim of this pilot study, was to determine the prevalence of some of the risk factors known to be related to CVD in Bahrain. Such information would be valuable as a baseline data for any further community-base study on CVD risk factors.

MATERIALS AND METHODS

The subjects studied were Bahraini residents aged 30-77 years. A simplified general method for cluster-sample survey of health was used to select these subjects. (Bennett et al., 1991). Bahrain was divided into 100 blocks distributed in 10 geographical areas, and 15 blocks were selected for obtaining the subjects. Households were selected randomly from blocks taking into consideration the proportional distribution of the population in the geographical areas. Selected households were those which housed persons aged 30-79 years old. Only one person, either male or female, was selected from each household. The population studied was 185, of whom 94 were men and 91 women.

Subjects were interviewed at home by two trained female assistant researchers, using a pretested questionnaire, which include information on socioeconomic background, lifestyle, smoking, history of diabetes and hypertension, food habits and anthropometric measurements.

Anthropometric measurements include weight and height. Weight was measured without shoes and with minimal clothing to the nearest 0.2 kg using portable digital scales with a 130 Kg capacity. Height was measured without shoes to the nearest 0.1 cm using a portable stadiameter. Body mass index [weight (kg)/Height(m)^2] was employed as a measure of obesity.

Data were first stored in Dbase files and analysed using EPI-INFO-5 programme (CDC/WHO, 1990). Odds ratios for association, Chi-square and confidence intervals for the odd ratios were calculated using the same programme.

RESULTS

Socio-economic status

The mean age of subjects studied was 46.7 ± 13.7 years. The distribution of subjects by age and sex showed a higher prevalence of men aged 60 years and over compared to women (28.7% and 16.5% respectively). There were significant differences for age and sex in the sample studied ($p<0.01$) (Table 1).

The prevalence of illiteracy was high in subjects studied (40%), furthermore 19% could only read and write, making the overall low educational level (illiterate and those who only read and write) about half of the sample. Illiteracy was higher among women than men. In contrast higher education (secondary and above) was more observed among men. Winkleby et al. (1992) found that the relationship between socio-economic status measures and risk factors for CVD was strongest and most consistent for education, showing higher risk associated with lower levels of education.

As shown in many community studies in Bahrain, most women were not externally employed (93.4%), whereas employment status was 77% among men. The relatively high percentage of unemployment among men is due to the fact that 29% of men passed the retirement age (60 years and over). The patterns of marital status of subjects were very similar among both sexes, and the Chi-square value showed no significant association between these two variables (sex and marital status).

Lifestyle

Four variables were measured to exhibit the lifestyle of subjects studied; walking, sedentary time spent at work, daily hours of watching television and smoking habits (Table 2). A significant association has been reported between men and women in relation to daily practising of walking ($p<0.03$). Of men, 67% practised walking compared to 51.6% of women. The relatively high percentage of subjects who practice walking may be due to the increase of health awareness among the public regarding the role of exercise in reducing the risk of several chronic illness. In the recent years, the mass media in Bahrain has intensively focused on the preventive measures to reduce the risk of heart diseases, and exercise has been always been given as an easy and less expensive measure to overcome these diseases.

Time spent sedentary at work and daily hours of watching television can provide a good picture about sedentary lifestyle of the population. As expected, men were less likely to spend their time at

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TABLE 1
Socio-demographic characteristics of Bahraini subjects by sex.

Factors	Male		Female		Total	
	No.	%	No.	%	No.	%
Age (years)						
30 - 39	35	37.2	33	36.3	68	36.8
40 - 49	15	16.0	26	28.6	41	22.2
50 - 59	17	18.1	17	18.7	34	18.4
60 >	27	28.7	15	16.5	42	22.7
Education						
Illiterate	30	31.9	45	49.5	75	40.5
Read & Write	10	10.6	10	11.0	20	10.8
Primary	15	16.0	14	15.4	29	15.7
Intermediate	6	6.4	5	5.5	11	5.9
Secondary	22	23.4	11	12.1	33	17.8
University	11	11.7	6	6.6	17	9.2
Employment						
Unemployed	22	23.4	24	26.4	46	24.8
Housewife	-	-	61	67.0	61	33.0
Employed	72	76.6	6	6.6	78	42.2
Marital Status						
Currently married	83	88.3	80	87.9	163	88.1
Not married	11	11.7	11	12.1	22	11.9
TOTAL	94	100.0	91	100.0	185	100.0

TABLE 2
Distribution of Bahraini subjects by walking, time spent sedentary at work, hours of watching television and smoking.

	Male No.	%	Female No.	%	Total No.	%
Practicing walking						
Yes	63	67.0	47	51.6	110	59.6
No	31	33.0	44	48.4	75	40.5
			$p < 0.03$ (OR = 1.9, 1.00-3.63)			
Time spent sedentary at work						
All time	34	36.2	85	93.4	119	64.3
More than half the time	4	4.3	-	0.0	4	2.2
Half the time	1	11.7	-	0.0	11	5.9
Less than half the time	13	13.8	3	3.3	16	8.6
Rarely	32	34.0	3	3.3	35	18.9
Daily hours of watching TV						
None	15	16.0	14	15.4	29	15.7
< 2 hours	35	37.2	27	29.6	62	33.5
2-3 hours	28	29.8	25	27.5	53	28.6
> 4 hours	16	17.0	25	27.5	41	22.2
Smoking						
Current smoker	37	39.4	21	23.1	58	31.4
Non-smoker	57	60.6	70	76.9	127	68.6
			$p < 0.02$ (OR = 2.2, 1.08 - 4.35)			

work being sedentary than women (36% and 93%, respectively). This is obviously due to low percentage of external employment among women. The recent population census in Bahrain (1992) showed that 93% of household have at least one television set. It has been shown that television occupied most of leisure time of the Bahraini population, especially females. Our result indicated that only 15.7% of subjects did not watch television, while the rest watch television between one to six hours daily. Women were more likely to watch television daily than men (27.5% and 17% of women and men watch television for more than four hours a day). Television viewing has been identified as a risk factor for childhood and adolescent obesity because spending long time in watching television reduce physical activity, as well as encourage the audience to eat snacks during watching (Gortmaker et al. 1990)

The prevalence of smoking among the adult population in Bahrain is lower than in most developed and many less developed countries. However, a secular trend of increasing cigarette smoking among Bahraini adults has been reported (Hamadeh et al., 1992). Findings of this study showed that the prevalence of smoking was higher among men than women, and the association was highly statistically significant (p<0.001). Of men, 40% were current smokers compared to 23% of women. Most women used the hubble bubble. Similar finding was confirmed in Bahrain (Hamadeh et al., 1992).

Obesity

Although the precise role of obesity in the aetiology of CVD remains controversial (Sharpnel et al., 1992), obesity was found to be highly correlated to other risk factors for CVD such as diabetes and hypertension (NDC, 1991). The prevalence of obesity in our subjects was alarming as 33.7% were overweight (BMI 25-29.9) and 38.6% were obese (BMI>30). Obesity occurred more among women than men. About 10% of women had severe obesity (BMI>40) and the association between obesity and sex was highly statistically significant (p < 0.0001) (Table 3).

History of diabetes and hypertension

Diabetes and hypertension have been shown repeatedly to predict the development of CVD in adults. Our findings showed that the prevalence of diabetes was almost 3 times greater among women compared to men (14.3% and 5.3%, respectively). The association between sex and diabetes was statistically significant (p<0.04) (Table 4). Taking age into consideration, the prevalence of diabetes increased steeply with age and the trend was both similar in men and women. At age 30-39 none of the subjects reported a history of diabetes, but at age 40-49 years, the prevalence of diabetes was 6.7%

TABLE 3

Prevalence of obesity among Bahraini subjects by sex

Grade of obesity	Male No.	%	Female No.	%	Total No.	%
Underweight (BMI<20)	7	7.5	4	4.4	18	6.0
Normal (BMI 20-24.9)	32	34.4	8	8.8	40	21.7
Overweight (BMI 25-29.9)	28	30.1	34	37.4	62	33.7
Obese (BMI 30-39.9)	25	26.9	34	37.4	59	32.1
Severe obesity (BMI 40+)	1	1.1	11	12.1	12	6.5
TOTAL	93	100.0	91	100.0	184	100.0

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TABLE 4

Distribution of Bahraini subjects by history of diabetes and hypertension

	Male		Female		Total	
	No.	%	No.	%	No.	%
History of diabetes						
Yes	5	5.3	13	14.3	18	9.7
No	89	94.7	78	84.7	167	90.3
	p < 0.04 (OR = 0.34, 0.10 - 1.08)					
History of hypertension						
Yes	13	13.8	15	16.5	28	15.1
No	81	86.2	76	83.5	157	84.9
	p < 0.6, (OR = 0.81, 0.34-1.95)					

TABLE 5

Distribution of Bahraini subjects by frequency intake of fresh fruits and vegetables.

	Male		Female		Total	
	No.	%	No.	%	No.	%
Frequency intake of fruit *						
None	16	17.0	6	6.6	22	11.9
Daily	51	54.3	61	67.0	112	60.5
4-6 per week	22	23.4	20	22.0	42	22.0
1-3 per week	5	5.3	4	4.4	9	4.9
Frequency intake of vegetables **						
None	10	10.6	2	2.2	12	6.5
Daily	55	58.5	71	78.0	126	68.1
4-6 per week	24	25.5	16	17.6	40	21.6
1-3 per week	5	5.4	2	2.2	7	3.8

* N.S.

** P < 0.02

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and 15.8% among men and women respectively. At age 50-59 years, the prevalence of diabetes in men decreased slightly to 5.9%, while that for women continued to increase to 29.4%. At age 60 years and over, the prevalence was doubled in men (11.1%), but slightly decreased in women (26.7%).

Hypertension was more prevalent among the subjects studied than was diabetes. The overall prevalence was 15%, and women (16.5%) have higher prevalence of hypertension than men (13.8%). However, there was no statistically significant association between sex and hypertension. Stratified analysis by age and sex showed that the prevalence of hypertension increased until age 59 and then slightly declined at age 60 years and over, particularly among women.

Frequency intake of fruits and vegetables

A high intake of fruits and vegetables is thought to reduce the risk of CVD through several mechanisms, including lowering serum cholesterol and blood pressure levels (Sharpnel et al., 1992). The weekly intake of fresh fruits and vegetables by subject studied is given in Table 5. The daily intake of these foods were higher in women than men. A significant association between intake of vegetables and sex was found (p< 0.02).

DISCUSSION

Many factors that are known to contribute to the risk of developing CVD in western populations are prevalent among Bahraini adult population; however, the prevalence estimates for most risk factors were not similar for men and women. The importance of age and sex as cardiovascular risk factors should not be underestimated even though they cannot be modified. Several studies showed that the incidence of CVD increase significantly with age, and men have higher rates than women (Isles and Hole, 1992). These findings have been confirmed in Bahrain by recent statistics of the Ministry of Health. The death ratio of CVD is 3 to 1 for men and women respectively, and the death rate increased remarkably with age (MOH, 1992). The longer life expectancy of the Bahraini population has increased the risk of developing certain chronic illness such as CVD, diabetes and hypertension.

Physical activity and exercise have profound effects on the cardiovascular system, most of which are beneficial (Narthcote, 1992). Our findings revealed that more than half of subjects studied practised walking, and the rate was significantly higher among men and women. Nevertheless, we did not ask about the frequency of walking per day and the duration of daily walking in general and walking for exercise purposes. We suggest that in further studies, the

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question of walking as well as for exercise should be more elaborated in order to get precise data about exercise habits in the community. However, we strongly believe that the phenomenon of exercise, especially walking has increased among adult population in Bahrain due to the increase in awareness and availability of places for practising such activity.

As in many other Arabian Gulf countries, the type of work of Bahraini inhabitants is mostly sedentary. Moderate and heavy work which need more muscular efforts are mostly practised by expatriates workers (Musaiger, 1987). The availability of car, housemaids, and electronic household appliances, in addition to long exposure to television all played an important role in diminishing the physical activity of Bahraini adults. This study showed that most of the population studied spent their time sedentary at work and watched television for at least two hours a day. This lifestyle will increase the risk of CVD, especially for those who have additional risk factors such as diabetes and hypertension.

The sedentary lifestyle and intake of high density foods may be the main causes of obesity in this part of the world. However, despite the fact that there is a well-established association between obesity and an increased cardiovascular risk profile, epidemiological studies relating obesity and CVD yield inconsistent results (Sharpnel et al.,1992). Obesity is however, highly associated with two major risk factors for CVD; diabetes and hypertension (NDC, 1991). Our data showed a high association between obesity on one side and diabetes and hypertension on the other side (not shown in tables).

Hypertension and diabetes are amongst the most common public health problems managed by physicians in Bahrain. It is well-documented that hypertension and diabetes continue to be major risk factors for CVD. The prevalence of these two diseases in our subjects was relatively high creating an urgent need for prevention strategies to control them. Diabetics develop long term complications such as CVD in this region at a rate similar to that reported in developed countries (Alwan, 1993).

In most countries where the incidence of CVD is high, cigarette smoking appears to be the most important risk factor for CVD. Recent evidence suggest that passive smokers may also be at risk (Isles and Hole, 1992). Hamadeh and McPherson (1993) found that smoking is one of the main factors that contribute to acute myocardial infarction (AMI) in Bahrain. The risk for AMI is doubled for smokers when compared to non-smokers.

It can be concluded that most risk factors that are known to be associated with CVD are highly prevalent among the adult

population in Bahrain. An epidemiological community-base survey is highly recommended to confirm the findings of this pilot study as well as to provide baseline data for any intervention programme to prevent and control CVD diseases in the country.

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RISK FACTORS FOR CARDIOVASCULAR DISEASE AMONG WOMEN ATTENDING HEALTH CENTERS IN QATAR

A.O. MUSAIGER[1], F.A. AL-KHALAF, and N.E. SHAHBEEK[2]

[1] Department of Food Sciences and Nutrition, Faculty of Agricultural Sciences, UAE University, Al-Ain, UAE;
[2] College of Medicine and Medical Sciences, Arabian Gulf University, Bahrain.

ABSTRACT

Diseases of the circulatory system are the major causes of death in Qatar, and represented 34% of total causes of death in 1992. This study aimed to investigate some of the known risk factors for cardiovascular diseases in women in Qatar. A cross-sectional survey was carried out in 1992 on 603 women aged 17-67 years who attended health centers in Doha, the capital. The prevalence of diabetes and hypertension was very similar: 12.9% and 12.3%, respectively. However, the prevalence of these disease increased steeply with age and reached 37.1% and 51.4%, respectively for those aged over than 44 years. Very few women were current smokers (3.2%), but 37.7% of married women have smoker husbands, making a high proportion of passive smokers among women. Using BMI (wt/ht^2) as an indicator, 30% of women were overweight and 33.6% were obese. The association between obesity and age was highly statistically significant (P<0.001). Only 16% of women practised exercise regularly, with 27% exercising infrequently. A simple tool for coronary heart disease risk factors was implemented using a point scoring system for 9 known risk factors. It was found that 7% of women had generally average risk while 1% had moderate risk. In conclusion, the study showed that some of the known risk factors for cardiovascular diseases were highly prevalent among women in Qatar and this suggests the need for more epidemiological studies among both men and women, as well as the need for action to prevent and control these diseases.

Key Words : Cardiovascular disease, diabetes, exercise, hypertension, obesity, Qatar, smoking.

INTRODUCTION

Qatar like other Arabian Gulf countries has faced a drastic change in its socio-economic situation and dietary patterns during the past three decades which have affected the way of living and pattern of diseases. These changes, in addition to the increase in life expectancy, have led to increase in the incidence of non-

communicable diseases - the so called "diseases of affluence" such as cardiovascular disease, cancer, diabetes mellitus, and accident injuries. Recent statistics showed that the diseases of circulatory system are the major cause of death in Qatar and represented 34% of total deaths. The Qataris are more likely to be susceptible to this group of diseases than non-Qatari (37% and 30%, respectively). Neoplasms are the third major cause of death (12.1%) after injury and poisoning (20%). In general, the non-communicable diseases, including accidents and injuries, constitute more than 70% of total deaths in this country (Preventive Health Department, 1993).

There have been no studies on factors determining the non-communicable diseases in the population of Qatar. The aim of this paper is, therefore, to study some of the known risk factors associated with cardiovascular disease in adult females in Qatar as a first attempt to provide baseline data on factors associated with diseases of affluence in this country.

MATERIALS AND METHODS

The target population was adult females aged 18 years and over who attended the health centers in Doha, the Capital, during 1-15 July, 1992. Pregnant women were excluded to avoid disorders due to pregnancy such as gestational diabetes, hypertension and increase in weight. The total number of target women attending health centers during the study period were 671. However, 48 women refused to participate and 20 women were excluded because of incomplete information, making a drop out of 68 women (10% of total). The total sample population was thus 603 women.

Women were interviewed by female medical students using a pretested questionnaire. Information obtained included socio-economic background, practising exercise, history of diabetes and hypertension, weight and height measurements. Weight was measured using a Deteco scale having a capacity of 140 kg. The weight was measured to the nearest 0.05 kg with women wearing the minimum clothes and no shoes. The height was measured without shoes to the nearest 0.1 cm by using the stadiameter attached to the scale.

Obesity was determined using Body Mass Index (BMI) which is defined as the weight in kilograms divided by height in meters squared. Women with a BMI equal or more than 25 were considered overweight while those with BMI > 30 were considered obese (Bray, 1978).

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Data were stored in Dbase file and analysed using EPI-INFO Programme (WHO/CDC, 1990). Chi-square and odd ratios were used to test the statistical significancy.

RESULTS

The distribution of women by socio-demographic characteristics is given in Table 1. Most women studied were Qatari (66%) while the rest were non-Qatari, mainly from other Arab countries, such as Egypt, Lebanon, Palestine and Sudan. The mean age of women was 31.1 ± 10 years and ranged from 18 to 67 years. The majority of women (69.4%) were less than 35 years of age, while those aged more than 44 years represented 12% of the total.

About half of women (53%) had a high educational level (secondary schools and above). This relatively high percentage of education among the women was mainly due to non-Qatari women, as the latest census showed that the non-Qatari women had a higher education level than Qatari women (Central Statistics Organization, 1994). The same explanation can be given for the relatively high proportion of employment in the women studied (26%), as in general, employment among national women in the Gulf does not exceed 10% (Musaiger, 1987). The percentage of women who were currently married was 72%.

History of Chronic Illnesses

Three main chronic diseases were investigated in this study namely, diabetes, hypertension and heart diseases. The women were asked whether or not they currently had any of these chronic diseases. The prevalence of diabetes and hypertension among women studied was very similar (12.9% and 12.3%, respectively). These figures compared favourably with that reported in Bahrain among women aged 29 to 79 years (Al-Roomi et al. 1994). The prevalence of heart disease was 3.8%. Actually, this category includes a group of diseases such as myocardial infarction, angina, and stroke, however, since the women generally could not differentiate among these diseases, they were asked about whether or not they had any diseases related to the heart.

A high statistically significant association was found between these diseases and age of women (Table 2). The prevalence of diabetes was 0.6% among those aged less than 25 years and then increased by 10% for every ten years to reach 37% among those aged over than 44 years. The situation for hypertension was diferent as the proportion tripled after age 34 years and then tripled again in those aged over 44 years to reach 51% among this age group. Surprisingly, 1.2% of women aged less than 25 years reported a history of heart

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TABLE 1
Socio-demographic characteristics of women in Qatar.

Characteristics	No.	%
Age (years)		
< 25	167	27.8
25 - 34	250	41.6
35 - 44	115	19.0
> 45	70	11.6
Nationality		
Qatari	398	66.0
Non-Qatari	205	34.0
Educational level		
Low	120	19.9
Middle	164	27.2
High	319	52.9
Employment status		
Employed	156	25.9
Housewives	447	74.1
Marital status		
Married	432	71.6
Single	131	21.7
Divorced	22	3.6
Widowed	18	3.0
Total	603	100.0

* Low education   = Illiterate + read and write
Middle education   = Primary + intermediate
High education   = Secondary and above

TABLE 2

History of some chronic diseases of women in Qatar by age

Age (years)	Diabetes %	Hypertension %	Heart diseases %
< 25	0.6	4.7	1.2
25 - 34	10.4	5.2	3.6
35 - 44	21.9	14.9	3.5
> 45	37.1	51.4	11.4
Total	100.0	100.0	100.0
	$p < 0.001$	$p < 0.001$	$p < 0.004$

disease. This relatively high prevalence may be due to congenital heart disease.

The relationships between the prevalence of diabetes and heart disease to a family history of these diseases were found to be statistically significant (p<0.001 and p<0.02, respectively). Of women who had diabetes, 70% had a family history of diabetes, compared to 44% of those who had no diabetes. The percentages for heart diseases were 43% and 23% among those who had heart diseases and those who had not respectively (Table 3).

Smoking

Smoking has been repeatedly found to be one of the main risk factors for cardiovascular disease (Lakier, 1992). The prevalence of smoking among women in Qatar is very low (3.2%) compared to that reported in other Gulf countries (Hamadeh et al., 1993). However, a high prevalence of smoking was found among husbands (38%) of women who are currently married. Thus a high proportion of women could be defined as passive smokers.

Physical Exercise and Obesity

It is believed that a sedentary lifestyle and high intake of food rich in fats are the main factors determining obesity in the Gulf, including Qatar (Musaiger, 1987). Our study showed that more than half of women (56.5%) did not practice any type of exercise; 27.5% practiced exercise infrequently while only 16.5% of women practiced exercise regularly. Most of these were non-Qatari. The common exercises practiced were walking and swimming. The low percentage of women who practice exercise could be attributed to several reasons, such as lack of health awareness, lack of places for women to practice exercise, and cultural barriers.

Typically, as reported in all Gulf countries, overweight was highly prevalent among women in Qatar (63.7% had BMI > 25). About one-third of women were overweight and a similar proportion were obese (BMI > 30). The association between overweight (based on BMI) and age of women was highly statistically significant (p<0.001). The prevalence of overweight among older women (35 years and over) was astonishing as about 80% of these women had a BMI equal or greater than 25 (Table 4). This percentage is higher than that reported in women in other countries in the region (WHO/EMRO, 1989).

TABLE 3

The relationship between the prevalence of diabetes and heart disease with family history of these diseases among women in Qatar.

History of the Disease	Prevalence of the Disease					
	Yes		No		Total	
	N	%	N	%	N	%
Family history of diabetes						
Yes	55	70.5	233	44.4	288	47.8
No	23	29.5	292	55.6	315	52.2
p < 0.001, O.R. = 3.0 (95% C.I., 1.73-5.22)						
Family history of heart diseases						
Yes	10	43.5	135	23.3	145	24.0
No	13	56.5	445	76.7	458	76.0
p < 0.02, O.R. = 2.5 (95% C.I., 1.00 - 6.4).						

TABLE 4
Prevalence of obesity in women in Qatar by age group.

| Obesity | Age (years) | | | | | | | | | |
| | <25 | | 25- 44 | | >45 | | Total | | | |
	N	%	N	%	N	%	N	%	N	%
Underweight (BMI < 20)	36	21.6	20	8.0	4	3.5	-	0.0	60	10.0
Normal (BMI 20-24.9)	69	41.3	58	23.2	20	17.5	11	15.7	158	26.3
Overweight (BMI 25-29.9)	40	24.0	86	34.4	32	28.1	23	32.8	181	30.1
Obese (BMI 30+)	22	13.2	86	34.4	58	50.9	36	51.5	202	33.6

* Weight and height were not taken for two women.

TABLE 5

Heart disease risk appraisal for women in Qatar by age (%)

Level of risk	Age (years)			
	<25	25-34	35-44	>45
Well below average risk	55.6	27.2	14.9	8.6
Below average risk	43.8	68.0	73.7	57.1
Generally average risk	0.6	4.4	9.6	30.0
Moderate risk	0.0	0.4	1.8	4.3

Heart Disease Risk Appraisal

A simple tool to assist health workers in evaluation of coronary heart disease risk was implemented. This tool is based on nine known risk factors for coronary heart disease namely smoking, blood pressure, diet, stress, exercise, weight, age, gender and heredity. Detailed information on how these risk factors were scored are available elsewhere (Delugolecka and King, 1989). The results showed that, using a combination of risk factors, 7% of women had generally average risk, and 1% had moderate risk. However, when risk was associated with age, it was found that the proportion of women who had generally average risk increased slightly with age till age 35-44 years, and then the risk become three times more for those aged over 44 years. None of the women had a moderate risk at age less than 25 years, and then the risk increased gradually to reach 4.3% in those aged over 44 years (Table 5).

DISCUSSION

This is the first study which has investigated risk factors for CVD in the adult population in Qatar. Women generally have lower incidence rate for CVD than men, however by age 65, the number of deaths due CVD was becoming higher for women than for men (Eaker et al., 1993). Some studies have shown that an increase in the incidence of atherosclerosis and coronary heart diseases occurs in post menopausal women (Isles and Holes, 1992). Statistics of the Ministry of Public Health showed that the rate of deaths due to diseases of circulatory system was 37% among men compared to 28% among women. There is a difference between sex and nationality, as deaths due to these diseases occurred more among Qataris than non-Qatari and Qatari women have a higher incidence rate of these disorders than non-Qatari women (Preventive Health Department, 1993). These differences in mortality between the Qatari and non-Qatari may be attributed to differences in lifestyle and dietary habits, in addition to age distribution. Most Qatari women are housewives and depend mainly on housemaids in home management. In addition, they rarely practice physical exercise compared to non-Qatari. The foods commonly consumed by Qatari families are high in fat and carbohydrates (Musaiger, 1987). These factors may play an important role in increasing risk of CVD among Qatari women compared to non-Qatari.

The prevalence rate of diabetes, hypertension and heart diseases among women in Qatar are high compared to their counterparts in some developing countries (WHO/EMRO, 1989, INCLEN, 1992). This prevalence reaches alarming levels after age 44 years, as almost one-third and about half of women at this age had a history of diabetes and hypertension respectively. Heart diseases

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occurred in about one-tenth of women at the same age group. This finding is in good agreement with that reported by Preventive Health Department (1993), as 94% of deaths owed to circulatory system diseases in women occurred at 45 years of age or over. However, it is worth mentioning that our study is of the women who attended health centers, and some of these women may visit the health centers for treatment of chronic diseases. Therefore, the prevalence of diabetes, hypertension and heart diseases in this study do not necessarily reflect the prevalence of these diseases in the community.

The role of heredity factor as a cardiovascular disease risk should be taken into consideration. It was found that with a family history of premature death from CVD, there was a much greater risk of cardiovascular deaths (National Dairy Council, 1991). Our study showed that family history of diabetes was highly associated with the prevalence of diabetes among women studied, while the association was only barely statistically significant in relation to heart diseases in general. This may be due to small number of women who reported occurrence of heart diseases.

The prevalence of obesity among women in Qatar is a source of concern, and more attention should be given to the prevention and control of obesity in both children and adults. Factors determining obesity in Qatar have not been studied. Studies in other Gulf countries (Musaiger and Al-Ansari, 1992; Khashoggi et al., 1994) showed that several social and dietary factors were associated with obesity in women. Musaiger and Al-Ansari (1992) found that age, education, employment, marital satus, family size and practising exercise have a statistically significant association with obesity among women in Bahrain, while ownership of cars, availability of housemaids and meal patterns have no statistically significant association.

Smoking may be one of the most significant risk factors for CVD in countries where the incidence of CVD is high (Isles and Holes, 1992). Although the prevalence of smoking in women in Qatar is very low (3.6%), it seems that a high percentage of these women are exposed to a smoking environment because of smoking by one or more male members in the family. This study revealed that more than one third of married women have husbands who smoke. Recent evidence suggests that passive smokers may also be at risk of health hazards due to smoking such as CVD (Isles and Holes, 1992).

In conclusion, this study showed that women in Qatar, especially those aged over than 44 years, are highly susceptible to some of the known risk factors for CVD such as diabetes and hypertension. In addition, obesity is highly prevalent among these women. There is, in consequence an urgent need for taking action to

prevent and control CVD in this country. However, since this study involved women who attended health centers, it is difficult to generalize the findings. Community-based studies among both men and women in Qatar are recommended to determine the true prevalence of risk factors for CVD and other chronic diseases. It is important in future studies to distinguish between nationals and non-nationals because socio-economic status, dietary habits, age and sex structure are different and these factors can affect the prevalence of chronic diseases.

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"OBESITY: DO CARBOHYDRATES MAKE YOU FAT?"

K.J. ACHESON

Nestec Ltd, Nestle Research Centre, Vers-chez-les-Blanc, 1000 Lausanne 26, Switzerland

ABSTRACT

In the past an increase in body weight essentially due to the accumulation of fat, has been considered, rather simply, to be the result of energy intake exceeding energy expenditure. This implies that the energy derived from the different macronutrients is treated the same within the body. However, more recently it has been demonstrated that energy balance should rather be considered to be the sum of the individual macronutrient balances and that fat balance is far more difficult to attain than that of either protein or carbohydrate.

It has been known for many years that provided protein intake is adequate, an increase or decrease in protein intake is rapidly followed by a subsequent increase or decrease in nitrogen excretion so that nitrogen balance is maintained. Carbohydrates, on the other hand, have always been implicated in obesity due in part to the pleasant taste of simple sugars and their use in confectionery products, which it should be remembered often contain high proportions of fat. A further possibility, supported by many animal studies, is that carbohydrates consumed in excess are converted to fat. Studies in human volunteers will be presented to support the hypothesis that very little carbohydrate is converted to fat, even when large quantities of carbohydrate are consumed and that under normal dietary conditions the body achieves carbohydrate balance. Further evidence will illustrate that fat balance is weakly controlled and that dietary fat is more dangerous for body weight control than either carbohydrate or protein.

Key Words : Carbohydrates, Gulf countries, obesity, protein

INTRODUCTION

In Western Industrialised Nations it has been recognised for many years that obesity is an important factor associated with high mortality and morbidity. Although, in the United States 25% of the population is considered to be overweight and 10% severely overweight (USDHHS, 1988), the prevalence of obesity is much greater in certain sub- groups of the population, of the order of 36% in American Blacks (both sexes) and 46% in Black females (NCHS, 1991) increasing to 60-80% in the Pima Indian population (Knowler et al. 1991).

Few large population, studies have been carried out in Saudi Arabia and the Gulf States, however, it is feared that over the last 20

years increased prosperity, associated with the oil boom, and subsequent changes in life-style and food habits have resulted in an increase in the incidence of obesity similar to that observed in the United States. Studies in Saudi Arabia and Kuwait, suggest that the incidence of obesity is as high as that observed in American Blacks (Amine 1980, Amine and Al-Awadi 1990) and, in a smaller study, similar to that of the Pima Indians (Al-Rehaimi and Bjorntorp 1992).

The increase in incidence of obesity in the Arab Gulf would appear to be due not only to an increase in per capita energy intake, rising from ~2000 kcal/day in 1975 to almost 3000 kcal/day in 1988 (Al-Shoshan 1992) but also to a decrease in energy expenditure, associated with a more sedentary life style (Musaiger 1987).

These observations agree very well with the energy balance equation which predicts that if energy intake is greater than energy expenditure an individual will gain weight. However, the energy balance equation assumes that the energy provided by the macronutrients, protein, carbohydrate and fat, are treated the same within the body and yet weight gain is essentially due to an increase in body fat mass. In reality energy balance depends upon the balance of the individual nutrients (Figure 1) and it is of interest to consider the metabolic fate(s) of the individual nutrients to obtain a better understanding of the contribution of the diet to the development of obesity.

Protein

Proteins which contribute only 10-15% of total energy intake have a number of metabolic options; - protein storage, conversion to glucose and oxidation. Under normal conditions protein storage or a positive protein balance occurs during growth and adolescence. In adults it is quite difficult to increase muscle mass by increasing protein intake alone. However, protein supplementation in combination with intense weight training, such as body builders and weight lifters, or the influence of anabolic sterioids will cause an increase in lean body mass.

Protein conversion to glucose occurs when the liver glycogen stores and carbohydrate intake are insufficient to provide glucose for the brain. This occurs towards the end of an overninght fast and in the initial stages of starvation before ketone bodies become the energy source for the brain.

The fact that protein oxidation closely follows protein intake was demonstrated by Oddoye and Margen (1979). Using a cross-over design in which their subjects were fed either 12 or 36 g nitrogen per day, for a period of seven weeks, they observed that nitrogen excretion

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Figure 1

Energy Balance Depends Upon Nutrient Balance
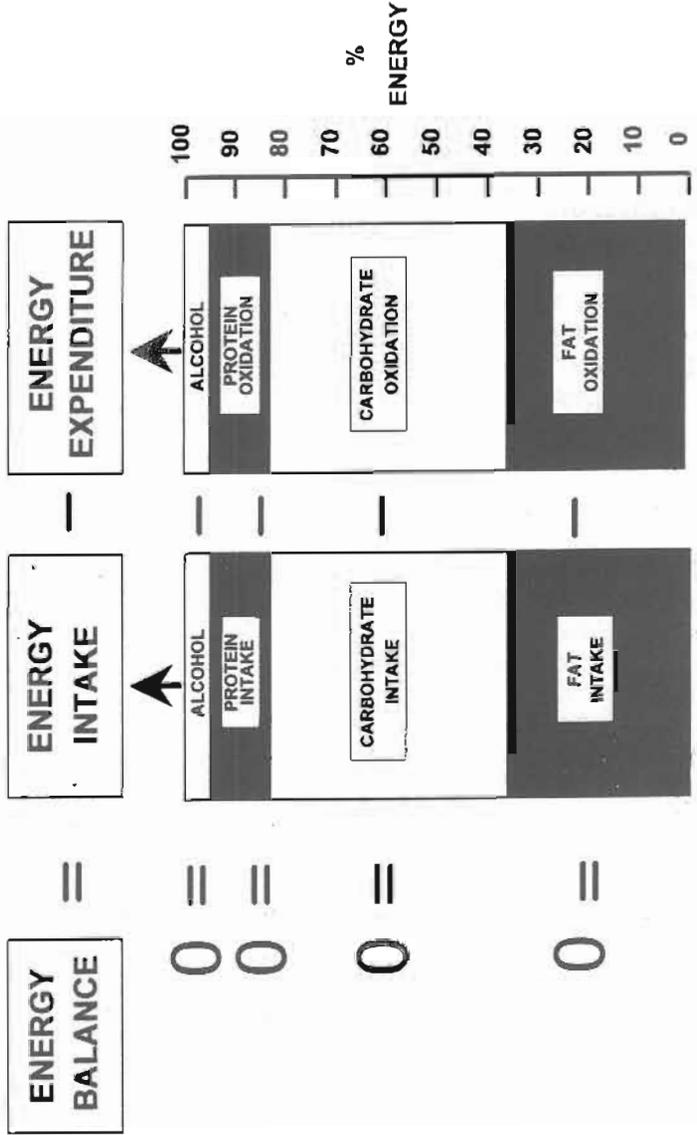
very closely matched nitrogen intake. When the subjects changed from the 12 g to 36 g nitrogen diet or from the 36 g to the 12 g nitrogen diet nitrogen excretion rose and fell respectively until nitrogen balance was attained. Although they did observe a slightly positive nitrogen balance on the 36 g nitrogen diet, it is rare that such large quantities of protein are habitually consumed. When protein intake is adequate protein balance has been shown to be achieved on a day-to-day basis (Abbott et al 1988).

Carbohydrate

Carbohydrates provide the major proportion of energy in the diet, contributing 45 to 50% in European countries and the United States and even more (~60%) in the Gulf States (Al-Shoshan 1992). Carbohydrates can be stored as glycogen, converted to and stored as fat or they can be oxidised. Although carbohydrates provide 45 to 60% of our daily energy, the body can only store very small amounts of energy as glycogen; 500-1500 g (Acheson et al. 1988), in comparison with the limitless adipose tissue fat stores.

It is commonly believed that dietary carbohydrates are converted to, and stored as fat. Much of the evidence for this is provided by experimental data obtained from animals such as rodents, who consume high carbohydrate diets but require a means of storing energy in the most compact form possible i.e. fat, to enable them to survive periods of food deprivation e.g. winter and hibernation. In man there is some, but little, evidence that *de novo* lipid synthesis occurs. Patients receiving energy in excess of their requirements, in the form of hypertonic solutions of amino acids and glucose, have been observed to have non-protein respiratory quotients (NPRQ) higher than 1.0, indicating the formation of fatty acids from carbohydrates (Elwyn et al. 1979). In healthy individuals considerable amounts of fat synthesis (150g/day) have only been observed during the very unnatural conditions of carbohydrate overfeeding (Acheson et al. 1988). When uncommonly large carbohydrate meals providing 500g or 2000 kcal are ingested, carbohydrate oxidation increases but rarely does the NPRQ exceed 1.0, and over a 24 hour period fat oxidation far exceeds any fat synthesis which might have occurred (Acheson et al. 1982, Acheson et al. 1984). Under normal circumstances when a mixed meal is consumed carbohydrates will be absorbed and disposed of by increased oxidation and/or storage in the glycogen stores which, although small, are sufficiently large to avoid the necessity for *de novo* lipogenesis.

Fat

Fat provides approximately 40% of our dietary energy and once it is absorbed it can only be disposed of by either oxidation or storage. Thus if fat storage is to be avoided, dietary fat must be oxidised. When a mixed meal is ingested, carbohydrate absorption, followed by the increase in blood glucose concentrations, stimulates insulin secretion. This in turn increases glucose uptake by the tissues and glucose oxidation. Unfortunately only a very small increase in insulin concentration is necessary to inhibit lipolysis and fat oxidation. The consequence of this is that although dietary carbohydrate stimulates its own oxidation it will also effectively inhibit the oxidation of any fat contained in the meal. Even when the fat content of a meal is increased significantly, nutrient oxidation is not directed towards greater fat oxidation (Flatt et al. 1985, Schutz et al. 1989).

The implications of this nutrient balance concept (Flatt 1988) are that in the short-term protein and carbohydrate balances are achieved, whereas that of fat balance is not. In consequence, dietary fat is far more dangerous for the maintenance of body weight than either carbohydrate or protein. To a certain degree these metabolic explanations for the development of obesity are supported by the changes in dietary composition which have occurred in the Gulf States over the past 20 years (Figure 2). The contribution of protein to the energy composition of the diet has changed very little, whereas that of carbohydrates has decreased and that of fat has increased (Al-Shoshan 1992). The increase in consumption of fast foods, oil and fat consumption and rapidly absorbed sugars (Musaiger 1990) combined with a more sedementary life style do nothing to prevent the development of obesity in this region.

From the above discussion the answer to the problem is obvious and not very surprising : the amount of fat in the diet should be reduced. A reduction in the fat content of the diet to 30% of total energy, with a maximum of 10% from saturated fats, has already been advocated in the United States and Europe. However, it is more easy to advocate a reduction in fat consumption than to ensure that the population follows this advice. This requires a concerted effort to make people aware of the dangers of obesity and provide them with sound nutrition education and practical advice. The food industry should also be aware of this problem and can contribute by investigating ways of providing interesting and appetising foods, low in fat and high in complex carbohydrates.

Figure 2

Trend in the Contribution of Carbohydrate, Fat and Protein
to Total Energy Intake in Saudia Arabia
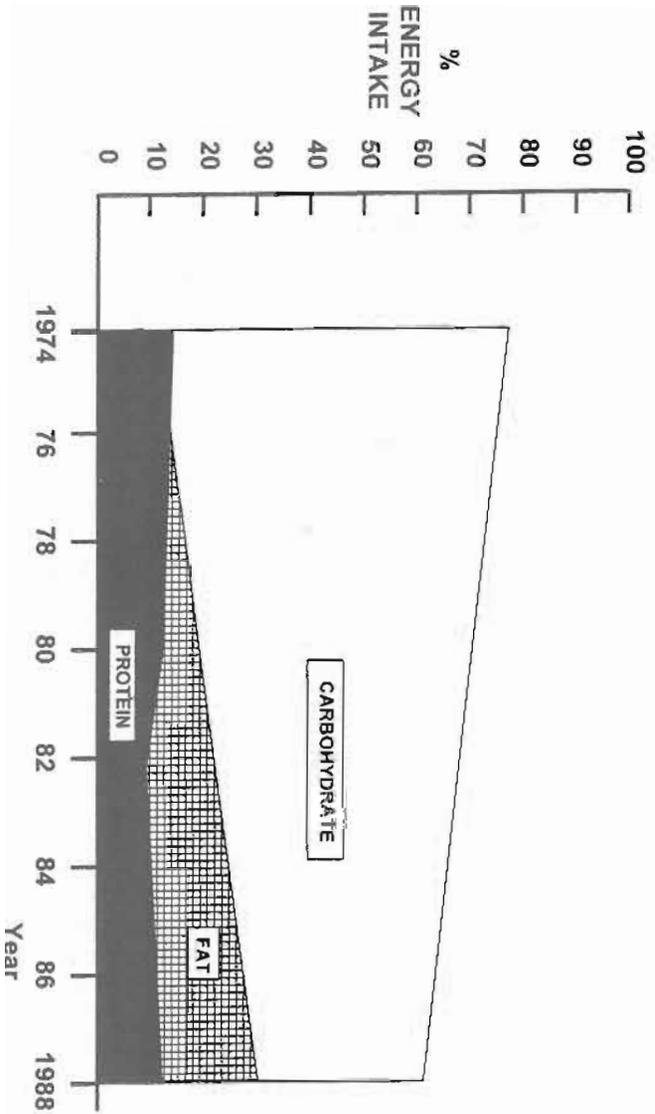
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OBESITY IN SAUDI ARABIA : AN OVERVIEW

K.A. MADANI[1] and R.H. KHASHOGGI[2]

[1] Directorate of Health Affairs, Ministry of Health, Jeddah; [2] College of Home Economics, King Abdulaziz University, Saudi Arabia.

ABSTRACT

It is well documented that obesity is associated with several chronic illnesses. Therefore. the prevalence of obesity in a population can be considered as a rough indicator for health status. This paper reviews the current state of knowledge related to obesity in Saudi Arabia. The prevalence of obesity ranges from 14% to 66%. This wide variation can be attributed to the difference in criteria used to define obesity and also to differences in age and sex structure of samples studied. In a study on Saudis aged 18-74 years the prevalence of obesity was found to be 51% among men and 65% among women. Several studies showed that obesity is more prevalent in diabetic patients. Factors contributing to obesity have not been well studied. Some studies suggested that lack of physical exercise, excessive intake of high energy foods and attitudes of the community to the overweight are important factors for the occurrence of obesity in this country. A recent study using multiple regression analysis indicated that five variables were significant predictors for obesity among women : age, marital status, number of servants, having children and parity. The paper calls for urgent action to prevent and manage obesity. Studies on factors contributing to the high prevalence of obesity in Saudi Arabia are highly recommended.

Key Words : Obesity, social factors, S. Arabia.

INTRODUCTION

Obesity is defined as excessive storage of energy in the form of fat (Simopoulos and Van Itallie, 1984). For men, obesity is present when body weight consists of more than 20% fat, compared to the normal values of 15% to 18%. For women, obesity is present when body weight consists of more than 30% fat, compared to the normal values of 18% to 24% (Roche et al., 1981).

Sums of scapular and triceps skinfold have also been used to define obesity. The body mass index (BMI) is the best approximation for the degree of obesity in population-based studies (National Institute of Health Consensus, 1985; Roche et al., 1981). The BMI (weight in kilograms divided by the square of the height in metres) was first proposed by Quetelet (1869). Garrow (1978) proposed grading severity for both males and females by subdivisions of BMI into (a) Grade O

(normal) BMI from 20 to 24.9, (b) Grade I BMI from 25 to 29.9, (c) Grade II BMI from 30 to 39.9, (d) Grade III BMI > 40. The BMI correlates well with body fat, but does not distinguish between body fat and lean body mass. Increased body weight could be due to the increase in muscle mass, body fluid, or body fat.

Obesity is not an uncommon finding, particularly in affluent societies (Binhemd et al., 1991; Seidell et al., 1986). It is associated with an increased risk of several major diseases including hypertension (Gillum, 1987), non-insulin dependent diabetes mellitus (Bennet and Knowler, 1984), gall bladder disease (Bray, 1985), and some types of cancers (Van Itallie, 1985). Therefore, the prevalence of obesity in a given population is a rough indication of its general health status.

Obesity is becoming one of the most important public health problems in Saudi Arabia. The available data clearly indicate a high prevalence of adult obesity particularly in women in the Kingdom. This paper aims to briefly summarize our current state of knowledge about the prevalence, the management, and the factors related to obesity in Saudi Arabia.

PREVALENCE OF OBESITY

In Saudi Arabia the prevalence of obesity ranges from 14% to about 66% (WHO, 1989; Binhemd et al., 1991). This wide variation could be due to the difference in criteria used to define obesity and also to the differences in age and sex.

The risk of childhood obesity and its continuation to adulthood is now well established (Rimm and Rimm, 1976). A survey, utilizing the National Centre for Health Statistic Standards, carried out in the Kingdom (WHO, 1989), revealed 14% childhood obesity among those 0 to 6 years of age. It has been estimated that obesity persists into adulthood in over 80% of obese adolescents (Lloyd et al., 1961).

Binhemd et al (1991) studied the height and weight of 1072 Saudis (477 men and 595 women), ages 18-74 years, with a view to determine the prevalence of obesity in patients attending the primary health care centre of King Fahd University Hospital in Alkhobar. Of the total group, 51.5% of the men, and 65.5% of the women were considered overweight or obese, using a criterion of body mass index of greater than 25. More women were found to be obese than men. Similar findings were also reported by Al-Attas et al. (1990), where obesity was found more frequently in females than in males.

The prevalence of obesity in diabetic patients was higher than non-diabetic. In one study (Bacchus et al., 1982), 65% of the diabetic patients were overweight as compared with 26% of the non-diabetic population. Diabetes in Saudis appear to be related to obesity (Fatani et al., 1989). Similar findings were also reported by Fatani et al. (1987) in a study of the prevalence of diabetes mellitus in the Western Region of the Kingdom. They defined obesity as the BMI equal to, or higher than 27 for men, and equal to, or higher than 25 for women. Among 5,222 adult subjects, fifteen years of age and over, the rate of obesity among diabetic subjects (41.4%) was significantly higher than that among normal subjects(29.3%). They reported that in men, the obesity rate was significantly higher among diabetic subjects (39.1%) than in normal subjects (21.3%). Women did not have a significant difference in the rate of obesity in diabetic (42.4%) and normal subjects (39.3%).

In another study, using the same criteria of obesity as the previous one, Al-Attas et al. (1990) studied the metabolic indices in 217 Saudi diabetic patients and 57 controlled subjects in relation to BMI. Obesity was found more frequently in females (82.7%) than in males (40.9%).

Factors contributed to the prevalence of Obesity

There are several factors contributing to the high prevalence of obesity amongst women in Saudi Arabia. Watching television and eating snacks are the main activities during their leisure time, especially when the majority of the women are not employed outside the home. Excessive intake of food is also responsible for obesity in the region (Musaiger, 1987).

According to the Saudi Food Balance Sheets (1987-1989), the mean daily energy availability per person in Saudi Arabia has increased to 3,064 kcal, which is 13.2% above the WHO/FAO recommended energy intake. Daily availabilities are 82.4 grams of protein, 90.4 grams of fat, and 480.2 grams of carbohydrate for Saudi Arabia. These values are 16.5%, 33%, and 6.1%, respectively above the US Daily Recommended Allowances (Saudi Food Balance Sheets, 1987-1989).

The attitude towards obesity is another important factor. Musaiger (1987) reported that the attitude of most men in the Gulf region is to prefer obese women, mainly for sexual purposes. This encourages the wife to keep her fatness just to satisfy her husband's desire. The cultural acceptability of obesity, as in rural Egypt, describes the proper woman as an "envelope for conception," and therefore, a fat woman is a desirable because she is thought to have more room to bear the child, lactate abundantly and give warmth to her children

(Amnar, 1954). Also, the Tarahumara of Northern Mexico, reportedly consider large, fat thighs as the first requisite of beauty; a good-looking woman is called a "beautiful thigh" (Bennett and Zingg, 1935). Among the Amhara of the Horn of Africa, thin hips are called "dog hips" and is insulting (Messing, 1957).

There is the possibility that the traditional, long, comfortable, and wide clothes worn by women in the Gulf has not made them notice the gradual gain in weight (Musaiger, 1987).

In both urban and rural areas, the modernization and affluence in Saudi Arabia, as a result of the oil boom over the last three decades, has probably increased the problems of obesity for vulnerable persons. Changes in lifestyle, in eating habits, and the increased variety of foods due to the high influx of immigrants of various nationalities working in the area has probably contributed to the higher prevalence of obesity. Finally, higher levels of physical activity combined with higher rates of smoking among males compared to females may explain the lower rates of obesity in males (Klesges and Meyers, 1989).

In a recent study, Khashoggi et al. (1994) considered the factors affecting the rate of obesity among females whose ages ranged between 11 and 70 years in the Western Province of the Kingdom. The sample involved 950 females screened at the primary health care centres and the prevalence of obesity was 64.3% using BMI with a cut-off point of > 25. Multiple regression analysis indicated that five variables were significant predictors for obesity. These variables include age, marital status, number of servants, having children, and parity. Other factors studied, including education and income, were of no predictive value.

In another study (Khwaja and Al-Sibai 1987) on a sample of 467 married non-pregnant Saudi female patients, using the cut point of >30 for the BMI, the overall prevalence of obesity was estimated to be as high as 27%. Age, rather than the parity, was a contributing factor to obesity. This appears more likely since the interval between pregnancies is usually short, and does not allow the female to lose the weight that was gained during pregnancy. This is particularly true in Saudi Arabia where grand multiparity (the births of five or more viable infants) is a common occurrence (Cochran and Faqeera, 1982; Madani et al., 1994).

Management of Obesity

Understanding the psychodynamics of obese patients and their families is a pre-requisite to successful treatment. Perhaps behaviour

modification with respect to food intake will be effective in the treatment of obesity, especially in Saudi Arabia.

It is often assumed that fasting during Ramadan (the ninth month of Islamic lunar calendar) will cause weight loss. However, some moslems that fast during Ramadan are gaining weight (Khashoggi et al., 1993). Fasting during the month of Ramadan is one of the five pillars of Islam. Moslems are obliged to abstain from eating and drinking between dawn and sunset. After sunset, and during the night, they are allowed to eat and drink until the first light of dawn appears. A survey was undertaken by Khashoggi et al. (1993) among Saudi females aged 20 to 50 years in the five main primary health care centres in Jeddah during the ten days before the month of Ramadan, and during the ten days after it ends. The result indicates that there was a significant increase in weight after the month of Ramadan (p < 0.001). The authors cited many reasons for the increase in the body weight, including the reduction in meal frequency, the increase in food energy intake, and the decrease in energy expenditure and activity during this month. Therefore, Moslems should change their food habits by attempting to keep to their normal food intake, reducing sweet consumption, increasing meal frequency, and increasing their activity in order to maintain the ideal body weight during the Holy Month.

A reasonable level of physical activity is recommended, not only to lose body fat (Hill et al., 1987), but also to improve circulation (Cresanta et al., 1987). This can be done either at the home or at physical fitness centre. Women in the Kingdom, are not allowed to participate in outdoor exercise programs, hence physical fitness centers have opened in order to fill women's needs for physical activity and exercise.

Surgical management of obesity has been introduced in Saudi Arabia for the treatment of patients with morbid obesity. In a surgical management study (Mofti and Al-Saleh, 1992), the mean weight loss during one year was 39% in males and 33% in females.

Conclusion

The previous studies highlight that obesity is becoming a public health problem in Saudi Arabia especially amongst adult females. To evaluate future programmes of applied nutrition interventions to help people maintain the ideal body weight, a well-designed national study is needed to determine the prevalence and the factors associated with obesity in Saudi Arabia. Studies are also needed to quantify, more precisely, the effects of energy intake and expenditure on obesity levels in various populations.

Other studies are needed to determine the cultural influences in developing obesity. Knowledge of the social factors associated with obesity will help to identify high risk groups. Certainly, public health measures should focus on all members of society (i.e. in school, via the printed media, T.V., radio, etc...) to discuss the health hazards of being overweight.

Studies are also needed relating to the distinction between gynoid and android obesity (Simopoulos, 1985). The latter type may correlate with medical morbidity, whereas the gynoid type may not (Larrson et al., 1984; Donahue et al., 1987).

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OBESITY IN LEBANON

N. BABA

Faculty of Agricultural and Food Sciences, American University of Beirut, Beirut - Lebanon.

ABSTRACT

There have been no national studies on obesity in Lebanon. The data available are derived from small scale studies on adolescents and adults. In adolescents aged 14-20 years, 35% of females and 23% of males were overweight (BMI 25-29.9), whereas 2% of females and 9% of males were obese (BMI > 30). In adults aged 18-54 years, 33% and 38% of females and males, respectively were overweight. The prevalence of obesity was 22% in females and 8% in males. In males, obesity was most prevalent in age group 35-44; while highest percentage of obesity was reported in females aged 45-54. The prevalence of obesity in the urban population was higher than the rural for both sexes. The observed differences in obesity prevalence between urban and rural populations could be explained by the changing dietary habits of the urban Lebanese where fat intake was found to constitute 36% of food energy in 1992 compared to 24% in the sixties. This change is an important factor in increasing the incidence of obesity. Another contributing factor could be the sedentary life style reported in the Lebanese population. In all age groups, obesity in Leanon appears to be less prevalent than for the US population but is difficult to compare with other countries in the region due to the different indices used to measure obesity. Further studies are needed to relate changing life styles in developing countries with the increasing incidence of obesity, and a unified index for obesity is necessary to facilitate comparisons between countries.

Key Words : Chronic diseases, Lebanon, obesity

INTRODUCTION

Historically the ability to store excess fat in adipose tissue was considered as useful protection against food shortages. This ability might have led to the propagation of the obesity gene with subsequent increase in obese people in the present era. This advantage, however, became a handicap in industrialized societies.

The industrial revolution resulted in food being available at all times and with minimal effort to obtain it, process it, or prepare it. Recently, as a consequence of epidemiological research, obesity was identified as a risk factor for some of the major diseases of modern times : diabetes, cardiovascular diseases, hypertension and certain cancers. Disorders related to dietary excesses are now increasing

among populations in developing countries. Changes in life-style and westernization of dietary patterns appear to be among the contributing factors. Of these disorders obesity has been reported to reach alarming levels in many countries of the Middle East. Most health planners in the region are aware of a generally increasing trend of obesity and actions directed towards control are being recommended to governments in the region (WHO/EMRO, 1989).

Quantitative assessment of changing dietary habits showed a reduction in consumption of starchy cereals and vegetables with a corresponding increase in fats of animal origin and increased intake of meat and sugar. Excessive intake of foods that are high in food energy, fats (especially saturated fats), and sodium and low in complex carbohydrates and fibre have been suggested as a dietary pattern that contributes significantly to most of the above mentioned disorders. It has also been reported that percentage body fat correlated positively with intake of total saturated, monounsaturated and polyunsaturated fats and negtively with carbohydrate intake. This suggested that diet composition independent of total energy intake, and physical activity may contribute to obesity (WHO/EMRO, 1989). Evidence is also available that reversing such dietary patterns led to reduced incidence of these chronic disorders. As a conclusion of much of the research connecting diet with nutrition and health, one can say that diet and lifestyle are major determinants of malnutrition of affluence (USDHHS, 1988; WHO/EMRO, 1989).

Prevalence of Obesity in Lebanon

In Lebanon, national studies on the prevalence of obesity have not been conducted. The data presented are derived from small scale surveys conducted on selected samples of adults and children.

A study on a random sample of 200 adolescents aged 14-19 years from different schools in Beirut showed that 36.1% of adolescent females and 24.6% of adolescent males had a BMI greater than 25 (Table 1). If we attempt to compare these data with data from other Arab countries we observe that, due to the different indicators used, comparisons and conclusions are difficult to be made. However, if we apply Garrow's classification (USDHHS 1988) we notice that the percentage of obese adolescents with BMI >30 is higher in males than females (9% vs. 2%) which is less than any of the figures reported for other Arab countries (Table 2). Morbid obesity (BMI >40) was absent in the population studied.

Data were collected on 406 female and male subjects from Beirut aged 18-24, 25-34, 35-44, and 45-54 years. The prevalence of over weight females and males was distributed as shown in Table 3.

TABLE 1

Prevalence of obesity among adolescents (14-19 years) in Lebanon

Females :

Grade of Obesity	Range of BMI	% female adolescent
Grade 0 (Normal)	20 - 24.9	63.9%
Grade I	25 - 29.9	34.4
Grade II	30 - 39.9	1.7%
Grade III	> 40	0.0%

Males :

Grade of Obesity	Range of BMI	% male adolescent
Grade 0 (Normal)	20 - 24.9	58.0%
Grade I	25 - 29.9	16.0
Grade II	30 - 39.9	8.6%
Grade III	> 40	0%

Source : Baba (1992)

TABLE 2

Comparison in the prevalence of obesity in various countries in the Arab Middle East.

Country & Year of Survey	Age (years)	Percent Obese M	F	Indicator of obesity used		
Egypt 1976	15 - 18	3.7%	15.0%	> 120% unspecified reference		
Cairo 1967	10 - 16	6%	4%	> 120%	"	"
Cairo 1978	11 - 16	14.4%	23.6%	"	"	"
Kuwait 1987	1 - 12	2.2	2.3	BMI	M>28.4	F>26.4
	15-19	7.4	18.8%	BMI	M>28.4	F>26.4
Saudi Arabia 1987	0 - 6	14.0%		> 97th Centile NCHS Ref.		
Tunisia 1987	12-20	20.3%		Unspecified		
Lebanon 1992	14 - 20	24.60%	36.10%	BMI > 25		

Source (WHO/EMRO, 1989; Baba, 1992).

TABLE 3

Prevalence of overweight (BMI > 85th percentile) and obesity (BMI > 95th percentile) in the United States by age and sex compared with the Lebanese study group.

Age (years)	Overweight		Obese	
	U.S.	Lebanese	U.S.	Lebanese
Males				
Total	24.1	5.1	9.1	4.2
18-24	13.1	10.4	5.5	0
25-34	19.5	13.9	7.6	2.5
35-44	27.0	20.7	10.4	10.3
45-54	33.8	20.0	14.1	3.3
Females				
Total	25.0	7.3	8.2	0.5
18-24	11.5	3.4	3.9	1.1
25-34	17.4	2.5	6.0	0
35-44	28.1	12.5	10.8	0
45-54	32.0	19.3	10.9	0
Total	-	6.41	-	3.8

Source (Baba, 1992).

The indicator used for overweight was a BMI $\geq 85^{th}$ percentile and for obesity a BMI $\geq 95^{th}$ percentile. It is noted that overweight was most prevalent among Lebanese adults in the 35-54 year age groups. The obesity percentage in females was highest in the age group (45-54) and in males in age group 35-44. In general a higher BMI was reported in males than females in all age groups studied.

In an attempt to relate life style to incidence of obesity in the Lebanese population a preliminary survey was conducted on a sample of 100 adults from rural and urban areas. Food intake data were collected by 24 hour recall and weight and height measurements were taken. A higher prevalence of obesity in urban population, whether for males or females, was reported. Among rural women, 42% were overweight (BMI 25-29.9), but none were obese. The prevalence, however, among urban women was 25% and 42%, respectively. The prevalence of overweight and obesity among men was lower, 33% and 9% of rural men were overweight and obese while the corresponding percentages for urban men were 42% and 8% respectively. The diet seems to be partly responsible for the higher prevalence of obese people in the urban group. In general higher intake of food energy was observed in the urban group (Table 4).

Dietary intake data indicate that urban men consumed more food energy than rural men as well as women. The lowest intakess intake were among rural women (61% of RDA). The same trend was observed for protein, fat, cholesterol, vitamin D, vitamin A and thiamine intake. In contrast more carbohydrate was consumed by rural women. The variation in cholesterol intake was high, and was mostly dependent on the consumption of animal foods.

Based on health statistics the morbidity from nutritionally related chronic diseases showed a higher prevalence of these diseases in older adults (Table 5). This is in accordance with the obesity data being more prevalent and more hazardous to health in males than females (Baba, 1992). Studying the prevalence of nutritionally related chronic non-communicable diseases on the basis of hospital admissions in post war years showed an increase in prevalence of heart disease from 2.9% to 6.7%. The prevalence of diabetes also paralleled that of obesity and was more prevalent in males (2.6%) between the ages of 30 to 50 years. This is similar to the figure (2.7%) reported in 1984. (Zurayk and Armenian, 1984).

From hospital admission data it was observed that obesity was more prevalent in men than women between ages 20-49 years. After the age of 50 years obesity became more prevalent among women with the highest percentage of obese women occurring between the ages of 60 and 69 years.

TABLE 4

Dietary intake of energy and certain nutrients as a percentage of US Recommended Daily Allowances.

Sex and age	Calories % RDA		Protein % RDA			FAT % Cal.			Carbohydrate % Cal.			Saturated Fat	
	Mean	SD	Mean	SD	% Cal.	Mean	SD	g	Mean	SD	g	Mean	SD
Men Rural 36-59	82.5	15.4	136	44.7	13.4	34	10.6	85	49	126	292	15	8.1
Men Urban 35-59	98.5	23.8	194	73.0	16	39	9.9	120	42	11.1	292	24	11.3
Women Rural 28-58	61	14.5	101	42.5	15	32	5.4	45	53	6.7	160	9	5.0
Women Urban 30-53	73	27.4	126	33.9	16	36	7.6	62	48	6.5	171	12	8.6

Sex and age	P/S		Cholest. mg		Alc. % Cal.		BMI		Vit.A% RDA		Vit.D% RDA		Vit.E% RDA		Thiamin%RDA	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Men Rural 36-59	0.54	0.42	3005	219	3.7	6.1	24.59	4.0	294.7	144	21	32.3	50	47.8	80	19.4
Men Urban 35-59	0.70	0.49	305	225.4	3.3	5.1	25.65	3.6	71.8	92	25	26.7	78	42.6	92	30.8
Women Rural 28-58	0.25	0.26	99	97	0	0	25.15	5.0	379.7	150	7	14.4	21	18.0	81	48.2
Women Urban 30-53	0.54	0.57	182	193.2	0	0	28.10	2.1	206.9	139	19	23.3	49	34.8	82	34.83

Source : Baba (1992).

TABLE 5

Percentage of morbidity from chronic nutritionally related diseases by age and sex in Lebanon (1984)

Condition	Age (years)								
	0 - 9	10-19	20-29	30-39	40-49	50-59	60-69	70+	Total
Hypertension									
Males	0.0	0.1	0.3	1.6	5.1	10.1	20.5	23.7	3.6
Females	0.0	0.2	0.9	3.9	8.3	21.0	31.0	35.1	6.1
Heart Disease									
Males	0.2	0.1	0.2	0.4	3.7	10.0	18.4	21.2	3.1
Females	0.0	0.1	0.3	1.1	2.4	6.7	14.2	25.8	2.7
Diabetes									
Males	0.1	0.0	0.2	0.7	4.0	9.8	12.7	13.5	2.5
Females	0.0	0.1	0.4	1.2	1.2	4.0	10.1	15.8	2.8
Hypercholesterolemia									
Males	0	0.0	0.1	1.4	5.4	7.1	5.7	9.0	2.0
Females	0	0.1	0.4	1.8	4.0	9.4	12.0	7.0	2.4

Source : Zurayk and Armenian (1985).

Cardiovascular disease accounted for 6.7% of hospital admissions and was higher than all other nutritionally related diseases. Admissions of obese patients was low since many people did not feel the need to be admitted to the hospital just because they were obese. Another reason for the low levels of obesity admissions was that obese patients with complications were often admitted under the diagnosis of the complication.

In conclusion, it is clear that comprehensive data for the prevalence of obesity in different age groups and in different sexes in Lebanon is not available. Moreover the use of different indices for obesity makes it more difficult to observe similarities and trends of obesity in the same population and among populations. It is recommended to conduct studies in various Arab countries using the classification for obesity in different age groups recommended by the Food and Nutrition Board (1989) in order to monitor its prevalence and implement various measures of control. In Lebanon changes in dietary habits have been observed with increases in dietary fat, mainly saturated fat, consumption along with decreased physical activity. Both factors are related to obesity and consequently to other nutritionally related chronic diseases.

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FACTORS AFFECTING THE PREVALENCE OF OBESITY AMONG SAUDI COLLEGE FEMALE STUDENTS

R.A. AL SHAGRAWI, A. ALBADR and E.A. EL-HAG

College of Agriculture, King Saud University, Riyadh, Saudi Arabia

ABSTRACT

This study was conducted to evaluate factors affecting the prevalence of obesity among Saudi college female students. Data were collected through personal interviews using a questionnaire. A sample of 460 Saudi female students representing 21.2% of the total students were selected using a systematic random procedure. The results showed that average height and weight of female students were 156.2 cm and 55 kg respectively. Obesity and underweight were preent among 12.2% and 58% of the students respectively using Body Mass Index (wt/ht^2) as a criterion. There was a significant relationship between age, social status, daily dietary intakes of energy, fat and carbohydrate as independent variables with obesity as a dependent variable. It is recommended that more attention should be given to nutritional education for university students regarding the selection of balanced diet.

Key Words : Dietary intake, obesity, socioeconomic factors, female, Saudi Arabia

INTRODUCTION

Obesity, a chronic nutritional disorder with adverse health implications, occurs when food energy intake exceeds the food energy expenditure (Ginleer, 1978). It is a worldwide public health problem (Dawson, 1988). Various theories have been advocated for its etiology involving physiology and psychology as well as the social and sensory components of dietary intake (Simopoulos and Van Itallie, 1984). It is associated with increased risks for insulin resistance, hypertension, hyperlipidemia, cardiovascular diseases, gallstones, and certain types of cancer (Sebai, 1987, Pi-Sunyer, 1993). The relationship between obesity and its consequences, however, varies with the age of the experimental subjects. For instance, the analysis of cardiovascular end points among individuals indicate that obesity is an important predictor for younger populations as compared to the older (Stamler et al., 1978, Garrison and Castelli 1985, Rissanen et al., 1989).

Psycho-dynamic theories of obesity have focused on overeating as a cause of unresolved conflicts. Obesity can be caused by

overeating, and/or lack of exercise (Foregt and Goodrick, 1993) but this neither explains the cause of obesity nor indicates the cure.

In all indicated studies over-weight and moderate obesity were common among female subjects. There was considerable evidence associating over-weight in women with increased risk of breast, endometrical and cervical cancer (Garfinkel 1985).

Different levels of obesity were found to be prevailing among Saudi females aged 15-49 years in the studies of Khwaja and Al-Sibai (1987) and Binhemd et al. (1991). Khashoggji et al. (1990) studied the factors affecting the rate of obesity among adult females in Western Province of the Saudi Kingdom. The prevalence of obesity was found to be correlated with a number of factors including age, income, marital status, parity, education, and occupation.

The present study was conducted to evaluate the prevalence of obesity among Saudi female college students in King Saud University and the various factors correlating with it.

Methods

This study was conducted in the female students department for Science and Medicine at King Saud University. A systematic random sample of 460 Saudi female students representing 21.2% of the whole population was selected.

Data were collected through personal interviews using a specially designed questionnaire which consisted of three major parts. The first part covered the socioeconomic factors of the female students. The second part included anthropometric information (height and weight). The third part included information on dietary habits.

Height was measured to the nearest 0.1 cm without shoes using stadiometer attached to the scale. Weight was measured with few clothes and without shoes to the nearest 0.1 kg using Seca scale. Body Mass Index (BMI) [Weight(Kg)/Height(M)^2] was used as indicator for obesity.

A 24 hour dietary recall technique was used to obtain dietary intake of the students. They were asked to record all food consumed during the day before the survey, including between meal snacks (Baranowski et al 1986). The intake of nutrients was calculated using the software programme Food Processor EShasle OR 97309.

Percentages, mathematical mean and Pearson's correlation coefficient were used to analyse the data statistically.

RESULTS AND DISCUSSIONS

A total of 460 female students were included in the study with mean age of 21 ± 5 years. The distribution of BMI values for female students are shown in Table 1. More than half of the female students in the sample (57.8%) were underweight with BMI < 20, while 12.2% were obese (BMI > 30). Only 21.3% of the subjects can be considered as having an ideal weight (BMI 20-24.9), and 8.7% were overweight (BMI 25-29.9). The prevalence of obesity (12.2%) was found to be lower than all the previous studies conducted in the Kingdom (Table 2). However, the mean age of this group was lower than in other studies and this may be one of the reason for low prevalence of obesity. The lower BMI in our subjects could also be due to their food habits and food preferences since Saudi females at this age tend to restrict their food intake with high degree of selection of fat free and low energy food items. Since they are college students with a basic knowledge of nutrition they may be more able to select low energy diets.

The distribution of obese female students accoding to their age suggested that two thirds of the obese students fall in the older age category while less than 10% were in the young age category (Table 3). This finding is in agreement with the studies of Khwaja and Al-Sibai (1987).

The correlations between socio-economical status with obesity are shown in Table 4. Significant relationships were observed at 0.01 level between age, social status and obesity. This is also in agreement with the study of Khwaja and Al-Sibai (1987).

Some significant correlation relationships (P<0.01) were found among students' daily dietary intakes of food energy and nutrients with obesity (Table 5). Obesity was significantly correlated with energy (r=0.508), fats (r=0.407), carbohydrates (r=0.395), and iron (r=0.493). These results demonstrate the positive correlation between overeating and obesity.

In conclusion, our findings indicate low prevalence of obesity among university female students. This is an unexpected result as several studies in the region showed that the prevalence of obesity is high among females (Musaiger, 1987; Al-Awadi and Amine, 1989). However, the main reason for this difference is the age distribution as the female subjects studied are younger than those reported in previous studies. Our data is comparable with that reported by Musaiger et al (1993) as they found that 17% of female secondary students in Bahrain were obese (BMI > 25). Interestingly, 58% of female studied were underweight. It is important, therefore, not only to focus on overweight in this community but also on underweight.

TABLE 1

Distribution of female students according to their Body Mass Index

Body Mass Index	No.	Percentage
> 20	266	57.8
20 - 24.9	98	21.3
25 - 29.9	40	8.7
30 and above	56	12.2
Total	460	100.0

TABLE 2

Comparison of studies on obesity among Saudi female population in the Kingdom of Saudi Arabia

Study	Age	Men age Yrs	Percentage ideal weight BMI < 25	Percetage over-weight BMI <25-29.9	Percentage moderate obese BMI 30-40	Percentage morbid obese BMI>40
Khwaja and Sibai 1987 n = 467	15-49	32	46.0	27.0	27.0	--
Binherd et al., 1991 n = 206	18-77	26	53.4	25.2	20.4	1.0
Al-Shammari et al., 1993 n = 1385	20-44	32	26.0	26.8	41.9	5.1
Present Study 1993 n = 460	18-25	21	21.3	8.7	12.2	--

TABLE 3

Distribution of obese female students according to their age

Age (Years)	Obese (BMI > 30)	
	No.	Percentage
< 20	5	8.9
20 - 24	14	25.0
25 and over	37	66.1
Total	56	100.0

TABLE 4

Pearson correlation between socio-economical status and personal characteristics of female students with obesity

Independent Variables	Obesity R
Age	0.144*
Housing region	0.044
Type of house holding	0.011
Type of the housing	0.014
Social status	0.142*
Credit hours	0.050
Economic status	0.023
Father's or husband's education	0.008
Father's or husband's occupation	0.039
Mother's education	0.019
Mother's occupation	0.020

* Significant at 0.01 level

TABLE 5

Correlation between female students' daily dietary intakes of energy and nutrientswith obesity

Independent variables	Obesity R
Energy	0.508 **
Fats	0.407 **
Carbohydrates	0.395 **
Protein	0.100 *
Iron	0.493 **
Vitamin A	0.067
Vitamin C	0.078

* Significant at 0.05 level

** Significant at 0.01 level

Factors associated with overweight as well as underweight among both female and male students should be studied carefully in order to establish a well designed preventive programme. We hope that this study provide some baseline information on social and dietary factors affecting nutritional status of university female students.

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SOME SOCIAL AND DIETARY FACTORS ASSOCIATED WITH OBESITY AMONG ADULTS IN EGYPT

A.O. DARWISH, E.K. AMINE, A.K. AMINE, M.E.EL-PRINCE, M.H. KHALIL, A.A. SARHAN AND H. E. ALI*

*Nutrition Department, High Institute of Public Health, University of Alexandria and *Nutrition Institute, Cairo. Egypt.*

ABSTRACT

A sample of 146 obese adults was matched with 183 non-obese adults to study the association of some social and dietary factors with occurrence of obesity. Triceps skinfold was used as a criterion for obesity among adults. There was no significant differences between obese and non-obese adults in the perception of obesity and knowledge towards causes of obesity. Significant differences were observed in eating while watching television ($p = 0.0002$) and cigarette smoking ($p = 0.03$). Obese adults were more likely to eat while watching television and not to smoke. Numbers of meals per day and eating outside home were not significantly associated with obesity. Among married females, age at marriage and number of pregnancies were significantly associated with occurrence of obesity ($p = 0.03$ and $p = 0.02$, respectively). Further in depth studies on factors affecting obesity among both children and adult are highly recommended.

Key Words : Obesity, social factors, dietary habits, Egypt

INTRODUCTION

In recent years obesity has become a public health problem of considerable importance. According to WHO (1990) obesity is becoming a universal problem in both affluent and less privileged population groups. Its occurrence reflects the interaction of dietary and other environmental factors. Potential contributing factors to obesity include sedentary life style, hereditability and higher energy intake, particularly excessive dietary fat. Earlier menarche, and earlier age at first child birth may be additional factors (Bruke et al. 1992). The problematic health aspect of obesity is due to its association with chronic disease. Obesity is strongly related to non-insulin dependent diabetes, which is a risk factor for coronary heart disease, other conditions associated with obesity include, hypertension, hyperlipidemia, respiratory disease and gall bladder disease. In the female, obesity may be a contributing factor to toxemia of pregnancy, osteo-arthritis, ovarian dysfunction and breast cancer (WHO, 1985). In the United States, the National Heart, Lung and Blood Institute Growth and Health study group (NHLBI.

1992) reported that race may be a possible etiological factor in obesity. They provided evidence that black young girls are more prone to obesity and hypertension compared to white girls.

This paper presents data concerning the potential correlates of obesity, namely dieting behaviour, some aspects of life style, knowledge and attitudes about obesity and reproductive history, obtained from adults of both sexes in Egypt.

METHODS

The adult involved in this study were 600 subjects of both sexes representing 10% of the employees of Alexandria University. Body measurements including height (cm) weight (kg) and triceps skinfold thickness (mm) were taken by trained researchers. A reference standard based on weight for height by age and sex was used (Jelliffe, 1966). Adults were screened for being overweight. Overweight individuals, were further screened for fatness taking the minimum level of obesity at triceps skinfold measurement > 23 mm for adult males and > 29 mm for adult females (Seltzer and Mayer 1965).

Of the total sample 146 (24.3%) were diagnosed as obese (16.4% males and 30.8% females). These subjects were matched with 183 non-obese adults having similar socio-economic backgrounds. The non-obese adults were selected from the same sample.

Adults were interviewed by nutritionists using a pretested questionnaire. Information was obtained from these subjects concerning knowledge about the cause of obesity, meal patterns, number of pregnancies of the mother and life style.

RESULTS

An appreciable proportion of the obese of both sexes did not perceive themselves as obese. Of these males, 59% considered themselves as obese compared to 55% among females (Table 1). The difference was not statistically significant.

Both obese and non-obese adults relate obesity to over-eating and lack of physical exercise. Heredity, pregnancy and psychological factors were also reported as causes of obesity. In addition, about one fifth of adults did not know the cause (Table 2). However, the difference was not statistically significant (p = 0.3).

The age at marriage (above or below 20 years) and the number of pregnancies by obese and non-obese females is shown in Table 3. A higher percentage of the obese females were married at a younger

TABLE 1
Perception of body image by obese adults in Egypt.

Body image	Obese males		Obese females		Both	
	No.	%	No.	%	No.	%
Perceived as obese	26	59.0	56	54.9	82	56.2
Perceived as not obese	18	41.0	46	45.1	64	43.8
Total	44	100.0	102	100.0	146	100.0

$X^2 = 0.22$, p = 0.7

TABLE 2
Knowledge about the causes of obesity of obese and non-obese adults

Causes of obese	Obese		Non-obese	
	No.	%	No.	%
Over-eating	79	54.1	115	62.8
Lack of physical exercise	17	11.7	13	7.1
Pregnancy and heredity	9	6.1	6	3.3
Psychological	8	5.5	8	4.4
Do not know	33	22.6	41	22.4
Total	146	100.0	183	100.0

$X^2 = 4.6$, $p = 0.3$

TABLE 3
Age at marriage and number of pregnancies of obese and non-obese
married females

Factor	Obese		Non-obese	
	No.	%	No.	%
Age at marriage*				
< 20 years	28	33.7	4	12.9
20 + years	55	66.3	27	87.1
No. of pregnancies**				
< 2	35	42.2	21	67.7
3 +	48	57.8	10	32.3
Total	83	100.0	31	100.0

* $X^2 = 4.81$, p = 0.03

** $X^2 = 5.8$, p = 0.02

age when compared to the non-obese. The difference was statistically significant (p = 0.03). Obese females experienced more pregnancies than the non-obese, and the difference was statistically significant (p = 0.02).

Questions concerning the number of meals per day indicates that the obese consume more frequent meals than the non-obese (37% compared to 34%), but the difference was not statistically different (p = 0.6). Eating outside the home was not a major part of their life-style by either obese and non-obese individuals (Table 4). A higher proportion of the obese eat while watching television (49% vs 18%), sleep after the lunch (61% vs 52%) and do not smoke (75% vs 64%). The differences were statistically significant for watching television (p=0.0002) and cigarette smoking (p = 0.03) (Table 5).

DISCUSSION

The etiological factors of obesity are complicated and seldom occur in isolation, but they all lead to increased storage of fat in the body. The prevalence of self-perceived obesity and dieting to lose weight differ depending on the situational and cultural contexts. What is considered normal body weight shows wide variations in different cultures. The perception of normal body weight in the Egyptian culture is based on having a plump and well-endowed body, hence obese individuals, particularly females, do not perceive themselves as obese.

Although it is a common knowledge to most obese as well as to the non-obese that obesity is caused by excessive intake of food compared to requirements yet a good number of the obese individuals do not watch their diet. Many of the obese individuals among the studied group associated eating with television watching and habitually fell asleep following the main meal in the afternoon. This may indicate that obese individuals consumed more energy than their non-obese peers. Furthermore, their energy expenditure was lower thus leading to increased fat storage in the body. However, such conclusion need further investigation.

Studies of twins show close correlation between the weight of identical twins even when they are reared in different environments. The environmental component plays an effective role in influencing the existence of obesity. The common family environment determines obesity in the family through the socio-economic and food habits, levels of energy intake and energy output and the total cultural context (Foster & Anderson, 1978).

The earlier onset of maturation of obese girls may have a role in the earlier age at marriage and the higher number of pregnancies.

TABLE 4
Meal patterns of obese and non-obese adults

Meal patterns	Obese		Non-obese	
	No.	%	No.	%
Number of meals/day*				
2-3	92	63.0	120	65.6
4 +	54	37.0	63	34.4
Eating outside home**				
Usually	20	13.7	22	12.0
Occasionally	87	59.6	112	61.2
Never	39	26.7	49	26.8
Total	146	100.0	183	100.0

* $X^2 = 0.23$, p = 0.6

** $X^2 = 0.21$, p = 0.9

TABLE 5
Some aspects of life-style of obese and non-obese adults

Patterns of lifestyle	Obese		Non-obese	
	No.	%	No.	%
Eat while watching T.V.*				
Eat more while watching	72	49.3	58	31.7
Do not eat more	28	19.2	72	39.3
No response	46	31.5	53	29.0
Sleeping after lunch**				
Sleep	89	61.0	95	51.9
Do not sleep	57	39.0	88	48.1
Cigarette smoking***				
Smoker	36	24.7	66	36.1
Non-smoker	110	75.3	117	63.9
Total	146	100.0	183	100.0

* $X^2 = 17.4$, p = 0.0002

** $X^2 = 2.7$, p = 0.1

*** $X^2 = 4.9$, p = 0.03

It has been suggested by some investigators that childbirth at a younger age and rearing children are determinants of obesity (Garn et al. 1986). Early marriage and early childbirth may contribute to an altered life-style among obese females. It may reduce their physical activity levels, decrease the likelihood of weight loss after childbirth and facilitate weight gain.

In conclusion, this preliminary study indicates that changes in lifestyle among Egyptian population may have a main role in prevalence of obesity. Lack of sound information on the causes as well as methods of prevention and managementof obesity may also contributed to the occurrence of obesity in this community. Further studies on factors associated with obesity among adults and children are urgently needed.

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وقائع حلقة العمــل حــول

التغذية والأمراض المزمنة
في دول شرق الأوسط العربية

(١٠ - ١٢ أبريل ١٩٩٤)

العين ـ دولة الإمارات العربية المتحدة

تحـــريـــر

الدكتور : بيتر بيليث
قسم التغذية
كلية الصحة العامة
جامعة ماساشيوتس ـ أميرست
الولايات المتحدة الأمريكية

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قسم علوم الغذاء والتغذية
كلية العلوم الزراعية
جامعة الإمارات العربية المتحدة ـ العين

و

الهيني، حاتم عيسى وخالد عبدالعزيز السعودي. ١٩٨٥. دراسة لبعض صفات ومكونات الدم في أعمار مختلفة للدجاج المحلي واللكهورن والنيوهامبشير. مجلة البحوث الزراعية والموارد المائية. المجلد ٤ صفحات ١٠-١٧.

وفي حالة وجود أكثر من مرجع في نفس السنة لنفس المؤلفين يتم ترتيبها والإشارة إليها بحروف أ، ب، جـ، ... الخ طبقاً لترتيب ذكرها في المقال وبالنسبة لطريقة كتابة كل مرجع يذكر اسم العائلة لكل مؤلف متبوعاً ببقية الاسم ثم يذكر أسماء بقية المؤلفين كما هي ويلي ذلك ذكر سنة النشر. ثم عنوان المقال ثم اسم المرجع سواء أكان دورية علمية، أم كتاب، أم عجالة... الخ ويذكر رقم المجلد وأرقام صفحات المقال. وفيما عدا المراجع المنشورة أساساً باللغة العربية في المقالات المقدمة باللغة العربية فإنه يجب كتابة عنوان المراجع باللغة الانجليزية وفي حالة المراجع المكتوبة بغير العربية أو الانجليزية يتم ترجمة العنوان إلى اللغة الانجليزية مع الإشارة إلى أن ذلك هو «عنوان مترجم».

وعند استخدام مراجع عربية وغير عربية معاً في نفس قائمة المراجع فإنه يجب ذكر المراجع المكتوبة بنفس لغة المقال أولا ثم يلي ذلك المراجع المكتوبة باللغة الأخرى.

٨ ـ نسخ المقال :

يحصل المؤلف مجاناً على ٢٥ نسخة من المقال المطبوع وعند الحاجة لعدد أكبر فيمكن شراؤه بالكتابة إلى هيئة التحرير.

نموذج للمراجع المنشورة باللغة العربية :

عثمان ، فاضل رشيد . ١٩٨١ ، دراسة عنصر الفسفور وجاهزيته في بعض ترب شمال العراق، أطروحة ماجستير، كلية الزراعة والغابات. جامعة الموصل.

الغيطاني ، محمد يسري . ١٩٦٧ . الزهور ونباتات الزينة وتنسيق الحدائق، الطبعة الأولى، دار المعارف مصر، ٤٧٩ صفحة.

الراوي ، خاشع محمود وعبدالعزيز خلف الله ، ١٩٨٠ ، تصميم وتحليل التجارب الزراعية، مؤسسة دار الكتاب للطباعة والنشر، جامعة الموصل . ٣٤٠ صفحة .

تشمل رزوس الجداول على وحدات القياس مذكورة تبعاً لطريقة اختصارها الدولية وتوضيع هذه الإختصارات بين أقواس ، ويشار إلى التذاييل بأحرف هجائية توضع في المكان المناسب .

٥ ـ الرسوم التوضيحية والتصوير :

يجب أن ترفق منفصلة دون لصقها على أية أوراق ودون ثنيها . ويتم ترقيم الرسوم أو الصور تباعاً طبقاً لترتيب ذكرها داخل المقال، ويحسن استخدام الحبر الهندي في عمل هذه الرسوم ليعطي وضوحاً أفضل. ويمكن استخدام الحبر الهندي أو الأرقام الجاهزة القابلة للصق في كتابة الأرقام. هذا وتقبل الرسوم التي يتم طبعها باستخدام أجهزة الحاسب الالي بشرط جودة طباعتها ووضوحها . تكتب عناوين الأشكال على صفحة مستقلة وبتفصيل كامل لفهم الشكل دون الرجوع إلى بقية المقال ويجب ألا يزيد حجم الشكل أو الصورة عن حجم صفحة A4 .

٦ ـ الإشارة للمراجع :

يجب عند الإشارة لأي مرجع داخل المقال استخدام اسم العائلة للمؤلف (دون ذكر الأحرف الأولى للاسم، والسنة التي نشر فيها المرجع. وفي حالة الإشارة إلى مرجع قام بتأليفه أكثر من شخصين يكتفي بذكر اسم المؤلف الأول ويضاف إليه كلمة (وآخرون) ثم يذكر السنة التي نشر فيها المقال وينطبق ذلك نفط على الإشارة للمراجع في متن المقال ولا يجوز استخدام هذه الطريقة في قائمة المراجع.

٧ ـ قائمة المراجع :

يتم ترتيب المراجع أبجدياً حسب اسم عائلة المؤلف الأول بكل مرجع. وفي حالة وجود أكثر من مرجع لنفس المؤلف أو نفس المؤلفين يتم ترتيبها حسب تاريخ النشر.

ج

مائة حرف ويلي العنوان وتحته مباشرة يذكر أسماء المؤلفين وجهات عملهم وعناوينهم.

ويجب أن يحتوي المقال على المكونات الرئيسة التالية :

(أ) ملخص : يجب أن يكون مركزاً وواضحاً ومحتوياً على أهداف البحث وتوصيفه وأهم النتائج ويجب ألا يزيد طول الملخص عن ٢٥٠ كلمة ويكون متبوعاً بعدد من الكلمات المفتاحية بما لا يزيد عن ست كلمات يتم ترتيبها أبجدياً.

(ب) مقدمة : تعكس خلفية البحث وهدف إجرائه .

(ج) مواد وطرق البحث .

(د) النتائج والمناقشة واللتان يمكن جمعهما معاً أو فصلهما إلى قسمين منفصلين.

(هـ) المراجع : طبقاً لنظام كتابتها الوارد في هذا الدليل .

(و) ملخص ثان يتم تقديمه باللغة الإنجليزية عند كتابة المقال باللغة العربية .

يمكن إضافة تذاييل للجداول بينما يكون ذلك غير مسموح به في بقية المقال. كما يمكن نشر مقالات موجزة وكذلك مقالات مراجعة Literature review (استعراض للبحوث السابقة) ولا يرتبط أي منها بالضرورة بأقسام المقال السابقة الذكر.

ويجب ألا يتعدى طول المقال الأصلي أو مقال المراجعة عن عشرين صفحة مطبوعة على مسافتين بينما يجب ألا تتعدى المقالات الموجزة خمس صفحات.

٤ ـ الجداول :

يجب تصميم الجداول بحيث لا تتعدى أي منها حجم صفحة مقاس A4 ويجب طباعة كل جدول في صفحة منفصلة وترقيم الجداول حسب ترتيب ذكرها في المقال .

ويجب أن يحوي كل جدول على عنوان مختصر يصف محتوياته كما يجب أن

قواعد النشر في مجلة الإمارات للعلوم الزراعية.

ا ـ تقديم المقالات :

يقدم أصل المقال ونسختين منه إلى رئيس التحرير:

أ.د. نهاد يوسف داغر
عميد كلية العلوم الزراعية
جامعة الإمارات العربية المتحدة
ص.ب : ١٧٥٥٥ ـ العين
الإمارات العربية المتحدة

أو إلى مدير التحرير الاستاذ الدكتور / فيصل خضر طه، على نفس العنوان السابق ويشترط أن يكون المقال المقدم أصيلاً ولم يتم نشره أو تقديمه للنشر في أي مكان آخر.

٢ ـ لغة المجلة :

يمكن نشر المقالات باللغة الانجليزية أو العربية على أن يرفق مع كل بحث ملخصان أحدهما بالعربية والآخر بالانجليزية . وفي حالة تقديم مقالات من قبل مؤلفين غير عرب فسيقوم المحررون بإعداد ملخص باللغة العربية إذا لم يتم تقديمه من قبل المؤلفين.

٣ ـ إعداد المقال :

يجب أن يكتب المقال بلغة سليمة واضحة وموجزة وذلك على أوراق مقاس A4 وعلى مسافتين بين الأسطر مع ترك هامش في حدود ٢.٥ سم.

يجب ترقيم جميع صفحات المقال بما فيها صفحة العنوان وصفحات المراجع والجداول وذلك في الركن الأيمن العلوي من كل صفحة. تبدأ الصفحة الأولى للمقال بالعنوان مكتوباً في وسط الصفحة ويجب ألا يزيد طول عنوان المقال عن

<center>أ</center>

بسم الله الرحمن الرحيم

مجلة الإمارات للعلوم الزراعية

(عـــدد خــاص)

مجلة علمية مُحكَمة تصدرها
كلية العلوم الزراعية
جامعة الإمارات العربية المتحدة