

Nutrition-related chronic diseases Epidemic in UAE: can we stand to STOP it?

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Abstract

By the year 2020, Non-communicable diseases (NCDs) are expected to account for seven out of every ten deaths in the developing regions, compared with less than half today. Research has already shown that NCDs have their roots in unhealthy lifestyles or adverse physical and social environments. Risk factors like unhealthy nutrition over a prolonged period, smoking, physical inactivity, excessive use of alcohol, and psychological stress are among the major lifestyle issues.

The current epidemiological profile of population health in UAE and consequently health care needs for the country are characterized by a double burden of disease and causes of ill health. In UAE about 77.5% of males and 75.7% of females eat less than 5 fruit and vegetable servings per day. Physical inactivity prevalence almost reached 37.9% among males and 56.7% among females. About 38.4% of youth (13 – 15 year) males and 42.6% of females spent 3 or more hours per day sitting. The result of this combination is high prevalence of obesity, overweight and related diseases.

The prevalence of obesity and overweight in UAE (BMI > 30) reaches 25.6% among males and 39.9% among females. The WHO estimates that obesity prevalence will reach 44.6% among females by the year 2015. Dislipidaemia is prevalent and Diabetes Mellitus is increasing in the population reaching a prevalence rate of 24%. The overall prevalence of Hypertension is found to be 31.6% among adult Emirates nationals.

International and regional experiences demonstrate practical approach for health promotion and NCDs prevention. The comprehensive integrated community-based intervention program for non-communicable diseases (NCDs) prevention and health promotion are successful in addressing diet-related diseases. The key interventions must address primary, secondary, and tertiary prevention levels.

INTRODUCTION

The world has traditionally focused on the vast magnitude of the many forms of nutritional deficiency, along with their associated mortality and morbidity in infants, young children and mothers. However, the world is also seeing a dramatic increase in other forms of malnutrition characterized by obesity and the long-term implications of unbalanced dietary and lifestyle practices that result in chronic diseases such as cardiovascular disease (CVD), cancer and diabetes.

All forms of malnutrition's broad spectrum are associated with significant morbidity, mortality, and economic costs, particularly in countries where both under- and over nutrition co-exist as is the case in developing countries undergoing rapid transition in nutrition and lifestyle.

Diet and nutrition are important factors in the promotion and maintenance of good health throughout the entire life course. Their role as determinants of chronic NCDs is well established and they therefore occupy a prominent position in prevention activities ^[1].

The latest scientific evidence on the nature and strength of the links between diet and chronic diseases is examined and discussed in detail in the Joint WHO/FAO Expert Consultation on Diet, Nutrition and the Prevention of Chronic Diseases report. The report gives an overall view of the current situation and trends in chronic diseases at the global level. The chronic diseases considered in the report are those related to diet and nutrition and present the greatest public health burden, either in terms of direct cost to society and government, or in terms of disability adjusted life years (DALYs). These include obesity, diabetes, (CVD), osteoporosis and dental diseases [2].

Global and regional burden of NCDs

The burden of chronic diseases is rapidly increasing worldwide. It has been calculated that, in 2001, chronic diseases contributed approximately 60% of the 56.5 million total reported deaths in the world and approximately 46% of the global burden of disease. The proportion of the burden of NCDs is expected to increase to 57% by 2020. Almost half of the total chronic disease deaths are attributable to CVD); obesity and diabetes are also showing worrying trends, not only because they already affect a large proportion of the population, but also because they have started to appear earlier in life [2, 3].

Non-communicable diseases have become a major health problem not just in developed countries but also in developing countries. Already 79% of the deaths attributed to non-communicable diseases occur in developing countries. The rising trends are a consequence of the demographic and dietary transition, and the globalization of economic processes. Scientific evidence shows that unhealthy diet and physical inactivity as well as tobacco use, recently highlighted in the World Health Report 2002, are major global determinants of non-communicable diseases [3].

Concurrent with epidemiological, dietary and nutrition transitions, including change in physical activity pattern, a demographic shift occurs, yielding longer life expectancy and reduced fertility. This change is associated with an increase in the proportion of deaths occurring in older people. However, the emergence of NCDs as important causes of morbidity and mortality is not only due to reductions in infectious disease

mortality and population ageing; it is also due to real increases in the age-specific incidence and mortality of several non-communicable conditions [4].

Currently, 45% of the Eastern Mediterranean region's disease burden is due to non-communicable diseases. It is expected that this burden will rise to 60% by the year 2020. The impact of these conditions falls heavily on the region's poor and marginalized populations [3]. In many countries of the Eastern Mediterranean Region (EMR), the health aspect of the epidemiological transition is already much further advanced than many health policy-makers have realized. Although health officials and the medical profession have a general awareness of the increasing occurrence of NCDs, the problem has, in general, not received the attention it deserves and its extent has not been sufficiently examined. Awareness among the general population of the adverse health consequences of the new behavior and lifestyles is likewise inadequate, largely because of the long delay between cause and effect, people tend to misjudge the hazards of these lifestyles [5].

When considering the prevalence of multiple risk factors, however, it was found that, of an adult population of 300 million in EMR, 60% had at least 1 risk factor and 8% had 6 risk factors. A sizeable proportion of the population is at risk since 30 million people have 4 risk factors, 36 million have 5 risk factors and 24 million have 6 risk factors [6]. The emerging new disease profile will lay a heavy burden on governments in many less industrialized countries. The management of NCDs is extremely costly. Population based prevention is a more efficient solution to tackle the problem. Many countries cannot afford expensive medications and heart surgeries. In addition, there will be the cost of lost workdays and disability. This concern is economically relevant because NCDs usually affect the most productive part of the population [7].

Common risk factors of chronic diseases

Risk is defined as "a probability of an adverse outcome, or a factor that raises this probability" [3]. People everywhere have exposed all their lives to an almost limitless array of risks to their health, whether in the shape of communicable or non-

communicable disease, injury, consumer products, violence or natural catastrophe. Sometimes whole populations are in danger, at other times only an individual is involved. Most risks cluster themselves around the poor. No risk occurs in isolation: many have their roots in complex chains of events spanning long periods of time. Each has its cause, and some have many causes. The common risk factors for chronic diseases are; unhealthy diet, physical inactivity, tobacco use and stress.

Strong evidence shows that an unhealthy diet and insufficient physical activity are among the major causal factors in coronary heart disease, cerebrovascular strokes, several forms of cancer, type 2 diabetes, hypertension, obesity, osteoporosis, dental caries, and other conditions. Consumption of vegetables, fruits, the amount and quality of fat ingested, and the intake of salt are the most important elements of the dietary prevention of both (CVD) and cancers. Maintaining normal weight and adequate physical activity throughout the life span are the most effective ways of preventing diabetes and many other chronic diseases [8].

Studies have revealed that there is a consistent relationship between unhealthy diet and the emergence of a range of chronic non-infectious diseases – including coronary heart disease, cerebro-vascular disease, various cancers, diabetes mellitus, dental caries, and various bone and joint diseases. But it is not only the adult lifestyle that determines the risk level of chronic diseases. Diet and nutrition throughout the life cycle affects the later health outcomes [7].

The role of nutrition in epidemiological transition

Many factors are enhancing the dietary and nutrition transitions. The key factors include: changes in the diet composition, urbanization, and eating away from home phenomenon.

Changes in the composition of diet: Economic development together with recent technological innovations and modern marketing techniques have modified dietary preferences, and consequently led to major changes in the composition of diet. There was a shift towards high fat, refined carbohydrate and low-fibre diet.

The shift in diet that took place within 100-200 years in the West occurred within a few decades in the developing world.

The accelerating factors for the rapid transition include globalization, for example exposure to the global mass media, shift in occupational structure including the trend from labour-intensive occupations and leisure time activities toward more capital-intensive, less strenuous work and leisure. This transition is accelerated by a high urbanization rate, which is usually accompanied by decreased physical activity level, and increased overweight and obesity.

Urbanization and diet: Urbanization is an example of social change that has a remarkable effect on diet in the developing world. Urbanization independently leads to increased consumption of new types of grains, e.g. rice or wheat, rather than corn or millet, and more milled and polished grains. Ready-made bread is an example of food that is easily accessible from stores and street vendors and that is replacing traditional staples in many economically developing societies, especially in urban environments. Increased consumption of fats, including saturated and trans fatty acids, and cheap vegetable oils that are more available due to globalization, makes urban people more vulnerable to some nutritional disorders. Also salt and simple sugar intake will increase at the same time.

Meals away from home: It is becoming more common to eat meals away from home or to eat prepared meals (take-away or from grocery stores). Eating away from home is common not only among low-income people. Western fast foods are becoming popular among the higher socioeconomic groups in the less industrialized countries. The researchers also noticed that the younger age groups especially favoured eating these foods [4, 7].

The current situation of NCDs and their risk factors in UAE

The current epidemiological profile of population health in UAE and consequently health care needs for the country are characterized by a double burden of disease and causes of ill health.

Social and economic advances in UAE following the union in 1972 have been accompanied by cultural changes, a reduction in the prevalence of communicable diseases, increased life expectancy, changes in nutritional habits and those related to physical activity and increased prevalence of non-communicable diseases. Environmental and behavioural changes such as the adoption of new dietary habits and a sedentary lifestyle, and the stress of urbanization and of working conditions have all contributed to the rise in NCDs (CVD) risk factors.

The total population of UAE is estimated to be 4,104,695 of which 824,921 are UAE citizens (20.1%). Nearly 51.1% of UAE citizens are younger than 20 years, 38.1% are less than 14 years old and only 3.9% are older than 60 years [9]. Even though this is a young community the prevalence of NCDs and their risk factors are very high.

Some efforts are exerted for control and prevention of NCDs, but among the problems inhibiting the implementation of NCDs programmes are the lack of risk factor surveillance, the non-harmonization of monitoring and surveillance methodologies, and the lack of reliable mortality data. Very limited data is available regarding NCDs and risk factors in UAE. The main sources are the World Health Survey, Global School-based Student Health Survey (GSHS), Global Youth Tobacco Survey (GYTS), National Family Health Study and a small number of national and sub-national studies [10].

Diet

The trend of fruit and vegetable consumption is decreasing. Less people ate sufficient fruits and vegetables in 2003 compared to 1993. Musaiger AO in 1993 found that the prevalence of daily fruit intake was 46.0% among males and 52.0% among females and the prevalence of daily vegetable intake was 60.0% among males and 65.0% among females, while in 2003, 77.5% of males and 75.7% of females in the Emirates eat less than 5 fruit and vegetable servings per day [11, 12].

Physical inactivity

Information on physical activity/energy expenditure of a population can be reported as a

median or mean value, e. g. mean hours of activity per week, or median MET-minutes per week.

MET means metabolic equivalent, and is used to describe the intensity of activities. One MET is defined as the energy spent sitting quietly (equivalent to (4.184kJ) per kg per hour), while e. g. moderate activity corresponds to 3-6 METs, and vigorous activity to >6 METs. In 2003, the median MET-minutes per week were 1,362.9 for males and 594.0 for females in urban areas compared to 693.0 for males and 198.0 for females in rural areas [12]. Physical inactivity is increasing rapidly in UAE, in 1996 about 35.8% of males were physically inactive, while this proportion increased to reach 37.9% for males and 56.7% for females in 2003 [12, 13].

An alarming sign is that 38.4% of youth (13 – 15 year) males and 42.6% of females spent 3 or more hours per day sitting. The recommendation of WHO and CDC that TV watching and sitting time must not exceed 2 hours per day [14].

Obesity and overweight

The prevalence of obesity and overweight (BMI > 30) was 25.6% among males and 39.9% among females in 2000 [15]. The WHO age-standardized estimates for BMI ≥ 30 kg/m² for ages 15-100 years is 24.5% for males and 39.4% for females, WHO estimates that the obesity prevalence will reach 44.6% among females by the year 2015 in UAE [16]. Almost about a third (33.1%) of youth weight is ≥ 85 th percentile for age/sex group [14]. The wide spread of physical inactivity and high energy foods and drinks increase childhood obesity to an epidemic level. One in each of five (21.5%) children is suffering from overweight and 13.7% of children were obese [17].

Tobacco use

In 1995, the National Family Health Study showed that the prevalence of daily user of cigarette reaches 18.3% among males and 0.4% among females [18]. The prevalence of current user of cigarette reached 28.1% among adult males and 2.4% among females in 2003 [12]. The prevalence of tobacco use among youth (13 – 15 year) is showing a dramatic increase especially among females. The prevalence of current user of cigarette increased from 12.7% to 14.3% among

males in the period 2002 – 2005. Also the prevalence of current user of tobacco other than cigarettes almost doubled in the same period (from 9.8% to 17.8%) [19,20]. See table (2)

GYTS results	GYTS 2002			GYTS 2005		
	M	F	T	M	F	T
Prevalence of current user of cigarette *	12.7	3.5	8.0	14.3	2.9	8.9
Prevalence of current user of tobacco other than cigarettes**	15.2	4.5	9.8	22.8	11.2	17.8
Prevalence of current user of all tobacco ***	-	-	-	29.7	12.6	21.9

Table (1): Tobacco use among youth in UAE, 2002 – 2005

*smoked on one or more days during the past 30 days

**used tobacco on one or more days during the past 30 days

***used ≥ 1 occasion on the 30 days preceding the survey

Source: WHO/CDC, Global Youth Tobacco Survey (GYTS) United Arab Emirates Report 2002, 2005.

Hypercholesterolemia

Cholesterol is a fat-like (lipid) substance found in the blood, bodily organs and also in nerve fibers. There are different types of cholesterol (high and low density lipoproteins) with different functions but most of the available population-level data are for total cholesterol expressed in millimoles per liter (mm/l) of blood.

In a sample of 67 office-based men aged 35 – 49 years for screening of CHD risk factors the mean total cholesterol was found to be 5.9 mmol/l [13].

In a preliminary study to explore the relevance of cholesterol screening in the United Arab Emirates, 835 volunteers were recruited at public sites. Almost 18.1% of males and 15.1% of females were found to have Hypercholesterolemia (total cholesterol ≥ 6.2 mmol/l (240 mg/dl) [21].

Diabetes Mellitus

The prevalence of Diabetes Mellitus in UAE is considered among the highest in the world. The trend is escalated from around 5.5% in 1990 to 24% in 2001 [13, 22, 23]. The mean fasting blood glucose level 106.8 (mg/dl) for males and 107.7 (mg/dl) for females [15].

High Blood pressure

There is a number of disease outcomes associated with raised blood pressure. These include: stroke, ischemic heart disease, renal disease and hypertensive disease.

The mean SBP was 124.0 mmHg among males and 116.2 mmHg among females [15]. The overall prevalence of hypertension is found to be 31.6% among adult Emirates nationals [24].

Causes of death in UAE

Neoplasm and some chronic diseases were causing 42.57% of deaths in UAE. Malignant neoplasm and Leukaemia were responsible for 11.6% of deaths and chronic diseases were responsible for 30.98% of deaths in 2005, see table (2) [10]

Diet-related chronic diseases Epidemic: can we stand to STOP it?

Can we stand to stop the epidemic? The answer is yes, because international and regional experiences demonstrate practical approach for health promotion and NCDs prevention. The comprehensive integrated community-based intervention programs for non-communicable diseases (NCDs) prevention and health promotion are successful in addressing diet-related diseases.

Research has already shown that non-communicable diseases have their roots in unhealthy lifestyles or adverse physical and social environments. Risk factors like unhealthy nutrition over a prolonged period, smoking, physical inactivity, excessive use of alcohol, and psychological stress are among the major lifestyle issues. While there is firm knowledge on "what should be done?" for the prevention of these diseases, the key question at present is "How should it be done?". How can our existing

knowledge on non-communicable diseases best be applied for effective prevention in real-life situations? Carefully planned community programmes are an important component of comprehensive integrated non-communicable diseases (NCDs) prevention and health promotion strategy that will help solve this problem [25]. The causes of NCDs are complex and the response needs to be multi-faceted and multi-institutional. The evidence is overwhelming that prevention is possible when sustained actions are directed both at individuals and families, as well as the broader social, economic and cultural determinants of NCDs [8]. The benefits of behavioural interventions in reducing the rates of CVD, cancers and diabetes in populations have been well-proven in countries such as Finland, South Korea, Japan, Singapore, Mauritius, and Iran.

As the examples from South Korea and Finland show, innovative approaches that take into consideration the local culture and conditions may provide useful tools in promoting healthy diet and healthy lifestyle in general [4]. In South Korea the trend of pursuing healthy foods already began in the mid 1980s when NCDs became a major health concern in South Korea. This trend reflects efforts to solve health problems by improving diet. The traditional Korean diet is low in fat and high in vegetables. Therefore the country has put a lot of effort to advertise and teach the public that the traditional Korean diet is healthy and that adoption of Western eating habits may have unfavourable effects. They are also working on the revival of the traditional diet using an approach that is acceptable to the contemporary Koreans, e.g. publishing traditional recipes with slight modifications [26].

The North Karelia Project that was carried out in Eastern Finland was able to produce favourable changes in diet, e.g. proportion of saturated fats was decreased while the proportion of unsaturated fats and vegetable consumption increased. Also salt intake decreased considerably [27, 28]. Mass media and community involvement together with changes in legislation and in environment were the main tools in this intervention which eventually influenced the dietary habits of the whole Finnish population. Pietinen et al. estimated that between 1972 and 1992 a major decrease in total serum cholesterol

(1 mmol/l on average) took place because of changes in the diet [28].

In 1987, the Ministry of Health in Mauritius launched a nationwide health promotion programme, the goal of which was the prevention of (CVD). During the nutrition policy and dietary education intervention in 1987-1992, a remarkable positive effect was observed in the diet and in the serum cholesterol level [29, 30].

In countries with high levels of literacy, strong school health programmes, media that emphasize the need for “healthy living” and “healthy policies” could make a significant contribution in educating the youth as well as the adult population. Community participation is essential in health promotion interventions to achieve the goals [31]. Globally, schools and community organizations like youth and women’s groups could play an important role in educating both young and adults on adverse effects of unhealthy diet and physical inactivity. For example, in Singapore [32] a school programme included health education for both teachers and students; in addition to more rigorous sport activities at school, environmental modifications like provision of water coolers, and reduction of sugar content of all drinks available in school were also part of the intervention. In a one-year period the programme was able to reduce overweight by 10% among the students.

Isfahan Healthy Heart Program (IHHP) is a comprehensive action-oriented integrated community-based intervention program for NCDs prevention and health promotion. The program was launched in late 1999. The communities of intervention were Isfahan and Najafabad (rural and urban areas) in central Iran, and the provincial city of Arak had been selected as the reference community. The aim of IHHP was to improve NCDs prevention and control and promote healthy lifestyle through healthy nutrition, tobacco control, physical activity and coping with stress. IHHP also aimed to assess the feasibility and impact of a comprehensive, community-based approach in a developing country setting. The results of the evaluation showed a positive impact on the intervention population. More people are physically active and using vegetable oil instead of hydrogenated oil. Tobacco use among adults and attempts to smoke among youth were reduced and the population

and health professionals' knowledge regarding risk factors were markedly improved in the intervention areas. The whole program demonstrates the feasibility of implementing comprehensive community-based intervention program for NCDs prevention and health promotion in the developing countries' context [33, 34].

But there is no "one size fit all". Each country has its unique characteristics in the aetiology of NCDs; not only in terms of the environment but also in terms of social, economic, and cultural influences. Therefore it is important to start with the problem assessment at the local level and get a good understanding of the surrounding community [25]. Research and surveillance are important supporting components of successful programmes that aim to modify health behaviour. Based on survey results and sound theoretical frameworks, new interventions can be developed.

To address this epidemic in UAE there is a need for developing national integrated NCDs prevention and control strategies and programmes, including community-based initiatives, surveillance and demonstration project.

In EMR there are three main strategies proposed to deal with the problem: estimate need and advocate for action; develop national policies, strategies and plans for prevention and care and capacity building; promote and implement community participation in prevention and care. NCDs are preventable using available knowledge; solutions are effective and highly cost-effective. There are four approaches to prevention:

Clinical prevention: interventions involving a health care provider and a recipient of care. Clinical prevention services are provided to individuals who may accept or decline the service or the recommended health actions. A physician counseling individual patients to quit smoking is an example of a clinical prevention activity.

Health protection: interventions that reduce health risks by changing the physical or social environment in which people live. Prohibiting smoking in public places is an example of a health protection intervention.

Health promotion: interventions that aim at encouraging individual behaviours believed to produce positive health effects and discouraging behaviour that produces negative health effects. Health promotion interventions frequently take the form of public information campaigns. A media-based anti-smoking campaign is an example of health promotion; taxation on tobacco products to reduce use is another tool.

Public health policy: social or economic interventions that affect health but do not have health as the main policy objective.

Preventive strategies need to focus on the population as a whole, or on the people identified as being at high risk of certain diseases. Thus, it is important to integrate a comprehensive approach to NCDs at the primary care level [6]. These issues must be covered with in the National comprehensive integrated NCDs prevention and control strategy. The components of the comprehensive integrated NCDs Prevention and Control Strategy should include:

1. Health services
2. Interventions on common risk factors
3. Surveillance and monitoring
4. Evaluation and Research [35].

These points are discussed below:

1. Health services

Actions within health services are essential elements of a comprehensive NCDs prevention and control strategy. Issues of cost-effectiveness are clearly of vital concern, and the goal is to bring about maximum control of NCDs through using the available resources in the national health system.

Cost-effective behavioural and pharmacological treatments for high blood pressure, diabetes and raised cholesterol have life-saving impacts and should be routinely implemented at the primary health care level. Dietary, physical activity and smoking cessation programmes should be integral to both the prevention and management of chronic diseases.

The principal objectives for an integrated health system should include:

- Population and high risk interventions. Successful interventions for NCDs prevention and control, such as those undertaken over many years in North Karelia, Finland, have been most successful when there has been active participation of the health services in addition to nationwide and community policies and actions.

- Primary, secondary and tertiary prevention. Public health should be everyone's concern, and must not be considered simply as the remit of public health practitioners. But those practitioners need to pay more attention to secondary and tertiary prevention as well. Health care managers should play a more prominent part in the public health agenda, and health practitioners, including specialists, should be more actively involved in the prevention agenda. There is no lack of readiness on the part of these practitioners, and many examples have shown that they can be effectively mobilized as opinion leaders to push the prevention issue on to the political agenda.

- Striking a balance between communicable diseases and non-communicable diseases. Clear opportunities exist for linking NCDs activities more closely to the funding streams in communicable diseases, particularly within the framework of primary health care. For example, outreach work to implement EPI activities can also be used for other lifestyle counseling; or messages aimed at alerting the public to tuberculosis can also build in messages against tobacco use.

- Patient, community and health care policies. All levels of care need to forge closer links with the patient and the consumer. This will require comprehensive systems models for NCDs prevention and control to move forward from a disease-oriented approach to a partnership, or collegial, approach, where the patient is at the centre of the action.

2. Interventions on common risk factors

Good health demands a "Life Course" approach to eating and physical activity that begins with pre-pregnancy, includes breast feeding, and extends to old age. Preventive health programs would have

better outcomes if public polices on taxation, trade, food, urban planning, and the like are evidence-based and set with due consideration of public health.

The NCDs Global Strategy targets the three risk factors of tobacco use, unhealthy diet and physical inactivity. Tobacco continues to be the most important risk factor for the individuals that use tobacco. A great many lessons have already been learnt in this field. Some success has been achieved through comprehensive, integrated, multi-level approaches, sustained over a period of time. Diet and physical activity have a major impact on population level. They operate not only on obesity but also on other intermediate risk factors such as hypertension and high cholesterol levels.

The integrated approach must be a partnership approach for planning, implementing and evaluating the interventions. This may require a strategic management structure at country level, such as those already in place in Brazil and Canada. The several dimensions of integration will involve an intersectoral approach, and joint action against the common risk factors along the continuum of promotion, prevention and care.

3. Surveillance and monitoring

Surveillance is a fundamental component of NCDs programme development, implementation and evaluation. The WHO step approach has proved successful among many regional networks. This is a simple and flexible tool which can provide useful baseline data as a basis for action and can serve as an entry point in NCDs prevention and control programmes.

4. Evaluation and Research

Establishment of a collaborative research initiative to evaluate the effectiveness of community-based NCDs interventions will document best practices for NCDs prevention and control policy, building on the lessons learned worldwide and updating available evidence in the future [35].

Conclusion and recommendations

Diet is going through a remarkable transition: staple foods are becoming more refined and processed, fat and meat intake is increasing, processed dairy products and other processed foods are consumed more than before, and larger numbers of meals are eaten outside home, making households more reliant on the food industry, food vendors and markets. The dietary transition is associated with the escalating trends of NCDs.

Agendas on non-communicable diseases are often left aside in the policy planning because the awareness is low among policy makers. However, NCDs are “silently” becoming a heavy burden in UAE. It is important to find cost-effective solutions to change unfavourable trends. Diet, together with physical activity, should get a major focus in public health policies in combating the emergence of NCDs.

Different national food and nutrition authorities should work together in searching for ideas about how to promote a healthy diet. Comprehensive national integrated NCDs prevention and control strategies and programmes, including community-based initiatives, health services re-orientation, surveillance and demonstration projects are crucial for successful control and prevention.

References

- Diet, nutrition, and the prevention of chronic diseases. Report of a WHO Study Group. Geneva, World Health Organization, 1990 (WHO Technical Report Series, No. 797).
- Joint WHO/FAO Expert Consultation on Diet, Nutrition and the Prevention of Chronic Diseases. Geneva, Switzerland, 2002.
- The world health report 2002: reducing risks, promoting healthy life. Geneva, World Health Organization, 2002.
- Globalization, diets and noncommunicable diseases. Geneva, World Health Organization, 2002.
- Ala'din Alwan. Noncommunicable diseases: a major challenge to public health in the Region. Eastern Mediterranean Health Journal 1997;3(1):6-16.
- O. Khatib. Noncommunicable diseases: risk factors and regional strategies for prevention and care. Eastern Mediterranean Health Journal 2004;10(6):778-788.
- Ulla Uusitalo, Pirjo Pietinen, Pekka Puska. Dietary Transition in Developing Countries: Challenges for Chronic Disease Prevention: In: Globalization, diets and noncommunicable diseases. World Health Organization 2002.
- World Health Organization. Global Strategy on Diet, Physical Activity and Health. Geneva. 2004.
- Ministry of Economy. United Arab Emirates. Preliminary Results of Population, Housing and Establishments Census. 2005.
- Ministry of health, United Arab Emirates, 2006. Annual statistical report 2005. Abu Dhabi, Planning Department.
- Musaiger AO, Abuirmeileh NM. Food consumption patterns of adults in the United Arab Emirates Journal of the Royal Society of Health, 1998, 118:146-150.
- World Health Organization, World Health Survey, United Arab Emirates, 2003.
- Pugh RN et al. Arabian Peninsula men tend to insulin resistance and cardiovascular risk seen in South Asians Tropical Medicine and International Health, 1998, 3:89-94.
- United Arab Emirates Global School-based Student Health Survey (GSHS) 2005 fact sheet, 2005.
- Malik M et al. Glucose intolerance and associated factors in the multi-ethnic population of the United Arab Emirates results of a national survey, 2003. <http://www.who.int/infobase>
- <http://www.who.int/infobase/repopr>
- M. Malik and A. Bakir. National Prevalence of Obesity: Prevalence of overweight and obesity among children in the United Arab Emirates Obesity Reviews. 2006;8(1):15-20.
- Ministry of Health. National Family Health Study. 1995.
- Abi Saab BH and Centers for Disease Control and Prevention (CDC). Global Youth Tobacco Survey (GYTS) United Arab Emirates Report 2002.
- Centers for Disease Control and Prevention (CDC). Global Youth Tobacco Survey (GYTS) United Arab Emirates Report 2005.
- Agarwal MM et al. Relevance of cholesterol screening in the United Arab Emirates. A preliminary study European Journal of Epidemiology 1995, 11:581-585.
- El Mugamer IT, et al. Diabetes, obesity and hypertension in urban and rural people of bedouin origin in the United Arab Emirates, 1995.
- Malik M, Bakir A, Abi Saab B, Roglic G, King H. Emirates National Diabetes and Coronary Artery Disease Risk Factors (Endcad) study: prevalence of diabetes, impaired fasting glucose, impaired glucose tolerance, hypertension and obesity in the multi-ethnic population of the United Arab Emirates. Diab. Res. Clin. Pract. 2005; 69:188-195.
- El-Shahat YM, Bakir SZ, Farjou N, Hashim T, BoHaliga A, Al-Hossani H, Jaffar A. Hypertension in UAE Citizens - Preliminary Results of a Prospective Study. Saudi J Kidney Dis Transpl 1999;10:376-81.
- Nissinen A, Berrios X, Puska P. Community-based noncommunicable disease interventions: lessons

- from developed countries to developing ones. Bulletin of the World Health Organization 2001; 79:963-70.
26. Lee MN, Popkin BM, Kim S. The unique aspects of the nutrition transition in South Korea: the retention of healthful elements in their traditional diet. *Public Health Nutrition* 2002; 5:197-203.
 27. Puska P, Tuomilehto J, Nissinen A, Vartiainen E, eds. *The North Karelia Project. 20 year results and experiences.* Helsinki: University Press, 1995.
 28. Pietinen P, Lahti-Koski M, Vartiainen E, Puska P. Nutrition and cardiovascular disease in Finland since the early 1970s: a success story. *Journal of Nutrition, Health & Ageing* 2001; 5:150-9.
 29. Dowse GK, Gareeboo H, Alberti KGMM, Zimmet P, Tuomilehto J, Purran A, Fareed D, Chitson P, Collins VR, Hemraj F. Changes in population cholesterol concentrations and other cardiovascular risk factor levels after five years of the noncommunicable disease intervention programme in Mauritius. *British Medical Journal* 1995; 311:1255-9.
 30. Uusitalo U, Feskens EJM, Tuomilehto J, Dowse G, Haw U, Fareed D, Hemraj F, Gareeboo H, Alberti KGMM, Zimmet P. Fall in total cholesterol concentration over five years in association with changes in fatty acid composition of cooking oil in Mauritius: cross sectional survey. *British Medical Journal* 1996; 313:1044-6.
 31. Puska P, Pietinen P, Uusitalo U. Influencing public nutrition for noncommunicable disease prevention: from community intervention to national programme-experiences from Finland. *Public Health Nutrition* 2002;5:245-51.
 32. Popkin BM, Horton SH, Kim S. The nutrition transition and prevention of diet-related diseases in Asia and The Pacific. *Food and Nutrition Bulletin* 2001; 22:1-58.
 33. Sarraf-Zadegan N, Sadri Gh, Malekafzali H, Baghaei B, et al. "Isfahan Healthy Heart Program: A Comprehensive Integrated Community-Based Program for Cardiovascular Disease Prevention and Control Design Methods and Initial Experience". *Acta Cardiologica* 2003; 58(4): 309-320.
 34. N. Sarrafzadegan, A. Baghaei, G. Sadri, R. Kelishadi, H. Malekafzali, M. Boshtam, A. Amani, K. Rabie, A. Moatari, A. Rezaeiashtiani. Isfahan healthy heart program: Evaluation of comprehensive, community-based interventions for non-communicable disease prevention. *Prevention and Control* 2006;2(2):73-84.
 35. WHO 2002. The report of second meeting of the Global Forum on Noncommunicable Disease Prevention and Control convened in Shanghai, China 4–6 November 2002