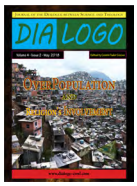
Diabetes mellitus and urbanization



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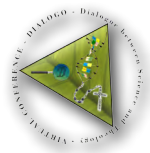

Diabetes Mellitus and Urbanization

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ABSTRACT

Diabetes Mellitus is one of the most common diseases, causing significant mortality and morbidity worldwide (1). Type 2 diabetes, obesity and hyperlipidemia have been traditionally considered as diseases of affluence. The contribution of dietary practices and lifestyle factors are crucial: e.g. overeating of junk foods and drinking carbonated beverages, modern-day working style like working without breaks, an increase in smoking, tobacco chewing and alcohol intake, exposure to severe stress; decreased physical activity. Incidence and prevalence of diabetes mellitus significantly more in the urban population.

I. INTRODUCTION

It is a disease with severe complications that has now reached epidemic proportions, and the prevalence rates are expected to go even higher in the future. If the current trend continues, more than 170 million people worldwide will have this disease, and this burden is projected to more than double by the year 2030 (from 170 million in 2000 to 366 million to 2030) (2).

II. MATERIAL AND METHOD:

We analyzed the effect of diabetes on urban population, educational level, family history of diabetes, overweight, and obesity.

III. DISCUSSION AND RESULTS:

It has been described that urbanization leads to an obesogenic environment as many urban areas do not support healthy

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lifestyle choices (3). Moreover, the risk of developing Diabetes Mellitus type 2 can also be increased if the thrifty phenotype is more prevalent in resource-constrained settings (3). A relatively recent systematic review found that, in the United States, urban sprawl and less mixed land use were consistently associated with overweight and obesity among adults (4). Although the results show great heterogeneity regarding other physical environmental factors, it is expected that these factors have an impact on physical activity levels too. Also, within-country migration and urbanization are two sociodemographic phenomena commonly occurring in developing countries undergoing rapid socioeconomic development.

One of the primary results of the 5-year follow-up of one study with rural-to-urban migrants in PERU was the increased risk of general and central obesity reported among the migrant group and urban dwellers as compared to the rural population. Obesity has been reported as the leading risk factor associated with Diabetes Mellitus type 2. The exposure to urban areas first leads to obesity and then progresses towards to type 2 diabetes (5).

Globalization, urbanization, migration and upward social mobility have been associated with pre-diabetic and obesogenic lifestyle behaviors, especially among poorly educated migrants or migrants of low socioeconomic status (6, 7, 8). The phenomenon called "nutritional transition" has been pivotal in understanding the increased risks of overnutrition and related conditions such as overweight/obesity and Diabetes Mellitus type 2 (8). Among within-country migrants, the nutritional transition signals the environmental change that individuals face following rural-to-urban migration, thus potentially explaining the elevated risk of developing some chronic cardiometabolic conditions (8, 9, 10). Rural-to-urban migrants, compared to those who remain in their rural region, tend to acquire sedentary behaviors and to have "less healthy" nutritional habits (11, 12, 13, 14).

The effect of urban exposure is associated with different factors, some of which are inherent to particular population groups. From a biological and mechanistic point of view, the thrifty phenotype hypothesis suggests that Diabetes Mellitus type 2 and obesity risk is greater in those exposed to fetal under-nutrition, a trait that is more pronounced in deprived sectors of society, including rural sites. The adversity in utero may lead to an increase in insulin resistance among other metabolic changes, beneficial for survival during the intrauterine period. The same adaptive process could potentially affect cardiovascular health later in life, and therefore is likely to affect the health of rural dwellers and rural-to-urban migrants in adulthood (15). This hypothesis has been tested in studies in India and China and highlights the influence of environmental exposure, i.e., urbanization and migration, especially for those with early deprivation, in the risk for developing Diabetes Mellitus type 2 (16, 17).

As a result of the high prevalence of malnutrition in the low socio-economic population in developing countries, obesity and diabetes were presumed not to be an essential issue for them.

However, there is an increase in the prevalence of diabetes in countries such as India (18), particularly in urban areas (19), both in native Indians (20, 21) and in the migrant population (22). Also, Indian people with abdominal obesity and insulin resistance, and develop glucose intolerance more often (23), eg. in the urban population of Delhi, the prevalence of diabetes mellitus ranged from 1.6 to 9%, being more common in obese subjects (24); in the rural Indian population, it is reported to be in the range of 1-5%. (25, 26, 27). A rural population in India

usually has a low risk of developing diabetes and obesity (25), but their migration to metropolitan cities exposes them to several adverse environmental influences. Several lifestyle alterations [65] result from this transition: the establishment of urban slums, working with the day, changes from traditional penurious eating habits to high-fat diets, increases in smoking, tobacco chewing, and alcohol intake - are several reasons for vulnerability to diet-related diseases. In people of the urban area, there is a decrease in physical activity and lack of natural exercises. Even though most of them go for physical exercise in the form of the gym and artificial exercises more often it has been practiced along with stress (28).

People who leave a rural lifestyle for an urban environment are exposed to high levels of stress and tend to have higher levels of cortisol (29). This hormone, Cortisol can counteract insulin, the hormone that regulates blood sugar, and slows the body's production of it (29). In the adverse socioeconomic circumstances, often combined with psychosocial stress, the hypothalamus-pituitary-adrenocortical axis is activated and a 'physiological defeat reaction' occurs (30,31). Increased waist-hip ratio and generalized obesity may thus result (32).

A few studies developed in developed countries indicate that prevalence of established risk factors, including obesity and diabetes mellitus, is higher among men and women with low levels of education and socioeconomic status (33). A recent study from the UK records that type 2 diabetes is inversely related to the socio-economic stratum (34). In this study, the prevalence of diabetes in the least deprived quintile was 13.4 per thousand persons (95% CI 11.44-15.36), compared to 17.22 (95% CI 13.84-17.11) in the most deprived.

Epidemiological studies reveal an increase in rates of type 2 diabetes particularly in developing countries where the transition from communicable to chronic diseases (35, 36) is found. In this respect, a predisposing factor in some populations is the rapid transition from rural to urban lifestyle (37, 38, 39). There are studies in low- and middle-income countries that show that urban populations are more prone to chronic illness than rural residents (40, 41, 42, 43).

According to a study conducted in Oman, we observe a high prevalence of diabetes, obesity, hypertension and high cholesterol, especially among urban-dwellers and older individuals (44).

In Malaysia, diabetes mellitus is a huge growing concern. Significant changes in the lifestyles of Malaysians have contributed to the increased incidence of diabetes. Malaysia. This rising trend is mainly due to some factors such as growing population, aging, urbanization and increasing prevalence of obesity and physical inactivity among Malaysians (45).

In some countries, eg. Bangladesh, the prevalence of type 2 diabetes and metabolic syndrome may be alarmingly high in the middle class. Centripetal obesity is common among Bangladesh, particularly among women (46, 47). Sustained economic growth has encouraged higher intakes of food and choices of so-called "fast-food" options rich in calories due to the increased exposure to processed and other salt and chemical rich foods (48). Nutritional information on packaged food is not enforced and food contamination is rampant due to inadequate regulation and limited oversight (49, 50). A lack of nutritional knowledge, cultural preferences and beliefs can inhibit informed decision-making about dietary intake and other lifestyle factors.

The physical environment is also likely a contributing factor. Moreover, the city neighborhoods are not conducive to safe outdoor activities due to the confluence of

population density, traffic jams, and crime; other prohibitive factors include a hot and humid climate, unremitting construction work, and excessive dust (51, 52).

Prevalence of Gestational Diabetes Mellitus is higher than expected in urban areas in Tanzania, indicating an increasing population who are at risk for delivery complications and type 2 diabetes in Sub-Saharan Africa (53).

A study conducted in Brazil on the urban population aged between 30 and 69 years revealed that there was a higher prevalence of DM with increasing age in people with low educational level, family history of diabetes, overweight, obesity and central obesity. The studies confirm the increased prevalence of DM in Brazil and emphasize the need for early diagnosis, as well as the importance of strict adherence to medical treatment in order to prevent its much-feared complications (54).

There is very little reliable information on the prevalence, awareness, treatment and control of diabetes in Central Asian republics of the former Soviet Union. One study found that a high overall prevalence of diabetes (12.5%); the prevalence was twice higher in the urban sample than in the rural area (16.3% vs. 8.6%). Awareness, treatment and control of diabetes were also approximately twice higher in the urban vs. rural area. The large urban-rural differences suggest a role of urbanized lifestyle and access to health care (55).

Diabetes mellitus (DM) is a major health problem in Africa and worldwide. The prevalence of diabetes is expected to increase at an alarming rate in Africa. Its estimated that around 20 million Africans are now living with diabetes, comprising a challenge for health systems at present and in the future. One study aimed to determine the prevalence of undiagnosed and diagnosed DM and impaired glucose tolerance (IGT) in adult urban communities of the River Nile State (RNS), north Sudan. There is a high prevalence of DM and glucose intolerance in the urban population of the RNS. Increasing age, a family history of diabetes, central obesity, abnormal body mass index, and hypertension were significant risk factors for DM. Screening for diabetes in individuals with any feature of metabolic syndrome is recommended (56).

The prevalence of type 2 diabetes in Africa is about 2.5 percent, ranging from 0.8 percent in rural Cameroon (57) to 13.5 percent in Mauritius (58). It is more frequent in South Africa and North Africa than in Central and West Africa, and it increases from rural to urban areas (59). In Africa, the number of people with diabetes is projected to rise from 7.020.000 to 18.234.000 and in Cameroon from 70.000 to 171.000.

The prevalence of diabetes in African communities is increasing with aging, rapid urbanization and westernization.

In this respect, genetic susceptibility contributes to certain ethnic groups in conjunction with environmental and behavioral factors such as sedentary lifestyle, overly rich nutrition and obesity (60, 61, 62).

Comparing with other developing countries, who suffer from malnutrition, Cameroon suffers from overnutrition having a diet consisting of palm oil, cornflower products, and red meat. Cameroonian lifestyle results in extreme risk of type 2 diabetes (63).

Weight reduction can reduce the risk of diabetes in those with impaired glucose tolerance. In diabetic patients, weight loss can also improve glycemic control and cardiovascular risk factors. Diabetes spending increases substantially in the presence of various cardio-metabolic risk factors (CMR) factors (e.g., obesity, hypertension, and dyslipidemia), independent of the presence of other chronic complications (64).

Conclusions

Diet and lifestyle influence significantly on our health. We are going away from the traditional style of life in this era. This is evident when we look at the prevalence of lifestyle disorders including Diabetes Mellitus type 2. Urban style of life is mostly the base for these disorders. Lifestyle Diseases are silent killers. People of urban and suburban areas are even though sophisticated in comparison with rural areas; they are unaware of the preventive aspects. That is why awareness of health regarding preventive elements is necessary for these areas (28).

Promotion of implementing healthy lifestyle along with the information about risk factors, diet, exercise, and screening should be encouraged through health campaigns. This can be started as early as in school. This study has significant implications to design future educational programmes to control diabetes mellitus. Apart from educating the public, these programmes can be designed in such a way to train and upgrade the health care professions, mainly the physicians and pharmacists, to produce competent diabetes educators who would be able to educate the public on the control of diabetes mellitus.

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