

Review Article

Important sociocultural aspects of diabetes mellitus in Qatar: A rapidly developing Arab gulf state

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ABSTRACT

Socio-cultural factors can profoundly influence diabetes control in diabetic patients. Qatar is an oil-rich country characterized by rapid urbanization. Excessive consumption of fast food, sedentary rich life style with totally air-conditioned housing, luxury cars, servants, and little outdoors activities and exercise due to hot weather most of the year have led to an epidemic of obesity and high prevalence of type 2 DM and negatively interfered with metabolic control. Increased incidence of divorce (around 40%) appears to be a risk factor for repeated diabetic keto-acidosis and poor control in children with type 1 DM. In addition, the high prevalence vitamin D deficiency and its possible depressive effect on insulin secretion may be associated with poor diabetes control.

Key words: Diabetes mellitus, obesity, sociocultural factors, urbanization

INTRODUCTION

The State of Qatar is an oil-rich country that lies halfway along the West Coast of the Arabian Gulf. It is a peninsula that covers 11606.8 Sq. Km., with a desert climate of hot summer and warm winter. In the last four decades, population growth rate has been very fast and in 2011 were 1,951,591.^[1-3] This article aims to highlight evidence- and experience-based effects of some important socio-cultural factors that considerably contribute to the prevalence of diabetes mellitus in Qatar.

Urbanization, sedentary life style, and obesity in relation to type 2 DM (DM2)

According to the International Association for the Study of Obesity, Qatar has the 6th highest rate of obesity among boys in the Middle East and North Africa region. It is also ranked 5th for having the highest percentage of people between 20 and 79 with diabetes.^[4]

Recently, the overall prevalence of metabolic syndrome in adults in Qatar according to the revised criteria of the National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) and the International Diabetes Federation (IDF) was 26.5% and 33.7% ($P < 0.001$). This prevalence of the metabolic syndrome in the State of Qatar is about 10-15% higher than in most developed countries. The prevalence of metabolic syndrome by ATP III and IDF increased with age and body mass index (BMI), whereas it decreased with higher education and physical activity. Among the components of metabolic syndrome, central obesity was significantly higher in the studied subjects. Multivariate logistic regression analysis (ATP III and IDF) showed that age and BMI were significant contributors for metabolic syndrome. Additionally, there was a steady increase in the prevalence of metabolic syndrome (MetS) through the decades, independent of the definition. The prevalence of MetS was higher among females. Among the components of MetS, the prevalence of central obesity was significantly higher in studied subjects.^[5]

In 2009, the overall prevalence of diabetes mellitus among adult Qatari population was high (16.7%) with diagnosed DM (10.7%) and newly diagnosed DM (5.9%). The impaired glucose tolerance was diagnosed in 12.5%, while impaired fasting glucose was in 1.3% with a total of (13.8%). The proportion of DM was higher in Qatari

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women (53.2%) than in Qatari men (46.8%), and it peaked in the age group 40-49 years (31.2%). Risk factors were significantly higher in diabetic adult Qatari population: Central obesity ($P < 0.001$), hypertension ($P < 0.001$), triglyceride ($P < 0.001$), HDL ($P = 0.003$), metabolic syndrome ($P < 0.001$), heart diseases ($P < 0.001$). Smoking habits and family history of DM were the major contributors for diabetes disease. The central obesity was associated with higher prevalence of DM and IFG among Qatari men and women.

One reason for the obesity trend is the lack of exercise and poorly designed pedestrian-friendly cities. «Like other oil-rich nations, Qatar has leaped across decades of development in a short time, leaving behind the physically demanding life of the desert for air-conditioned comfort, servants, and fast food.»^[6] In addition, urbanization has occurred rapidly and has been accompanied by new technologies that promote sedentary lifestyles. Due to accessibility of private cars, television, and household appliances, the hot damp weather outdoors and the deficiency of designed pedestrian-friendly cities, the population as a whole is engaging in less physical activity. Although the type of food eaten has changed, the cultural traditions surrounding food have not. Food is often consumed communally, making it nearly impossible to ensure proper portions. A person who does not eat when food is offered is seen as offensive and shameful. The presence of foreign workers has introduced many new foods from all over the world. Qatar's cuisine has been influenced by close links to Iran and India and more recently by the arrival of Arabs from Lebanon, Syria, and North Africa. In recent years, restaurants and fast-food franchises have increasingly opened. It is also normal within Qatari society to be obese.^[7-10]

In children, obesity is associated with a number of co-morbidities in childhood^[5] and with increased risk of adult disease, particularly DM2.^[6] In Qatar, a randomly selected cluster sample of 38070 students aged 6-18 years, the prevalence of overweight (BMI > 85th centile) and obesity (BMI > 95th centile) were 11.6% and 14.7%, respectively (total 26.3% above 85th for BMI). Obesity among Qatari children (15.8%) was higher than among non-Qatari children (13.2%). The mean BMI crossed above and became progressively higher than the mean for CDC by the age of 8 years in Qatari girls and by the age of 10 years in Qatari boys.^[11] These results are in accordance with those reported from Kuwait (prevalence of 26.5% (BMI > 90%) among children aged 6-13 years and from the KSA (1996) with prevalence of overweight and obesity among Saudi boys age 6-18 years was 11.7% and 15.8%, respectively.^[12,13] Before 2007, DM2

has not been reported in Qatari children; however, consequent to this epidemic of obesity, DM2 has been increasingly reported among Qatari children and adolescents. [Table 1, Figure 1] All children with type 2 DM were obese (BMI > 95th centile), and all had family history of DM2 in first- or second-degree relatives.^[11] In a random sample of obese children and adolescents in Qatar, using continuous glucose monitoring system (CGMS) for 3 days, revealed that 69% of them had either impaired fasting glucose (36%) or impaired glucose tolerance (69%) denoting markedly disturbed glucose homeostasis.^[14]

VITAMIN D DEFICIENCY AND DIABETES IN QATAR

Vitamin D deficiency has been shown to alter insulin synthesis and secretion in both humans and animal models. Glycemic control and insulin resistance are improved when vitamin D deficiency is corrected and calcium supplementation is adequate. Children and adults need at least 1000 IU of vitamin D per day to prevent deficiency when there is inadequate sun exposure.^[15-17] The prevalence of vitamin D deficiency (VDD) is high in Qatari children (49.8% of males and 50.2% of females), adults (91%) including pregnant women. Rickets and osteomalacia are still reported. This vitamin D deficiency appears to result from a combination of limitations in sunlight exposure and a low oral intake of vitamin D. Women are completely covered because of religious factors, and humid hot weather outdoors most of the year leads to no or low duration of time spent outdoors. In addition, breast feeding less than 6 months and decreased physical activity are significant predictors for vitamin D deficiency in Qatari children.^[18-23]

Epidemiological studies suggest a link between vitamin D deficiency in early life and the later onset of DM1. A case-control study has been designed to find the association between vitamin D and DM1 then to study the difference in the level of vitamin D in T1DM and healthy subjects, and to determine the associated environmental risk factors in young Qatari DM1 children and healthy subjects below

Table 1: Incidence of type 1 DM and type 2 DM in children (1-16 years) in Qatar

Year	Type 1 incidence/100,000	Type 2 incidence/100,000
2006	18.63	0
2007	30.64	0
2008	21.64	0.33
2009	22.91	1.43
2010	21.22	1.47
2011	23.64	1.47
2012	26.33	2.66

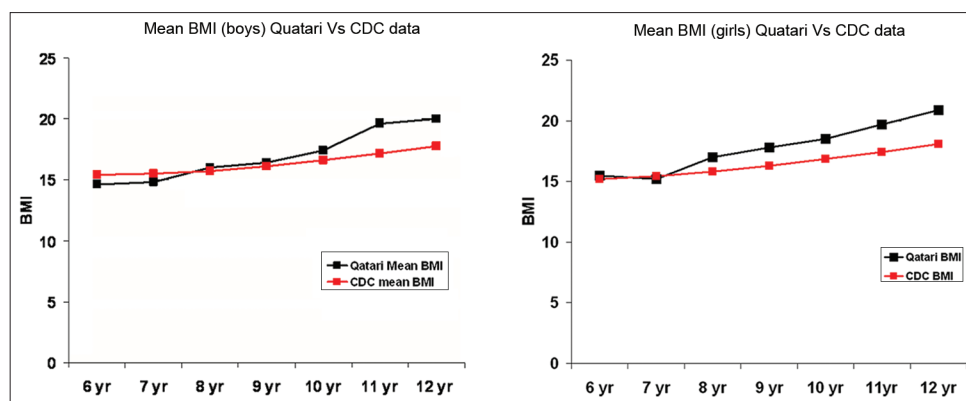


Figure 1: Mean body mass index for Qatari children (6-12 years) (boys and girls) versus mean for centers for disease control and prevention CDC standard

16 years. The study revealed that VDD was considerably higher in T1DM children compared to non-diabetic children, and the mean value of vitamin D was lower in DM1 versus non-diabetic children ($P = 0.009$). Family history of vitamin D deficiency was considerably higher among DM1 children (35.3%) versus non-diabetic children (22.9) ($P < 0.012$). Vitamin D supplement with breast milk was very poor in diabetic children compared to non-diabetic children. Multivariate logistic regression analysis revealed that low vitamin D level, less physical activity, low duration of time under sun light, and breast feeding less than 6 months were considered as the main factors associated with the DM1.^[24,25]

Diabetic ketoacidosis: Relation to social issues

The incidence of diabetic ketoacidosis (DKA) is still high in Qatar (11% of the diabetic children suffer an attack of DKA per year). Analysis of causes of DKA in diabetic children revealed that, apart from the known causes of DKA, among the important factors behind this is the decreased family role in the management and support of diabetic children, due to high rate of divorce (41.0% in 2009, 46.8% in 2010, and 39.7% in 2011).^[26] However, the incidence of DKA at first presentation has decreased significantly from 47% to 32%, and the degree of severe acidosis decreased from 41% to 20% of cases in the last 10 years. These significant changes are attributed to increased awareness for early symptoms for diagnosis through the extensive education programs adopted by the Qatari Diabetes Association through all forms of media (TV, newspapers, magazines), camps, and conferences.

Consanguinity, smoking, education level and housing and DM

The association between consanguineous marriages and genetic and environmental factors and NIDDM in the adult Qatari population has been studied in a total of 338 randomly selected diabetic patients. The diabetic population was found to have a significantly lower

educational level and a tendency to live in houses with less room. Diabetics were significantly higher among the subjects with consanguinity, and this effect was even more significant in first degree consanguinity. Diabetics were also seen to consume more fruit and less fish/chicken. Logistic regression analysis identified consanguinity, smoking, level of education, number of children, high BMI and systolic blood pressure as risk factors to be considered for NIDDM. It appears that the high prevalence of diabetes in the Qatari population could be attributed to an interaction of these environmental and socio-cultural factors with the genetic factors.^[27]

In 2011, a national diabetes survey was conducted in Qatar to explore the general population awareness levels of diabetes, its causes, and complications. The survey revealed that, 53% believe that diabetes is less serious than heart disease, and diabetes does not lead to stroke. On the same time, 37% are at risk of developing diabetes, and 93% of them have never been informed of that risk. These results reflect the fact that diabetes is very common disease, which makes people get acquainted with it and not take it too seriously.^[28]

Fasting Ramadan and control of DM2

Although Muslim patients with type 2 diabetes may be exempt from fasting during Ramadan for medical reasons, a high proportion of them fast. Results a recent study in Iran showed that fasting during Ramadan deteriorated the glycemic control in type 2 diabetes patients. This was more evident in patients using oral hypoglycemic medication than in diet-controlled patients. However, Ramadan fasting had small positive effects on lipid profile and body weight.^[29] In keeping with this, two large epidemiological studies conducted in 13 Islamic countries on 12,243 diabetic individuals who fasted during Ramadan showed a high rate of acute complications.^[30,31] Patients with type 1 diabetes are discouraged to fast Ramadan. However, those who fast are at increased risk

for development of diabetic ketoacidosis, particularly if their diabetes is poorly controlled before Ramadan.^[29] In addition, the risk for DKA may be further increased due to excessive reduction of insulin dosages based on the assumption that food intake is reduced during the month. In Qatar, the prevalence of DKA in adolescent with DM1 who fast against medical advice is almost doubled in Ramadan compared to other months of the year that is confirmed in other Arab countries.^[31,32] A recent study from another Gulf country showed that fasting during Ramadan deteriorated the glycemic control in type 2 diabetes patients.^[29]

The government in its effort to build the welfare state is providing all the health services free of charge (including diabetes clinic visits (including diabetologists, diabetes educators, dietitians, and foot care clinics), insulin pens, insulin pumps and disposables, glucometers, and glucostrips). However, in many patients, this led to a negative attitude of dependency on the government and hospital without taking their role for self-monitoring and control.

CONCLUSION

In conclusion socio-cultural factors can profoundly influence diabetes control in diabetic patients. In Qatar, important socio-economic factors that lead to rapid urbanization, excessive consumption of fast food, sedentary life style that led to an epidemic of obesity, increased rate of divorce, and vitamin D deficiency appear to have negative influence on diabetes control.

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