

Review article

Glycemic Control among Patients with Type 2 Diabetes Mellitus in Countries of Arabic Gulf

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Abstract

Type 2 diabetes mellitus is a growing, worldwide public health concern. The countries of Arabic Gulf appear to have a higher prevalence of diabetes than the global average. The recent and rapid socio-economic development of these countries has been associated with this rising prevalence. Although the rate of type 2 diabetes management based on glycosylated hemoglobin level in the countries of Arabic Gulf is labeled as poor, the outcomes are almost similar to those reported from elsewhere. Unfortunately, overweight and obesity are driving the global diabetes epidemic. A minority of patients with type 2 diabetes had a normal body weight which might make the control of diabetes difficult. Anyhow, Greater efforts are urgently needed to properly manage diabetes early in order to prevent short and long-term complications. Practical strategies aimed at more effective management of type 2 diabetes patients are strongly needed.

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Introduction

Diabetes mellitus (DM) is a leading cause of death and disability worldwide.⁽¹⁾ DM is one of the most common chronic diseases in nearly all countries, and continues to increase, as modern lifestyles lead to reduced physical activity, and increased obesity. Unfortunately, the prevalence of type II DM is rapidly increasing all over the world in which the number of adults with diabetes mellitus in the world will rise from 135 million in 1995 to 300 million in the year 2025.⁽²⁾

Glycemic control is one of the important strategies for the management of DM as regarded by the American Diabetes Association (ADA). The ADA has determined glycosylated hemoglobin (A1C) as the best measure of glycemic control, level less than 7% as a goal of optimal blood glucose control to prevent the complications and to reduce overall disease management costs.⁽³⁾ Despite the availability of evidence-based studies establishing the benefit of intensive diabetes management in reducing diabetic complications,⁽⁴⁾ high rate of patients remain poorly controlled.⁽⁵⁾

The countries of Arabic Gulf have faced a rapid transition in their socio-economic status, which resulted in great changes both in life-style and in patterns of health and disease. There has been a marked decline in infectious diseases and an increase in number of chronic diseases.⁽⁶⁾ So, DM has become one of the most common public health problems in these countries. This paper is aimed at reviewing published studies that discussed the rate of glycemic control among patients with type 2 DM in the countries of Arabic Gulf.

Prevalence of Type 2DM in Gulf Countries:

As the global average prevalence of diabetes is around 10%. However, the gulf countries appear to have a higher prevalence of diabetes than the global average.⁽⁷⁾ The recent rapid socio-economic development of these countries has been associated with this rising prevalence. Based on a study in 2009, the overall prevalence of Type 2DM in the Kingdom of Saudi Arabia (KSA) was 30%.⁽⁷⁾ The prevalence of DM has increased from 23.7%, when compared to the study done in 2003.^(8, 9)

In Qatar, there was about 10% increase in the number of diabetic patients among people

more than 25 years of age from 37,000 in 2006 to 122,000 in 2012 (about 1% annually). The relative increase in prevalence of diabetes and number of diabetic people was higher in women than in men (18.4% in men vs. 25.1% in women).⁽¹⁰⁾ The rates for DM (diagnosed and undiagnosed) and pre-diabetes among 30-64 years old Emirati citizens living in Al Ain, United Arab Emirates (UAE) were 29.0 and 24.2%, respectively.⁽¹¹⁾ In the studies in Arab region, the overall prevalence rates of DM (in adults aged 20 to 79 years) in Qatar, Kuwait, Lebanon and Bahrain were 20.2%, 20.1%, 20.2%, and 19.9% respectively.⁽¹²⁾ The prevalence of DM among adults in Oman appeared to be the lowest of the gulf countries, about 11.1%.⁽¹²⁾

Proportion of Glycemic Control in Gulf Countries:

Management of DM based on A1C is essential to reduce the complications and to improve the quality of life. In KSA, the rate of patients who had poor glycemic control (A1C \geq 7%) among patients of type II DM attending the Primary Care Clinic (PCC) of King Khalid University Hospital (KKUH) in 2012 was 67.7%.⁽¹³⁾ This rate is almost similar to the study done in Al Hasa area of KSA (67.9%).⁽⁵⁾ Nevertheless, this percentage of glycemic control had improved slightly at the PCC of KKUH. As the rate had changed from around 25% to 32%, when compared to the situation at 2006.⁽¹⁴⁾ In one study done in Al-Madinah Diabetic Center on 2012, the proportion of poor glycemic control was significantly higher (76.4%) than what has been seen in other studies.⁽¹⁵⁾ About 20.6% of patients attending a primary care center in Riyadh achieved A1C less than 7%.⁽¹⁶⁾ During 2006, one paper represented data collected from 28 health centers all over KSA. The average last A1C among these patients was approximately 8.20 and among all diabetic patients, only 27% had reached the target A1C of <7%.⁽¹⁷⁾ Table 1 shows a summary of the rate of glycemic control in Gulf countries.

A retrospective study on Omani patients with type 2 diabetes (N=177) attended a primary health care in Al-Dakhiliya region of Oman found that only 35% had a good glycemic control.⁽¹⁸⁾ In another study done in Muscat Region of Oman, the results showed that only 22.8% of patients had good glycemic control.⁽¹⁹⁾ In Kuwait, the overall prevalence of

poor glycemic control (AIC \geq 7%) among type 2 diabetic patients was 78.8%. These data were collected from eight primary health care centers in the Capital Region of Kuwait. Not surprisingly, patients at the specialized diabetic clinics had a significantly higher rate (86.1%) of poor glycemic control than what have been seen at the general clinics (68.3%), with mean AIC of 8.73 and 7.94, respectively. ⁽²⁰⁾ In another study in Kuwait, 66.7% of the studied population was found to have AIC \geq 8%.⁽²¹⁾

Overall in 2010, in Al-Ain, a result taken from Emirates patients with Type 2DM in diabetes center located in a tertiary care hospital showed that about 41% had good glycemic control. There was a significant improvement from 2008 to 2010 AIC (21% versus 41%, respectively). ⁽²²⁾ During 2006, among people with diabetes in Al-Ain District, only 31% had an AIC of less than 7%. The proportion of subjects with diagnosed DM who achieved internationally recognized targets for HbA1c (<7%), LDL-C (<2.6 mmol/L) and blood pressure (<130/80 mmHg) was 33.3, 30.8 and 42.1%, respectively. ⁽²³⁾ In primary care in Bahrain, diabetes was inadequately controlled and seems to be the worst. There was no significant difference in glycemic control between the diabetic clinic and general clinic in which good glycemic control was achieved only in 14.8 and 11% of patients attending diabetic clinics and General clinics, respectively. ⁽²⁴⁾ In another setting of Bahrain, Mean AIC among diabetic patients at a Military hospital was found to be 7.9 \pm 2.2% and only 21.8% of them had normal values. ⁽²⁵⁾

Table 1. Summary of the rate of glycemic control in Gulf countries

Reference	Date of the study	Country	AIC less than 7%
(18) Al Balushi KA, et al.	2013	Oman	35%
(13) Al-Rasheedi	2012-2013	KSA	32.3 %
(15) M. Almutairi, et al.	2012	KSA	23.4 %
(5) Khan, et al.	2010-2011	KSA	32.1 %
(20) Al-Ibrahim	2010	Kuwait	21.2

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(22) Al-Kaabi, et al.	2010	UAE	41 %
(19) Venugopal S, et al.	2007	Oman	22.2 %
(17) Al. Elq	2006	KSA	31.1 %
(23) Saadi H, et al.	2006	UAE	31 %
(24) Al-Khaja	2004	Bahrain	14.8 %
(16) Al-Hussein	2003-2004	KSA	20.6 %
(14) Alfadda, et al.	2001-2003	KSA	24.7 %
(25) Modebe, et al	2000	Bahrain	21.8 %

Obesity among diabetic patients in the Gulf countries:

Overweight and obesity are driving the global diabetes epidemic. They affect the majority of adults in most developed countries and are increasing rapidly in most developing countries. If current worldwide trends continue, the number of overweight people based on Body Mass Index (BMI \geq 25 kg/m²) is expected to increase from 1.3 billion in 2005 to approximately 2.0 billion by 2030. ⁽¹⁰⁾ The prevalence of obesity has increased at an alarming rate during the last two decades. World Health Organization (WHO) in its report mentioned that gulf countries have highest rate of obesity. Kuwait, Bahrain, KSA and UAE came in the list of top ten countries worldwide with regard to obesity. ⁽²⁶⁾

Unfortunately, approximately half of the diabetic patients at KKHU in Riyadh were obese, while 38% had over weight. Nearly half of the study people among diabetic patients in Oman had a body mass index > 25 kg/m². ⁽²⁷⁾ The results coming from Qatar with regard to obesity among diabetic patients were not better, in which approximately more than two third of diabetic patients attending a general hospital and PHC in Qatar were either overweight or obese. ⁽²⁸⁾ Based on BMI, few patients were of normal body weight; the majority was either overweight (BMI 25-30, 36%) or obese (BMI \geq 30, 45%). Abdominal obesity (based on waist circumference, >102 cm for males and >88 cm for females) was present in 59% of the total sample and was

more common among females (77%) than males (30%) (Chi-square test, $p < 0.01$).⁽²²⁾ Patients with diagnosed and undiagnosed DM were more likely to have obesity.⁽²³⁾ Only a few percentage of Kuwaiti diabetic patients had a normal BMI, while half of the patients were obese. There was no difference in BMI between family medicine clinics and specialized diabetic clinics.⁽²¹⁾

Discussion

Although the rate of type 2 DM management based on A1C level in the Gulf Countries is labeled as 'poor', the outcomes are almost similar to those reported from elsewhere. In the gulf countries, good glycemic control ranges from approximately 11% to 41%. In some neighbor Arabic countries, glycemic control is near what have been seen in the gulf countries. In Jordan, 65.1% of patients with type 2 DM had poor glycemic control.⁽⁹⁾ In Lebanon, 31.8% of the 551 diabetic patients attending endocrinologist's clinic between June 2008 and July 2012 in Beirut attained good A1C control.⁽²⁹⁾ In another Arabic country namely Sudan, the rate of poor glycemic control is near to those results in gulf countries in which 31.4% of diabetic patients had poor control.⁽³⁰⁾

Outside the Arabic countries, the results came to be almost similar when compared to the gulf countries. The rate of good glycemic control among patients with type 2 DM who received routine care in Iran was 35.6% during an average 8.4 years of this cohort study.⁽³¹⁾ Internationally, approximately one quarter of European out-patients with Type 2DM had adequate glycemic control (A1C $< 6.5\%$).⁽³²⁾ In Canada, the results seem to be better when compared to the results of gulf countries and other regions. A1C $\leq 7.0\%$ was met by approximately 50% of 5123 type 2 diabetes patients whom they had seen on a single day on or around World Diabetes Day, November 14, 2012.⁽³³⁾

An important factor in diabetes risk and poor glycemic control is overweight and obesity.⁽³⁾ Most studies done in gulf countries showed that only a few rate of diabetic patients have been of normal body weight. In addition, higher prevalence of overweight and obesity was documented among the general population of these countries.⁽²⁶⁾ Overweight and obesity in these patients increased odds of

poor glycemic control.^(9 & 13) This could be explained by increased insulin resistance among those with high BMI.⁽³⁾ Only about 20% of diabetic patients in Iran had normal BMI,⁽³¹⁾ which is near to the results reported in gulf countries. With regard to body weight among diabetic patients in Canada, the results are near to those reported in gulf countries in which 14%, 29% and 57% of patients were within the normal weight range, overweight and obese, respectively.⁽³³⁾

Although the adherence to lifestyle changes among diabetic patients is important in the management, low rate of adherence was reported in some studies. One study found a high rate of poor adherence to diet (68%) and poor adherence to exercise (79.4%).⁽¹³⁾ Only 21% of diabetes patients perform daily physical activities.⁽¹⁰⁾ These results indicate a possible continuum in the relationship between diabetes risk and physical activity levels.⁽¹⁰⁾ Poor patient adherence (e.g. diet, physical activity, medication, blood glucose monitoring) was the most commonly found barrier to managing type 2 diabetes patients in Canada.⁽³³⁾ Some studies showed no difference in glycemic control between male and female patients,⁽¹³⁾ while others demonstrated better control among females.^(5, 15, 18) The adherence to lifestyle changes appeared better among males in some studies.⁽¹³⁾ The poor adherence to exercise among female could be due to more sedentary lifestyle of women in these countries.^(5, 13, 26) Traditional/cultural restrictions in lifestyle of women in Gulf countries are one source for more sedentary life among women. Women have usually a limited access to sports and exercise, besides there is an easy availability of migrant labor for house hold work in these countries.⁽²⁶⁾

Conclusion

In the Gulf countries, good glycemic control ranges from approximately 11% to 41% which is almost similar to what have been reported elsewhere. Most of diabetic patients are overweight or obese. Practical strategies aimed at more effective management of type 2 diabetes patients are strongly needed. Programs that both motivate patients to make the important but difficult lifestyle changes, and empower them to promote self-care, need to be initiated throughout these countries.

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