



Review Article

## **A Current Status of Diabetes Mellitus and Its Risk Factors in Saudi Arabia: A Review**

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### **ABSTRACT**

Diabetes Mellitus is a Major Public Health problem in the kingdom of Saudi Arabia. It is a very common health problem across the globe. Diabetes Mellitus has a huge impact on Quality of life. It has an Impact of an individual's subjective perception of physical, emotional, and social well-being, including both a cognitive component and an emotional component. This Paper aims at informing the reader about the current prevalence of diabetic mellitus and the various risk factors that can cause diabetes.

**Key words:** Diabetes Mellitus, Current Status, Saudi Arabia, Risk Factors

### **INTRODUCTION**

Diabetes mellitus (DM) is defined as a metabolic disorder of multiple etiologies, characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism. It results from defects in insulin secretion, insulin action (resistance), or both.<sup>[1]</sup> The transition from communicable to non-communicable diseases arrived at the heels of demographic transition,<sup>[2]</sup> and led to a Major shift in the paradigm of health and illness. Other developing countries have followed suit, where the demographic and epidemiologic transitions have been much faster than anticipated. The diabetes pandemic is an outstanding example: the estimated number of diabetic patients worldwide was 171 million in 2000, which is expected to increase to 366 million by 2030, and the percentage of diabetics living in developing

countries is projected to increase from 74% in 2000 to 81% in 2030.<sup>[3]</sup>

Type 2 diabetes mellitus (T2DM) is defined as a combination of insulin resistance (reduced ability of insulin to stimulate utilization of glucose in the body), and reduced secretion of insulin. Insulin resistance is believed to be associated with decreased physical activity and obesity.<sup>[4]</sup>

The epidemiologic transition in the Kingdom of Saudi Arabia (KSA) has been fast and complete. Rapid economic growth during the last 4 decades led to a remarkable increase in living standards and adoption of a 'Westernized' lifestyle, characterized by unhealthy dietary patterns, and decreased physical activity.<sup>[5]</sup> Increase in the prevalence of T2DM is also observed during the same period, which is attributed to the dramatic changes in lifestyle, in addition to genetic predisposition of Saudi people to

diabetes, and a high prevalence of consanguineous marriages. [6] Research has shown that the Middle East region faces a double burden of the disease due to decreasing rates of communicable diseases and the growing rates of non-communicable diseases. [7]

However, compared with the developing countries, the dearth of research currently available on the incidence and prevalence as well as the socio-demographic properties of diabetes certainly warrants concern particularly the lack of appropriate studies in this specified area. In this review, we discuss the range of various aspects of

diabetes in Saudi Arabia from the literature published.

## METHODOLOGY

A literature search was conducted to find the published papers on Diabetes in Saudi Arabia. Google Scholar was used to access both peer reviewed and non-peer reviewed articles. The search was limited to the English language only. The articles were selected by reviewing their titles and abstracts with additional references identified from the reference lists of selected articles.

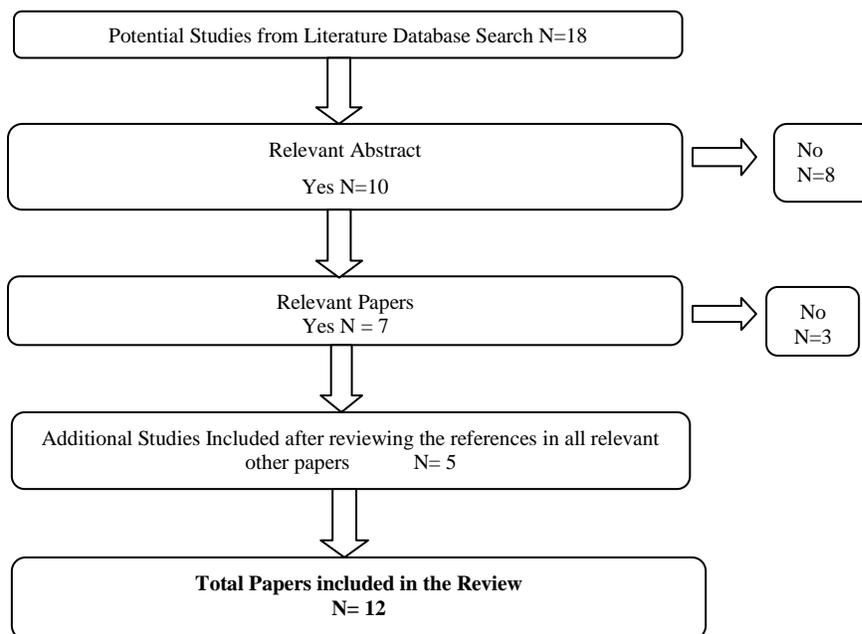


Figure: 1. Flow Diagram of Study Selection

## RESULTS

Nine Studies (09 Papers) relating to risk factors and their prevalence were identified for review. All Papers were Journal articles published between 2010-2013. In order to compare the trends even some studies published before 2010 were also included. In addition to examining the prevalence of Diabetes we were also interested in looking at trends in prevalence across time period and its association with

age and gender and also quality of life among diabetic population.

### Prevalence:

N.A. Al-Baghli et al study published in the year 2010 showed that the prevalence of Diabetes among Saudi population was 15.7%. In the same study it was found that women were more diabetic than men. Higher proportions of men were in the age group of 60-69 and women were in 50-59 years. [8] similarly another study by Khalid

A. Alqurashi et al in 2011 showed the prevalence of diabetes was 34.1% in males and 27.6% in females ( $P < .0001$ ). The mean (SD) age for onset of diabetes in males and females was 57.5 (13.1) and 53.4 (13.1) years, respectively ( $P < .0001$ ). Females <50 years old had a higher prevalence than males in the corresponding age range- 34.1% and 25.1%, respectively ( $P < .0001$ ). The prevalence of diabetes decreased in patients older than 70 years. [9]

Recently the International Diabetics federation for Middle East and North Africa released the prevalence of diabetes among adults groups in 2013 along with comparison of other countries.

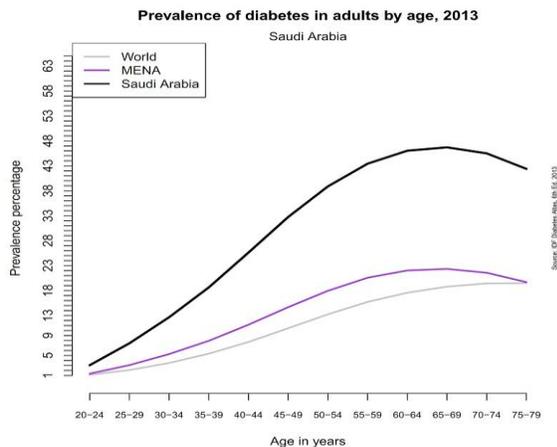


Figure 2. Age Wise Prevalence of Diabetic Mellitus among Adult Population

The figure: 2 describe which age groups in the population have the highest proportions of diabetes. The grey line is the distribution of diabetes prevalence by age for the world; the purple line is the distribution for the region; and the country distribution is plotted in the black line.

Many middle- and low-income countries have more people under the age of 60 with diabetes compared to the world average. Meanwhile, for high-income countries, the growing population over the age of 60 makes up the largest proportion of

diabetes prevalence. [10] The study done using the WHO's STEPwise Surveillance (STEPS) of NCDs risk factors in 2005. In this study, individuals aged 15-24 years were included, in addition to the recommended age of the WHO STEPS approach (25-64 years). An overall prevalence of 15.8% and 14.9% was reported in men and women aged 15-64 years respectively, using the ADA 1997/WHO 1999 diagnostic criteria (fasting plasma glucose  $\geq 7$  mmol/l). However, the reported overall prevalence for those aged 25-64 years was 20.1% in men and 18.3% in women. Results showed significant increasing prevalence rates with increasing age in both sexes.

The age-specific prevalence rates were very similar for men and women across all age groups, except for the oldest age group (55-64 years), where women had a higher prevalence (49.7%) than men (39.5%). [11]

**Risk Factors:**

Ziad A. Memish et al showed proved that obesity is strong associated with diabetes and the prevalence of obesity was higher among women. The study concluded that Obesity remains a major risk factor associated with diabetes, hypercholesterolemia, and hypertension in the KSA; although the epidemic's characteristics differ between men and women. [12] Farid M. Midhet et al study proved that there is strong association between diabetes and maternal history of diabetes, education, lack of exercise, and dietary habits. The AOR for regular eating of Kabsa was 5.5 (95% confidence limits [CL]:2.3-13.5); for vegetables an AOR of 0.4 (95% CL: 0.2-0.7); for dates an AOR of 1.8 (95% CL: 1.0-3.3); and the AOR for sedentary lifestyle was 2.5 (95CL: 1.2-5.0). This study finding concluded that these food items are the most important determinants of T2DM in the study population. The study

also showed that persons not carrying out any form of regular exercise are at a significantly greater risk, even after adjusting for their dietary habits, age, and family history. [13]

The Recent Case Control Study by Manal A. Murad et al proved that cases were likely to be current smokers, hypertensive and overweight/obese Cases were also more likely to have a history of DM in a first-degree relative. By multivariate analysis, cases were more likely to be older than 40 years, less educated, married or divorced jobless/housewives. They were also more likely to have salaries <7000 Saudi riyals. [14]

### **Quality of Life among Diabetic Patients:**

As advances in medical technology and new, more aggressive treatments succeeded in increasing survival rates, attention increasingly turned towards the quality of life (QOL) of patients rather than longevity alone. Health-Related Quality of Life (HRQOL) which covers mainly the physical, cognitive and social functions has been emphasized as an imperative index of the outcome after stroke; therefore, assessing the HRQOL assumes great importance for a diabetic survivor.

Numerous factors including age, gender and dependency for the Activities of Daily Living (ADL) / disability, and decreased social support have been connected with a low HRQOL value in a diabetic survivor. [15]

Fahad S. Al-Shehri study concluded that Most diabetic patients (78.7%) had negative (i.e., unfavorable) Audit of Diabetes Dependent Quality of Life (ADDQOL) scores. Diabetic patients' age, education and occupation were not significantly associated with their QOL. Female patients had significantly worse QOL than male patients ( $p = 0.026$ ). Married patients had significantly worse QOL compared with non-married patients ( $p$

$= 0.012$ ). Patients with type 2 diabetes had significantly worse QOL than those with type 1 diabetes ( $p = 0.029$ ). Duration of diabetes was not significant factors as regard their QOL, with the worst QOL among those with more than 20 years of diabetes. The degree of diabetes control was significantly and directly associated with QOL score ( $p < 0.001$ ).

The worst QOL was expressed among poorly controlled diabetes while the best was among patients with excellent control. QOL of diabetics was less among those who had diabetes complications, i.e., neuropathy ( $p = 0.03$ ), retinopathy ( $p < 0.001$ ), and diabetic foot ( $p = 0.031$ ). However, difference was not significant according to those with nephropathy. [16]

### **DISCUSSION**

This Study found that the prevalence of diabetes increases over a period of years. The prevalence of diabetics was 34.1% in males and 27.6% in females ( $P < .0001$ ). The women were found to be more diabetic than men but most studies concluded more or less the same prevalence rate but in contrast they showed that more men are diabetic than women. Elizabeth et al study also showed that the prevalence of diabetes in general Saudi population was 30%. The prevalence of diabetes was 34.1% in males and 27.6% in females ( $P < .0001$ ). The mean (SD) age for onset of diabetes in males and females was 57.5 (13.1) and 53.4 (13.1) years, respectively ( $P < .0001$ ). [17] Our findings show that the food items are the most important determinants of T2DM and also show that persons not carrying out any form of regular exercise are at a significantly greater risk, even after adjusting for their dietary habits, age, and family history. Our results are consistent with previous studies on the role of physical activity, leading a sedentary life increases the risk of diabetes considerably. [18]

Our study showed that physical inactivity and obesity are among the most important risk factors associated with T2DM besides family history of diabetes. In a study in Qatar they proved that obesity and physical inactivity are the important risk factors for diabetes besides that consanguinity also came as a risk factor, especially if it is a first-degree consanguinity marriage. <sup>[19]</sup>

#### **Limitation of the Study:**

We report above that individual studies included in our review demonstrated recent temporal trends in prevalence of diabetes and its risk factors even though this was not clear from our overview of studies. This is probably illustrative of the general heterogeneity of the reviewed studies. The studies reviewed were relatively few and distributed across many years. They were of varied population characteristics, in different regions of a country and definitions of particular risk factors were inconsistent. We were thus able to make only relatively crude observation.

#### **CONCLUSION**

The prevalence of diabetes increased over a period of years. The obesity and physical inactivity remains the major reason for diabetic mellitus among the population of Saudi Arabia. Besides there are several other risk factors which can also cause diabetes. However, more Epidemiological based research studies are needed to facilitate developing community based prevention programs. Epidemiologists, public health researchers, and health policy makers should work together to develop comprehensive programs for health promotion and disease prevention through increasing public awareness.

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