



Assessment of Knowledge, Awareness and Perception of Diabetes Miletus among the people in Saudi Arabia: A Peer – reviewed Study

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KEYWORDS

Diabetic Mellitus, drug adherence, drug adherence, insulin injections.

Abstract

Objectives:

To give a summary of the peer-reviewed study on Saudi Arabians' awareness of and public comprehension of diabetic mellitus (DM).

Methods :

We followed the standard reporting requirements for the PRISMA statement in our systematic review. Using the keywords "Knowledge" OR "Awareness" AND "Diabetes Mellitus" AND "Saudi Arabia," we searched PubMed, Scopus, and Web of Science for pertinent data between 2019 and 2023 in June 2023. The records underwent a thorough screening process, pertinent studies were chosen based on keyword analysis, and narrative reports were created.

Results:

Our systematic review contains twenty-one papers. The following populations were included in these studies: individuals with diabetes (n = 15), healthcare professionals (n = 2), medical students (n = 2), secondary school students (n = 1), and the public (n = 1). Most studies discovered that the public is unaware of potential risks and problems associated with diabetes mellitus. The key finding of this study is about the knowledge of prevalence of type 1 diabetes with people and type 2 among children, youngsters in Saudi Arabia. It is also evident that among medical students and healthcare professionals, women possessed inadequate understanding regarding the disease's epidemiology and the perspective at which insulin injections are administered. This study also reviewed how social and religious factors affect drug adherence. The number of yearly hospital visits for the treatment of diabetes patients has significantly increased by 20% for men and 23% for women.

Introduction:

Over the past 20 years, there has been a significant rise in the prevalence of type-2 diabetes mellitus (T2DM), primarily due to an increase in obesity rates, which is the leading risk factor for T2DM. The statistics on diabetes in the Arab world are especially alarming because it is expected that by 2035, there would be 96.2% more cases of the disease in this region. The unchecked rise in T2DM prevalence in the Middle East may be mostly attributed to genetic risk factors. The fast rise in T2DM rates in the Arab world is largely due to other causes, though, like obesity, fast urbanization, and inactivity.[1]

Diabetes mellitus (DM) is a metabolic disease marked by hyperglycemia from a lack of insulin secretion or activity. There are three main kinds of diabetes mellitus: gestational diabetes, type 2 diabetes (T2DM), and type 1 diabetes (T1DM). Insulin production is

reduced in type 1 diabetes due to the autoimmune death of beta cells in the islets of Langerhans. Insulin resistance by bodily tissues causes a decrease in insulin function, which disrupts glucose entrance into body cells and causes type 2 diabetes. Since obesity has been shown to exacerbate insulin resistance, type 2 diabetes has been associated with obesity. The comprehensive review of the literature on T1DM and T2DM prevention and education in Saudi Arabia will be the main emphasis of this paper.

In 2019, Mohammed Abdullah Al Mansour used a convenience sample technique to conduct a cross-sectional study in Saudi Arabia to ascertain the prevalence rate of T2DM. He stated that 34.6% of people in this study had type 2 diabetes mellitus. In comparison to the lower age categories, the older respondents had a higher prevalence of the condition (44.6% versus 15.6%). It was discovered that although



the rate at which females contract the disease is marginally higher than that of males (34.9% versus 34.2%), this difference is not statistically significant. The following were the sociodemographic risk factors for the disease: poor income (42.4%), divorced or widowed (56.3%), old age (44%), and work in a business or private sector (38.5%). The following were the factors related to health behaviors: being overweight or obese (42.3%), having high triglycerides (TG) (43.4%), and having low high-density lipoprotein (HDL) (37.3%), and high total cholesterol (23.7%). There was a statistically significant difference in these risk factors between patients with and without diabetes. [2]

Since, diabetes mellitus (DM) is so common in Saudi Arabia, it is crucial to make sure that the public is sufficiently informed about the illness to support ongoing efforts to reduce its incidence through public health measures. Patients with diabetes mellitus should also have a deeper understanding of the medications and lifestyle changes that might help them better control their blood sugar levels and postpone the development of problems from the disease. High levels of understanding and awareness regarding DM pathology, risk factors, management, and complications are necessary for patients, families, nurses, and healthcare professionals to assist DM patients in achieving this aim. The prevalence of T2DM is given in chart below.[26]

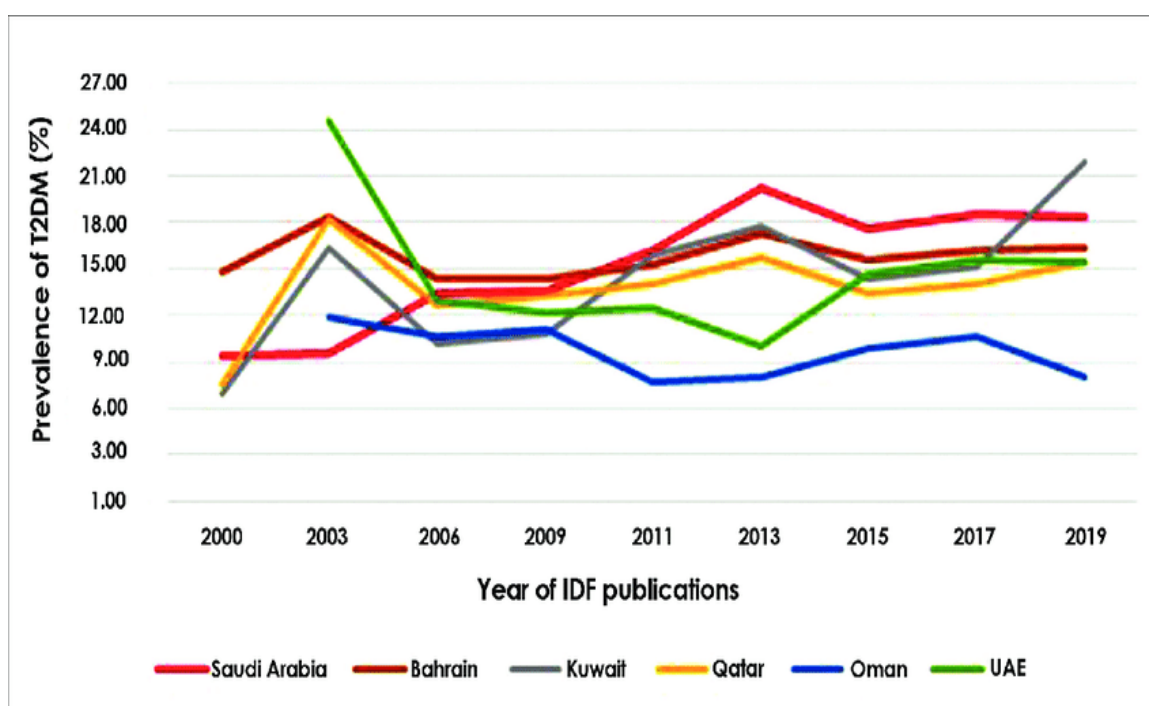


Fig: Prevalence of T2DM among Saudi and nearby countries

This article reviews the literature in a systematic manner to help readers to better understand about the knowledge of Saudi people about diabetes mellitus. Techniques. This systematic review was prepared in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and Meta-analyses of Observational Studies and guidelines followed for this review statement [3, 4]. The years 2019 - 2023, the terms "knowledge OR awareness" AND "diabetes mellitus AND Saudi Arabia" were used to search the literature on PubMed,

Scopus, and the Institute for Scientific Information (ISI) Web of Science. These were the most applicable terms for the review and were pertinent to the topic area. The search outcomes from the databases were then limited to English language, peer reviewed, and research articles.

Methods

This study considers articles published in English about kidney disease. PubMed, Science direct, Web of Science, and Scopus databases are considered as



searchable databases [Table 1]. Table 1 shows the number of published studies between 2019 and 2023 in the mentioned dataset.

Search strategy

A combination of keywords and synonyms is searched based on Boolean logic (OR). Search results are combined and searched using Boolean logic (AND).

Inclusion criteria

Studies in English between 2019 and 2023 using included. Keywords searched: "knowledge OR awareness" AND "diabetes mellitus AND saudi arabia"

Exclusion criteria

Studies which are not in English language are not considered.

Selection of studies

Duplicate records are removed, and then the title and abstract of the remaining studies are considered based on input and output criteria. Unrelated studies were excluded in terms of title and abstract. Then the full text of the articles was considered, and then among the remaining articles, the articles whose full text was not related were deleted. Finally, the remaining articles were considered.

Search results for relevant studies were filtered by two researchers separately. Using the previously mentioned computerized searches, they first turned up nearly 152 possible papers from medical databases. There were further checked for duplication and then 72 items were removed. After this review process, 21 articles were determined to be relevant and were included in the systemic review.

Fig:1 Selection Strategy :

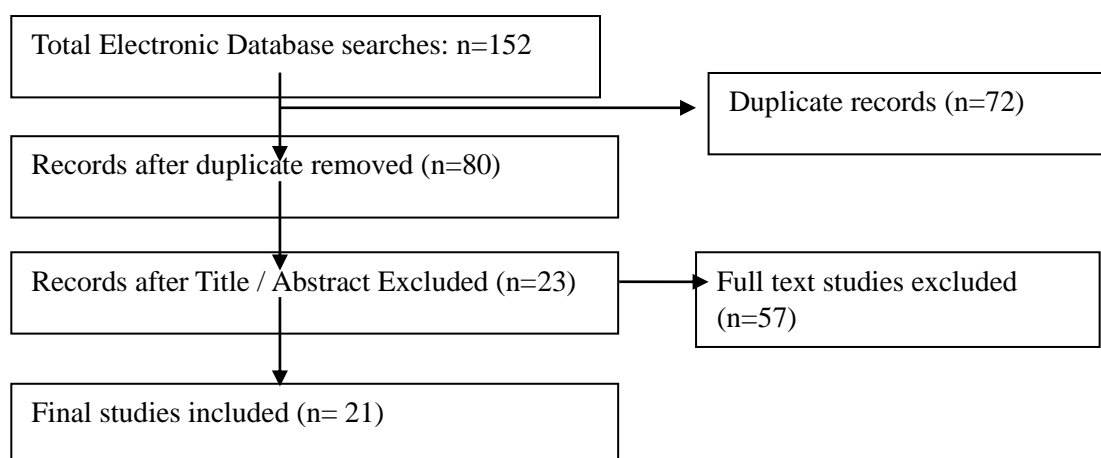


Table:1 The number of records available in the databases that are part of this research.

Database	No. of Records
PubMed	30
Scopus	42
Science Direct	35
Web of science	45
Total	152

The following selection criteria were used to determine which studies would be included in this review: 1) studies that were classified as cross-sectional studies; 2) research where the population of interest was Saudi Arabia; and 3) studies assessing the people's awareness

and knowledge of T1DM, T2DM, or both. The articles that were excluded: 1) published outside of Saudi Arabia; 2) theses or dissertations; and 3) conference abstracts. Three types of data were extracted like research design characteristics, study population



features, study result data and combination of findings. The Included studies were classified according to the type of the population: 1) studies on the general population, 2) studies on health care professionals and

3) studies on DM patients. Extracted data from some of the studies were tabulated and reviewed narratively in Table2.

Table 2: Summary of cross-sectional studies performed in Saudi Arabia about knowledge and awareness of DM.

Study Reference	Population	Sampling Size	Sampling Methods	Key outcomes
ZiyadSaeed Almalki,et,el ¹¹	DM patients	10000	Random sampling	Over the course of the study, diabetes rose by 21% (20% in males and 23% in females).
<i>Khaled AlQarni,et.al</i> ¹²	DM patients	212	Convenience sampling	This study emphasizes how social and religious events may have an impact on medication adherence in this demographic.
Aqeel A. Alaqeel ¹³	DM patients	239	Convenience sampling	The primary barriers to treating diabetes in children and teenagers in Saudi Arabia are parents' and patients' ignorance of T1D and its consequences.
Muaed Jamal Alomar,et.al ¹⁴	DM patients	371	Random sampling	The incidence of hypoglycemia reactions is influenced by participant ignorance about hyperglycemic medications, which is seen as an indirect cost.
Muhammed H.Mujammami,et.al ¹⁵	DM patients	789	Convenience sampling	The risk factor is obesity; individuals without diabetes were less knowledgeable of DM than healthcare professionals.
Ghadeer A. Alhazmi , et.al ¹⁶	DM patients	437	Convenience sampling	The research revealed that the DM patients in the Makkah region did not follow adequate procedures when it came to using insulin. One significant modifiable risk factor for uncontrolled blood glucose levels is inadequate insulin injection technique.
Dhfer Alshayban, Royes JosephID ¹⁷	DM patients	378	Convenience sampling	According to the findings, people who are male, have a high income, are free of problems, and have good glucose management lead



				relatively better lives.
Emad Salawati 18	DM patients	603	Convenience sampling	On the WHO-5 scale, 69.7% of research participants scored poorly (below 13), suggesting poor mental wellness, potential depression, and a lower quality of life.
Ghadah Alkhaldi 19	DM patients	3493	Convenience sampling	The population's awareness of the risk factors for diabetes mellitus and its consequences is low.
Muffarah H. Alharthi, et.al 20	DM patients	404	Random sampling	In Bisha, southwest Saudi Arabia, the study discovered that both those with and without diabetes had a high level of awareness of DM RFs.
Sitah Alshutwi, et.al 21	DM patients	250	Convenience sampling	The findings also show that workers who had assistance at work reported higher levels of motivation, activity, and focus ($r = .41$, $p < .05$).

Results:

There were 152 distinct articles found using the search method for the period of 2019 to 2023. From that 21 articles were included in the systematic review after passing the eligibility screening. These studies included the following populations: 15 DM patients, 2 healthcare personnel, 2 medical students, 1 secondary school student, and 1 general population.

Knowledge about complications of DM:

Most of the research revealed that Saudi Arabian DM patients knew very little about the DM, so that there is a continuous increase in DM patients among Saudi Arabia. Ziyad Saeed Almalki, Ahmed Abdulrahman Albassam, *et al.* highlighted that in Saudi Arabia, the prevalence of diabetes was approximately 1 in 11 in 2010 and was projected to increase to nearly 1 in 5 cases by 2020. This condition constituted a noteworthy percentage of all emergency department (ED) visits, comprising 3.5% of all ED visits for various causes over a five-year span. The researchers concluded that Saudi Arabia grapples with elevated rates of diabetes, leading to increased healthcare costs associated with the treatment of the disease and its complications. The analysis of current trends in diabetes-related ED visits in the Saudi population revealed a relatively consistent

rate of ED visits for diabetic patients from 2012 to the conclusion of the study period.[11]

Mujammami MH, Alodhayani et.al, stated in their studies that out of all the participants, only 37.3% were aware of the present prevalence of DM. They revealed that the most often found risk factor for diabetes mellitus was obesity. For the most part, comparisons showed that health staff were more attentive. In conclusion, it was found that Saudi society lacked a substantial understanding of DM. Knowledge and awareness of DM can be enhanced by social media and educational curricula.[15]

In the research conducted by Khaled AlQarni *et al.*, findings demonstrated that drug adherence was influenced by social and religious factors. To improve patient attitudes and foster comprehension regarding the adherence to prescribed anti-diabetic medication, it is essential to incorporate patient counseling. Chemists, serving as patient counselors and educators on diseases, can play a valuable role in this regard. The study's results suggest that patients exhibit increased adherence as they age, revealing a positive correlation between medication adherence and patient age. One plausible explanation for this trend is that elderly individuals



often have a higher number of prescription medications, attributed to comorbidities. [12]

Alkhalidi G, Aljohani N, et al. reported in their study that the majority of the subgroups (age, sex, married status, educational attainment, having a relative with DM, and nationality) revealed a substantial downward trend in general DM knowledge, according to demographic stratification. Furthermore, a decreasing trend in PA awareness was also evident in some of the subgroups. Future initiatives aimed at prevention should routinely evaluate the community's knowledge of diabetes mellitus to focus awareness campaigns on the demographic groups most in need of intensive educational support. [19]

Knowledge about Diabetic challenges:

Aqeel A. Alaqeel highlighted significant regional variations in the frequency of the condition and the incidence of diabetic ketoacidosis (DKA) at diagnosis, as observed in a review of Type 1 Diabetes (T1D) research conducted in Saudi Arabia. Limited data are available on the occurrence and prevalence of Type 2 Diabetes (T2D) among young individuals. Saudi Arabian pediatric and teenage diabetes patients encounter major challenges, including insufficient psychological support, inadequate school resources, deficient self-management skills, and a lack of knowledge among patients and parents about Type 1 diabetes and its complications [13].

Ghadeer A. Alhazmi et al. conducted a review and reported that decreased insulin adherence is associated with several factors, including polypharmacy, smoking, young age, low socioeconomic status, level of education, and the presence of additional comorbidities. In their study, the only factor showing a significant difference in insulin injection practices between groups was the frequency of administration ($p = 0.049$); patients administering insulin three times a day exhibited the best overall practices. The authors anticipated that patients consistently using insulin injections would score the highest, aligning with an experience-based trend. However, the smallest group of patients ($n = 9$) injected insulin five times or more, potentially impacting statistical analysis and obscuring the true outcome of the experience-based trend [16].

Knowledge about DM with HRQoL:

Dhfer Alshayban and Royes Joseph identified, through their study, that the health-Related Quality of Life (HRQoL) among Type 2 Diabetes (T2DM) patients is

assessed as moderate. The primary aspects through which diabetes affects HRQoL are associated with pain, discomfort, and mobility issues. The research findings highlighted that those individuals with higher income, uncomplicated health conditions, and effective glucose management tend to experience a relatively higher quality of life. This study contributes valuable insights to guide the development of effective intervention initiatives aimed at improving HRQoL related to T2DM among the Saudi Arabian population. Such programs should particularly target populations that are female, older, from lower socioeconomic backgrounds, have numerous diabetic complications, and exhibit elevated Random Blood Glucose (RBG) levels [17].

Almoar et al. [15] stated that the governments must make significant investments in national screening and education programs to assist prevent and aid in the early discovery of such a costly disease. Numerous pharmacoeconomic studies can be conducted to assist hospital decision-makers in considering ways to support patients in maintaining physical fitness, such as providing access to a gym or areas for walking or exercise.

Emad Salawati, demonstrated that patients aged between 31-35 and 41-45, who had experienced hospitalization due to hypoglycemic episodes in the preceding six months, had been diagnosed with diabetes for a duration of six to ten years, were undergoing insulin therapy, and had mental health conditions, were more prone to fearing hypoglycemia. These findings align with prior research indicating that individuals with more chronic and severe illnesses are likely to experience poor mental health and a diminished quality of life. Additionally, the study's results support earlier findings suggesting that individuals with compromised mental health and lower quality of life are more prone to being diagnosed at a younger age, having diabetes for an extended period, and receiving insulin therapy [18].

Knowledge about DM Risk factors:

In their study, Muffarah H. Alharthi *et al.* substantiated that individuals at a higher risk of developing diabetes mellitus can derive greater benefits from lifestyle interventions, such as engaging in physical activity and weight loss, as opposed to relying solely on medication to either prevent or delay the onset of the disease. The study underscores the significance of promoting a healthy lifestyle and educating individuals about



diabetes mellitus risk factors (DM-RFs) and preventive measures as the initial step in prevention efforts [20].

As per the findings of Sitah Alshutwi *et al.*, the severity of diabetes and the necessity for medication during the workday tend to influence the decision to disclose the condition. Most participants in the study reported receiving support from both supervisors and coworkers. The research indicates that a positive working relationship between supervisors and coworkers could play a role in an employee's choice to disclose or withhold information. Moreover, the study revealed a correlation between greater self-management practices at work and the disclosure of diabetes in the workplace [21].

Conclusion:

This assessment emphasizes how important it is for Saudi nationals to learn about and become aware of DM. To effectively educate patients, families, and communities about this chronic illness, methods for increasing understanding and awareness of DM must be included into the processes and systems now in place in the healthcare industry. To improve glycemic control for diabetic patients, efforts should be made to guarantee that people have access to innovative technologies, such as closed-loop insulin administration systems, sophisticated insulin pumps, and physical activity awareness programs. Since DM is a complex disease that would require the combination of several strategies from the government, such as mass screening for persons at risk and education, and from individuals, such as eating a balanced diet and exercising regularly.[26] This review highlights the essential need of knowledge and creating awareness of DM among the Saudi population. It is concluded with two solutions in this area in which one of the main potential solutions is to implement educational programs to create awareness about T1D and its complications, as well as screening programs must be prioritized with the collaboration of health workers and ministry of health. The second solution is to give knowledge for the parents of the children who have DM through access with healthcare providers at 24-h availability to answer questions about diabetes, and a health worker should be assigned to each school to manage diabetes and coordinate between families and healthcare providers.

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