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Prevalence Of Adherence To Drugs In Patients With Type 2 Diabetes In Saudi Arabia: A Systematic Review 2024

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Abstract:

Background:
Diabetes Mellitus is one of the most common metabolic problems in Saudi Arabia and its chronic progressive disease is characterized by numerous health complications. Diabetes Mellitus is considered a key public health problem globally due to its incidence and prevalence and the complications therein. Globally, diabetes affects 425 million people at a prevalence of 8.8% and will rise to approximately 700 million people by the year 2040. Diabetes often coexists with other medical conditions and is a contributing cause of death in 88% of people who have it. The primary purpose of this systematic review is to synthesize the evidence regarding risk factors associated with non-adherence to prescribed glucose-lowering agents, the impact of non-adherence on glycemic control and the economics of diabetes care, and the interventions designed to improve adherence Prevalence of adherence to drugs in patients with type 2 diabetes in Saudi Arabia . Currently, one in every 11 adults worldwide is living with the condition with 90% of these being type II diabetes patients. The past three decades have recorded a distressing rise in the cases of diabetes mellitus, resulting in quadrupling of the cases.
Aim of this systematically review : To determine the prevalence of adherence to drugs in patients in type 2diabetes patients in Saudi Arabia.
Method: Online searching engines were using databases to identify relevant articles through the included electronic databases: PubMed, EMBASE, PsycINFO, and CINAHL from July 2020 to April 2024 and Saudi Digital Library (SDL), data extracted from published articles were systematically analyzed for prevalence of adherence to drugs in patients with type 2 diabetes.
Results:. The usability and outcome of Prevalence of adherence to drugs in patients with type 2 diabetes in Saudi Arabia . 7 articles were selected that compliant with the theme of this present systematic review (Table 1). Among the 7 reviewed articles, articles have explained the current Prevalence of adherence to drugs in patients with type 2 diabetes in Saudi Arabia;
Conclusion: The present studies found low medication adherence by patients with T2DM regarding their prescribed diabetes medication. Low and medium adherence were significantly associated with gender, education status, and duration of diabetes. Moreover, we found that medication adherence is positively correlated with diabetes knowledge and patients' brief perception of their diabetes status.

Keywords: Prevalence, adherence, drugs, patients, type 2 diabetes, Saudi Arabia, Saudi Arabia

Introduction

Background

The global prevalence of diabetes worldwide in adults was estimated to 536.6 million in 2021 and is expected to reach 78 3.2 million by 2045[1]. Approximately 6.7 million people died due to diabetes or its complications in 2021[2]. Diabetes complications can be prevented by achieving good glycemic control, which requires a multidimensional approach to diabetes management, with one important aspect being medication adherence. [3]

The prevalence of T2DM has been increasing in low- and middle-income countries more than in high-income countries, which is among the risk of non-communicable diseases (NCD) with high premature deaths in 2000–2016 [4]. This condition affects adults aged over 45 years more than young adults, teens, and children. Insulin resistance and elevated blood sugar lead to other health problems, including vision loss, heart disease, and kidney diseases [5], T2DM affects 8529 Europeans per 100,000 of the population, and the diabetes burden is rising at a higher rate in Europe than the global average. [6] The data show a continued rise in T2DM cases in developed nations. For comparison, [7] noted a 7% (N = 808) prevalence of 10,821 adults who had T2DM, which indicates an increase in diagnosed cases in Saudi Arabia and other Gulf countries stressed that T2DM is a leading public health problem across all demographics.[8]

Type 2 diabetes is a progressive disease characterized by both insulin resistance and decreased insulin secretion due to declining beta cell function [9]. Persistent hyperglycemia increases the risk of major vascular complications, such as cardiovascular and cerebrovascular complications, as well as micro vascular complications, which include retinopathy, nephropathy, and neuropathy [10]. Treatment of type 2diabetes involves adopting healthy lifestyle behavior, diabetes self-management education, and pharmacologic therapy [11]

Medication adherence refers to the extent to which a patient properly takes and follows their medication, as prescribed by their doctor [12]. For a patient to be considered as an adherent to prescribed medication, several factors must be met: the doctor's prescriptions must be filled, the patient must remember to take their medication at the right time and with the right dose, and the patient must follow and understand the prescription's directions.[13] Medication adherence is critical as it improves quality of life by controlling chronic conditions and treating temporary conditions [14]. It also plays a crucial role in individuals' long-term health and well-being, according to the World Health Organization (WHO) [15]. Medication adherence is a key factor in managing diabetes mellitus (DM). Treating patients with DM requires that they achieve optimal glycemic control, which reduces diabetes complications and the likelihood of risk and death [16].Patients' awareness of and knowledge about their chronic illness and its management are two of the essential components for their better understanding of the treatment protocols [17]. Previous studies demonstrated that in order to properly self-manage diabetes, a patient must have a thorough understanding of medications, food, exercise, home glucose monitoring, foot care, and necessary treatment changes.[18] The assessment of diabetes-related knowledge among T2DM patients is a critical initial step from which to customize diabetes education programs and measure their efficacy [19].

Methodology

Aim of the study

To determine the prevalence of adherence to drugs in patients in type 2diabetes patients in Saudi Arabia 2024.

Study design :

Systematic reviews using Online searching engines were using databases to identify relevant articles through the included electronic databases: PubMed, EMBASE, PsycINFO, and CINAHL from July 2020 to April 2024, and Saudi Digital Library (SDL), data extracted from published articles were systematically analyzed .

Search strategy:

Online searching engines were using databases to identify relevant articles through the included electronic databases: PubMed, EMBASE, PsycINFO, and CINAHL from July 2020 to April 2024 and Saudi Digital Library (SDL), data extracted from published articles were systematically analyzed for prevalence of adherence to drugs in patients with type 2 diabetes Cross-sectional studies published in English were included if they met the following criteria: (1) reported the adherence to using a validated measure; and (2) had a sample size of at least 300 patients with type 2 diabetes. The Joanna Briggs Institute critical appraisal for studies reporting prevalence data was used to assess the quality of the included studies.

Searches and Data Sources

A comprehensive search was performed to obtain studies on the adherence to antidiuretic drugs in Saudi Arabia. The databases used in the search included. The search terms used were consistent with our previous systematic review, which includes "adherence or compliance or persistence" and "diabetes". The full list of search terms used, and the results obtained from each database are presented. We also employed a snowballing technique and citation tracking to identify all potentially relevant studies that might not have been identified from the above databases.

Inclusion criteria:

- Focused on illness perceptions and medication adherence in with T2DM;
- Studies with adult patients aged at least more than18 years; Full-text papers;
- Journal articles published within the last 4 years, between 2020 and 2024;
- Studies published in the English language;
- Primary sources with qualitative or quantitative research designs

Exclusion Criteria

- Studies with pregnant participants;
- Studies with participants under treatment for psychiatric disease;
- Studies written in languages other than English;
- Secondary sources, opinion editions, government periodicals, case reports, or lab reports.

Data extraction

Extracted data from all the included studies , individually extracted the data of one-third of the included studies, using a modified version of The Joanna Briggs Institute Data Extraction Form for prevalence studies. The extracted data included study design, aims of the study, setting, country, number of participants and their characteristics, adherence measures including cut-off points, and the reasons for non-adherence reported by patients. The extracted data were verified.

The process of selecting the articles, which are contained in this review

We modified the study selection criteria from a previous study which reported adherence to antidiuretic drugs, and used representative samples of the general population of type 2 diabetes patients. Cross-sectional studies published in English were included in our review if they met the following criteria: (1) reported the adherence to using a validated measure with a defined cut-off point to indicate adherence; and (2), with the expected prevalence of adherence to antidiuretic drugs at 50% based on our previous systematic review. This approach of using a minimum sample size as a selection criterion has been employed in a previous the prevalence of a specific disease .

Table1: Summary of Findings of the prevalence of adherence to drugs in patients with type 2 diabetes in Saudi Arabia .

Author, Date, Country	Region	Study design	Study aim	Results
Boonpat tharatthiti et al (2024) (20)	This is an open access article under the terms of the Creative Commons	A systematic search was performed in PubMed, EMBASE, PsycINFO, and CINAHL from July 2013 to April 2023. Cross-sectional studies published in English.	To determine the prevalence of adherence to OAD in type 2 diabetes patients.	Twenty-six studies involving a total of 69,366 patients met the selection criteria and were included in the meta-analysis. The overall estimated prevalence of adherence to oral anti diabetic drugs was 55.53% (95%CI: 44.22%–66.85%). Among the included studies, nine were deemed to be of high quality. A sensitivity analysis conducted using only the high-quality studies revealed a prevalence of adherence to oral anti diabetic drugs at 52.24% (95% CI: 39.63%–64.85%). Moreover, of the 27 studies from our previous study , two studies met the inclusion criteria of the present review. Furthermore, nine additional studies were identified through other methods. In total, 26 studies were included in the quantitative synthesis. The remaining 202 full text studies were reviewed for eligibility. Subsequently, 187 articles were excluded for the following reasons: 49 studies were conducted in a single setting, 35 studies did not report the proportion of patients adherent to oral anti diabetic drugs, studies did not separately report adherence to oral anti diabetic drugs from other medications, studies had an inadequate sample size, studies were not cross-sectional, 10 studies were conducted in special populations, studies were predictive studies about adherence, 5studies were not published in English, and 2 studies were a validation of adherence measurement . **Conclusions** The overall prevalence of adherence to oral anti diabetic drugs was remarkably low among type 2 diabetes patients worldwide. Healthcare practitioners and policy makers should employ appropriate approaches to improve adherence to oral anti diabetic drugs In our study, we did not explore the causes of non-adherence or interventions to improve adherence to oral anti diabetic drugs; this area could be explored in future research. With the burden of diabetes rising, the imperative for innovative approaches to address low adherence becomes increasingly urgent for the advancement of diabetes care on

				a global scale. Addressing the challenge of improving medication adherence is complex and demands multidimensional self-management support strategies. Healthcare practitioners should employ appropriate approaches to enhance medication adherence in diabetes. Future studies can further investigate the factors influencing adherence and develop targeted strategies to improve medication adherence for better achievement of diabetes treatment goals.
Khardali, et al (2024) (21)	Saudi Arabia	Qualitative Face-to-face interviews.	To explore patients' perceptions of the barriers to medication adherence through the Social Health determinants framework.	The findings of this study provide insights into other factors that might impact adherence directly or indirectly; these were grouped into four domains based on education access and quality, healthcare access and quality, economic stability, and social and community context. This indicates that factors contributing to medication non-adherence are not restricted to patient-related causes but encompassing a wide range of external factors. A total of 15 patients with uncontrolled T2DM participated in this study. Face-to-face interviews were conducted between February and June 2023. The interviews were conducted with 9 (60%) male and 6 (40%) female patients at the diabetic center. Eight out of the 15 patients suffered from diabetic complications, such as neuropathy, diabetic foot , and retinopathy , and the majority of patients suffered from hypertension as a comorbid disease (73%). The themes that might impact anti diabetic medication adherence were identified from interviewing patients based on the social determinants of health model. Education access and quality: Two main themes that emerged under this domain are Health Perception and Health Behavior. The majority of patients in this study revealed a lack of knowledge regarding the nature of T2DM and the cause of the disease **Conclusions** Social determinants of health factors, such as education, health perceptions, healthcare quality and accessibility, and social support, can significantly influence patients' ability and willingness to adhere to their anti-diabetic medications. To promote medication adherence among T2DM patients, multilevel interventions and

				approaches are needed to target the patients, healthcare system, and community. This approach should include educating the patient to enhance disease understanding and medication adherence, personalized care plans that consider each patient's unique lifestyle and needs, simplified medication regimens to reduce the burden of polypharmacy, effective communication between healthcare providers and patients to foster trust and understanding, and strong social support to mitigate the effects of stigma and provide encouragement in disease management.
Alharbi et al. (2023) (22)	Saudi Arabia	critical analysis	To examine illness perception and medication adherence among adult patients with T2DM.	The 20 studies selected for the scoping review covered different themes on the overall concept of illness perception and medication adherence in adults with Type 2 Diabetes Mellitus. Each study presented unique implications for research and influence on the policymaking relating to the treatment or the management of type 2 diabetes mellitus in adults of different aged groups. Different compelling themes emerged from the study to underscore the overall concept of illness perception and medication adherence in adult patients with T2DM. The authors discussed illness perceptions in line with the management, self-care practices, and treatment of T2DM. The studies further discussed medication adherence in isolation and linked it to patients' health beliefs, social support, and personal convictions, as well as the severity of the disease. Moreover, the studies present illness perception as the antecedent for medication adherence or non-adherence in adult patients with T2DM. The studies differed on the relationship between medication adherence and perceptions towards T2DM. **Conclusions** The studies reveal both high and low adherence to medications in adults with type 2 diabetes mellitus. The management and treatment of the condition depend on the uptake of oral hypoglycemic agents or insulin as well as the recommended therapies to

				enhance the clinical outcomes of the patients, also findings show that participation in practices such as blood sugar testing, specific diets, avoiding smoking, participating in physical exercise, and foot care performance influence the adoption of the prescribed treatment or management programs. Indeed, illness perception leads to medication adherence, which might vary according to one's knowledge of T2DM, gender, and age. Overall, the studies indicate older adults and women adhere to medications more than younger adults and male patients
Alsaidan, et al (2023) (23)	Saudi Arabia of Eastern Province	The survey was a multi-site cross-sectional study conducted from July 2022 to January 2023 among T2DM patients attending PHCs in Hafr Al-Batin, KSA. This region is situated in the Eastern	To evaluated the medication adherence, illness perception, diabetes knowledge, and associated factors among patients with type 2 diabetes mellitus (T2DM)	Adherence to prescribed medications by patients with diabetes is correlated with lower healthcare spending costs for a country, better clinical outcomes, decreased morbidity, decreased hospital admission rates, and decreased mortality, as stated by the Centers for Disease Control and Prevention (CDC). Diabetes education, based on a patient's knowledge to protect their health, is the theme of the current year of the World Diabetes Day 2021–23 activities These statements from the major international health organizations restate the importance of the present study. The present study discovered that only 30.8% of patients with T2DM were highly adherent to the medications prescribed by doctors. **Conclusions** We recommend improving T2DM patients' knowledge about the importance of adherence to their medication regimen in several health education sessions at the PHCs. In addition, we recommend mixed-method medication adherence assessment surveys in different parts of the KSA. The present PHC-based cross-sectional study low medication adherence by patients with T2DM regarding their prescribed diabetes medication. Low and medium adherence were significantly associated with gender, education status, and duration of diabetes. Moreover, we found that medication adherence is positively correlated with diabetes knowledge and patients' brief perception of their diabetes status. We recommend improving T2DM patients' knowledge related to diabetes and note the importance of compliance with the medication regimen through several health education sessions at the PHCs

				and other health care facilities. These sessions can be delivered by physicians and other health care providers, namely, nurses and community pharmacists. Furthermore, we recommend mixed-method medication adherence assessment surveys in other regions of the KSA.
Saudi et al (2022) (24)	Port Said City, Egypt	A cross-sectional study was conducted between July 2019 and November 2020. A random sample of 265 Egyptian T2DM patients were enrolled from primary health-care settings in Port Said, Egypt.	To assess illness perception, medication adherence, and glycemic control among primary care attendees with T2DM.	This study revealed that the participants had a fair level of diabetes perception, which was associated with a history of complications, medication regimen intake, and controlled glycemic level. Adherence to anti diabetic treatment was reported among three-fifths of them, and was associated with the duration of diabetes, a family history of diabetes, and glycemic control. About three-quarters of participants failed to achieve adequate glycemic control. Higher HbA1c levels were linked to a higher BMI, a positive family history of T2DM, insulin users, high illness perception, and poor medication adherence. In our study, participants mostly perceived T2DM as a disease that had no significant consequences on their life (consequences), they were unable to control their diabetes (personal control), diabetes treatment was ineffective **Conclusions** Glycemic control level was suboptimal among PHC patients with T2DM. Higher HbA1c levels were linked to a higher BMI, a positive family history of T2DM, insulin users, high illness perception, and poor medication adherence. also the way for further interventions and strategies to improve illness perception, medication adherence, and glycemic control among PHC patients with T2DM in Egypt during the universal health coverage era.

Alshehri, et al (2020), (25)	Saudi Arabia	Cross-sectional analytic study in National Guard Health Affairs .	To assess the adherence among patients with T2DM via a self-completed questionnaire after participant verbal and written consent.	Adherence levels and the factors that influence adherence vary from study to study, and the variation could be due to differences in traditions, customs, and environmental factors among various societies and regions. A systematic review conducted by Cramer in the United States assessed patients with diabetes' adherence with oral hypoglycemic agents and insulin and reported that 36% to 93% of the patients taking OHA remained on their treatment for 6-24 months. For insulin adherence, Cramer estimated that adherence was 62% and 64% for patients on long-term and short-term insulin, respectively. She also reported that some of the patients omitted OHA doses and insulin injections before a clinical visit. She emphasized the need for further investigations about specific factors that might lead to an improvement in medication adherence. **Conclusion** Patients' adherence to their medications can minimize morbidity and mortality. The overall percentage of medication adherence among patients with T2DM is less than optimal for several reasons. The primary reason for suboptimal adherence was patient forgetfulness. Health awareness campaigns may play a vital role in improving patient adherence levels. Further studies are warranted to explore the impact of awareness campaigns on patient forgetfulness as a means to improve adherence to T2DM treatment.
AlShayban et al (2020) [26]	Saudi Arabia	A cross-sectional study	To evaluate the association between disease knowledge and medication adherence in patients with type 2 diabetes mellitus.	Reported a weak-to moderate positive relationship between the two. Moreover, it further revealed a moderate-to-strong negative relationship between adherence score and gyrated hemoglobin A1c value as well between disease knowledge and same. HbA1c was considered as a proxy for disease control as the American Diabetes Association (ADA) mentions a better HbA1c value as an indicator for adequate glycemic control over 4 months . This approach has been previously used in Saudi patients with T2DM. All correlations were

				statistically significant. This implied that patients who had better adherence and disease knowledge demonstrated better glycemic control . Moreover, it further highlighted that knowledge about the disease and adherence to therapy were related. Better knowledge contributes to better adherence. **Conclusions** The disease knowledge in most patients was average and half of patients had high-to-good adherence. A significant weak-to moderate correlation between disease knowledge and medication adherence was present. Moreover, there was a significantly moderate-to-strong, negative relationship between HbA1c and, disease knowledge as well as adherence, that glycemic control was better in patients with good knowledge of diabetes and high adherence to anti diabetic medications. A positive relationship between disease knowledge and adherence score was observed that highlights the impact of disease awareness on treatment concordance. This may result in better control of disease. These results highlight the importance of patient education and awareness regarding medication adherence in managing diabetes. Patients with better knowledge were 4 to 5 times more likely to have high adherence.

Results and discussion

The usability and outcome of Prevalence of adherence to drugs in patients with type 2 diabetes in Saudi Arabia . 7 articles were selected that compliant with the theme of this present systematic review (Table 1). Among the 7 reviewed articles, articles have explained the current Prevalence of adherence to drugs in patients with type 2 diabetes in Saudi Arabia; articles assess the prospective role of adherence to drugs in patients with type 2 diabetes in the healthcare system. Different health adherence to drugs in patients with type 2 diabetes in Saudi Arabia was explained in different articles, articles highlight the strengths and weaknesses of adherence to drugs in patients with type 2 diabetes in Saudi Arabia. Finally, articles have provided recommendations for Saudi adherence to drugs in patients with type 2 diabetes in Saudi Arabia

Many researchers and health professionals have acknowledged that diabetes is a self-management disease with the onus on the patients to take care of themselves [27]. Two of the most essential facets of diabetes management are medication adherence and self-care behavior's. Adherence to these aspects of care is very challenging for most patients with diabetes [19]. in this study the influential distribution of the History of Diabetes among the patients factors associated with medication-non adherence and self-care practices among diabetes mellitus patients (patient, medication, health care related factors).(Insufficient knowledge about medications , no progress , depression sense of unusualness . Medication adherence is a critical element in treating among diabetic patients, and non-adherence among patients is an issue facing health care providers. Previous studies report that measuring adherence and patient compliance is quite difficult and is patient-dependent most of the time.[22] Hence, this study aimed to assess prevalence and risk factors of treatment Non-compliance among Diabetic Patients in Saudi Arabia.

In line with prior studies [12], an overwhelming percentage of the participants were adherent to medication. This study found no statistically significant association between knowledge and medication adherence. We therefore argue that participants might have had the perception that medication is more important than other self-care behavior's for example diet and exercise to control diabetes [14] It could be assumed that clinicians probably focused more on the importance of adherence to therapeutic regimen than other self-car behavior's. Contrasting findings were reported in Cameroon [19] and Malaysia [27] whereby the majority of patients were non-adherent to medication. The study in Cameroon cited financial challenges as a reason for the low adherence with patients having to purchase expensive drugs out of pocket. Though the National Health Insurance status of participants was not assessed, its coverage on anti-diabetes medications in Ghana might have contributed to the high adherence rate of the present study population as most of the patients were not affluent .

Conclusion

The present study findings revealed a low prevalence of medication adherence. The factors associated with adherence were age, education, and practice of self-care activities. Knowledge also had a significant influence on self-care practice. We recommend consistency in education to deal with issues related to self-care behavior's and medication adherence as this is necessary to enhance self-management and minimize complications. Non-adherence was associated with younger age. Interventions to improve adherence should target younger and newly diagnosed patients through aggressive counseling to address healthy self-management behavior's. Other approaches that have been used to study adherence measure validity could be future research. Medical practitioners need to be aware of it and address this problem because compliance is directly related to the prognosis of the illness. A high prevalence of non – compliance is still a problem in the treatment of patients, particularly those who had positive risk factors future studies should investigate potential strategies to identify at-risk patients and develop new methods to increase persistence and adherence by addressing the modifiable risk factors.

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