Volume 4, Issue 2, 2026

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

EVALUATING MEDICATION ADHERENCE IN DIABETES MELLITUS PATIENTS AT TERTIARY CARE HOSPITAL NAWABSHASH

Kainat Kandhro[*1], Munwar –us- Salam[2], Rubina Parveen[3], Sawera Kandhro[4], Fiza Rani[5], Ghazala Khokhar[5]

*[*1]BSN Student, Begum Bilquees Sultana Institute of Nursing, People's University of Medical and Health Sciences of Medical and Health Sciences SBA*

[2]Associate Professor, Begum Bilquees Sultana Institute of Nursing, Peoples University of Medical & Health Sciences for Women Nawabshah, SBA.

[3]Assistant Professor, Begum Bilquees Sultana Institute of Nursing, Peoples University of Medical & Health Sciences for Women Nawabshah, SBA.

[*1]bb938281@gmailcom

DOI: https://doi.org/10.5281/zenodo.18752610

Keywords

Diabetes Mellitus, medication adherence, MARS-10, patient compliance

Article History

Received: 24 December 2025
Accepted: 08 February 2026
Published: 24 February 2026

Corresponding Author: *
Kainat Kandhro

Abstract

Background: *Diabetes mellitus is a long-term disease that requires patients to take their medications regularly. Diabetes mellitus (DM) is a progressively increasing metabolic disorder and a significant public health burden that demands immediate global attention. However, there is a paucity of data about adherence to antidiabetic drugs among patients with type-2 DM . It has been reported that patients with chronic diseases who adhere to treatment may experience improvement in quality of life. Poor medication adherence can lead to poor blood sugar control and complications.*

Objectives: *This study aimed to evaluating medication adherence in diabetes patients.*

Methods: *A cross-sectional study design was employed to assess medication adherence among patients with diabetes mellitus attending the medicine ward of a tertiary care hospital in Nawabshah. The study population consisted of adult diabetic patients who met the inclusion criteria and consented to participate in the study. Data were collected using a structured questionnaire that included two sections: demographic and clinical characteristics, and medication adherence assessment. Medication adherence was measured using the Medication Adherence Rating Scale-10 (MARS-10), a validated tool designed to evaluate patients' adherence behaviors. The collected data were entered and analyzed using Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics including frequencies and percentages were used to summarize the data.*

Results: *The study showed that many patients did not fully follow their medication schedules. Common reasons for non-adherence included forgetfulness, side effects, and complicated medication routines. Adherence was found to be better in patients with higher education and shorter duration of diabetes. The MARS-10 scale effectively identified patients' adherence behaviors.*

Conclusion: *Medication adherence among diabetes patients in Nawabshah is not optimal. Using MARS-10 helps healthcare providers understand adherence*

Volume 4, Issue 2, 2026

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

problems and plan interventions. Educating patients, simplifying medication regimens, and regular counseling can improve adherence and diabetes management.

INTRODUCTION

Diabetes mellitus (DM) is most prevalent chronic illnesses in world with a increasing number of cases of diabetes mellitus in developing nations across the world.[1] Diabetes mellitus is recognized as one of largest global health emergencies of the 21st century due to its growing burden on individual, families and health care, according to the Pakistan national diabetes survey the prevalence of type-2 diabetes mellitus among adults is approximately 16.98%.[2] Diabetes mellitus (DM) is a health issue where the body's blood sugar remains high, a condition known as hyperglycemia, because the pancreas doesn't produce enough insulin or the body's cells don't effectively use the insulin that is produced.[3] Diabetes leads to numerous physical and mental complications such as cardiovascular disease, diabetic nephropathy, worry about the future of the disease as well as marital, family, and occupational problems.[4] World Health Organization has promoted the term "adherence" for use in chronic disorders as "the extent to which a person's behavior taking medication with recommendation of healthcare provider.[5] There are several factors that cause non compliance in Diabetes mellitus sufferers including demographic factors (low education level, low economic status, and ethnic background), psychological factors, family support, health workers and the health service system and family support is one of the factors that influences DM sufferers in terms of care and treatment as well as the health values of DM sufferers with good family support will help in healthy behavior so that the management of diabetes mellitus will be in accordance with the recommendations of medical personnel such as taking medication regularly, maintaining a diet and doing physical activity which can reduce the risk of complications, while the lack of family support can affect the coping mechanisms, this will indirectly affect the compliance of Diabetes mellitus sufferers when undergoing treatment therapy, medication adherence, which refers to the extent to which patients take medications as prescribed by their physician it is crucial in controlling blood sugar levels and reducing the risk of long-term complications in individuals with T2DM.[6] Poor medication adherence among patients with Diabetes mellitus is associated with poor glycemic control and decreased benefits from their prescribed medication that can contribute to increased morbidity and mortality, development of comorbidities, poor quality of life and increased costs for healthcare and also develop the neuropathy.[7] These negative outcomes contribute to increased morbidity and mortality, higher prevelance of comorbid conditions, deterioration in quality of life and increased healthcare costs.[8] Non-conforming non-adherence includes a variety of ways in which medication is not taken as prescribed, this behavior can range from skipping doses, taking medications at incorrect times or in correct doses, or even taking more than prescribed.[9] Medication adherence contributes to an improved quality of life in type 2 diabetes mellitus patient.[10] Antidiabetic drugs are classified as oral antidiabetic agents and insulins and other injectable preparations and related to degree of glycemic control, both insulin and sulphonylureas reduced micro vascular complications in type 2 DM Metformin, however, could reduce both micro vascular and macro vascular complications in type 2 DM patients do not attain desired level of glycemic control with metformin alone, and a second drug is needed.[11] The person having diabetes has to adhere to a normal glucose level to maintain health, avoid complications in body and attain a healthy lifestyle and treating a chronic disease, the role of doctor as well as patient adherence is important.[12] Among the public health problems with the quickest rate of growth is diabetes the expense of testing and treatment and a lack of qualified medical personnel provide significant challenges for patient evaluation and treatment.[13] Medication adherence is important in diabetes

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

mellitus play crucial role in control sugar level and reduce the complication also improve health if patient obey the instruction of physician.[14] Evaluating medication adherence among patients with diabetes mellitus is essential to improve therapeutic outcomes and reduce diabetes related complications in tertiary care settings.[15]

MATERIAL & METHODS

This study is descriptive cross sectional study design was used to evaluate medication adherence in diabetes mellitus patients. The study was conducted in diabetes mellitus patients at the Medicine ward of Peoples Medical Civil Hospital Nawabshah. Data collection was over conducted from 17 November to 17 January 2026 2 months after approval of Institutional Review Board (IRB) Sample size was 298 calculated by using open epi info software, calculated based on 95% confidence level and 5% margin of error. A non-probability sampling technique was used to select participants. The inclusion criteria included Diabetic patients who admitted to hospital Patients with an age above 18 years, Patients who willing to gave informed consent to participate in study, and the exclusion criteria included Patients who Unwilling to participated in the study.

RESULTS

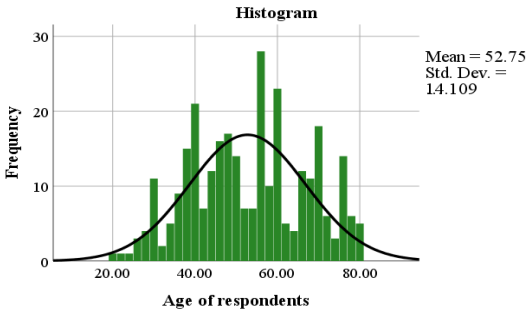

Figure 1: Age of Respondent

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

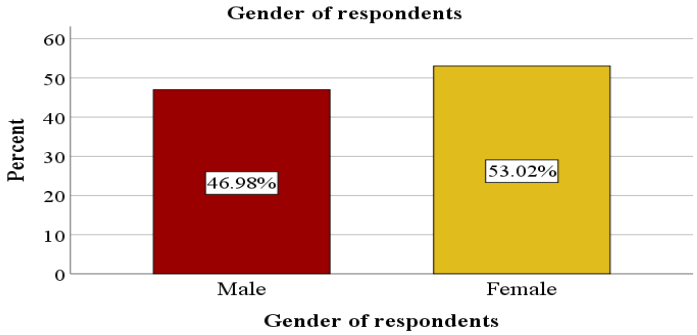

Figure 2: Gender of Respondents

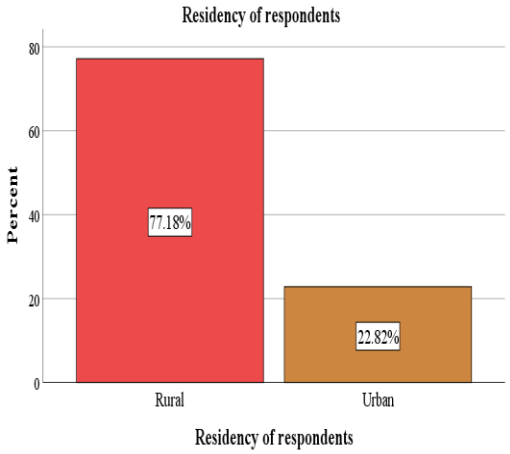

Figure 3: Residency of Respondents

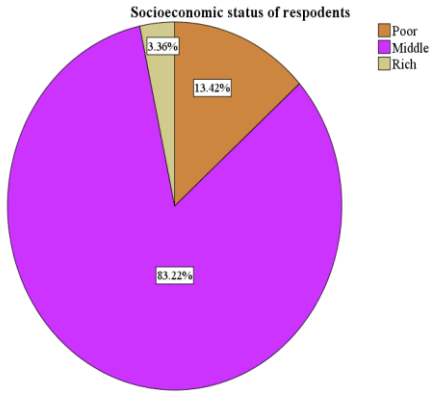

Figure 4: Socioeconomic Status

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Table No 2: Religion of respondents

Religion	Frequency	Percentage %
Muslim	273	91.6%
Hindu	25	8.4 %
Total	298	100.0 %

Table No 3: Educational level of Respondents

Educational level	Frequency	Percentage %
Illiterate	178	59.7 %
Primary	20	6.7 %
Middle	8	2.7 %
Matriculation	14	4.7 %
Intermediate	18	6.0 %
Graduate	60	20.1 %
Total	298	100.0 %

Table No 4 : Family Type of Respondents

Family type	Frequency	Percentage%
Single	142	47.7 %
Joint	149	50.0 %
Extended	7	2.3 %
Total	298	100.0 %

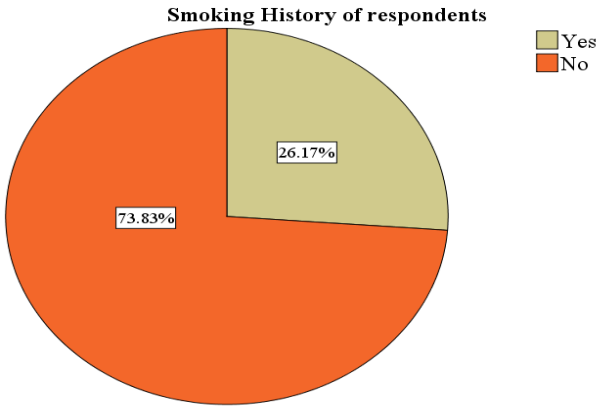

Figure 5: Smoking History

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

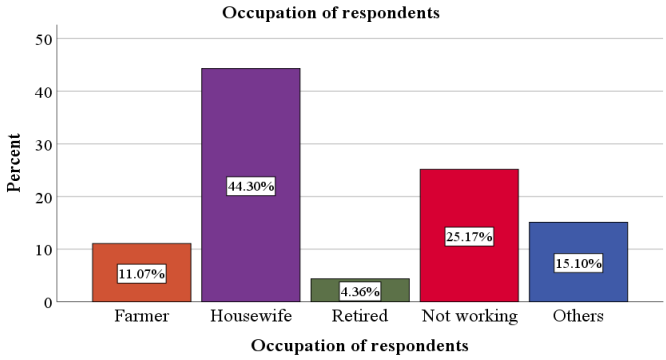

Figure 6: Occupation of Respondents

Table No 5: Alcohol history of Respondents

Alcohol	Frequency	Percentage%
Yes	7	2.3%
No	291	97.7%
Total	298	100.0%

Table 6: Section B

QUESTIONNAIRE	YES F(%)	NO F(%)
Do you take your diabetes medication on time?	266(89.3%)	32(10.7%)
Do you obey the follow-up order as per the advise of your physician	269(90.3%)	29(9.7%)
Do you continue to take medication for diabetes when you sick?	273(91.6%)	25(8.4%)
Do you carry your diabetic medication while travelling?	256(85.9%)	42(14.1%)

Table 7: QUESTIONNAIRE

QUESTIONNAIRE	NEVER F(%)	SOMETIMES F(%)	OFTEN F(%)	ALWAYS F(%)
Do you stop/skip a dose when you are a feeling better?	231(77.5%)	53(17.8)	9(3.0)	5(1.7%)
Do you stop taking medication when you have any side effects without consulting your physician?	218(73.2%)	49(16.4%)	24(8.1%)	7(2.3%)
Do you modify the dosage of medication based home glucose monitoring without consulting your physician?	217(72.8%)	51(17.1%)	16(5.4%)	14(4.7%)
Do you have difficulty in remembering to take your medication?	183(61.4%)	80(26.8%)	22(7.4%)	13(4.4%)
Do you have difficulty following treatment plan when you have to take multiple drugs at different time of the days?	172(57.7%)	101(33.9%)	14(4.7%)	11(3.7%)

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Do you skip buying the medications when you have financial troubles?	185(62.1%)	90(30.2%)	18(6.0%)	5(1.7%)
Do you forget to take your medication due your busy schedule (for example family events/festival)?	117(59.4%)	96(32.2%)	14(4.7%)	11(3.7%)
Do you discontinue your medication when you feel well?	206(69.1%)	74(24.8%)	13(4.4%)	5(1.7%)

Table 8: MEDICATION ADHERENCE RATING SCALE - 10 items (MARS-10)

QUESTIONNAIRE	YES F (%)	NO F(%)
Do your ever forget to take your medication?	116(38.9%)	182(61.1%)
Are you careless at times about taking your medication?	112(37.6%)	186(62.4%)
When you feel better do you sometimes stop taking your medication?	104(34.9%)	194(65.1%)
Sometimes if you feel worse when you take the medication do you stop taking it?	135(45.3%)	163(54.7%)
I take my medication only when i am sick.	179(60.1%)	119(39.9%)
It is unnatural for my mind and body to be controlled by medication.	171(57.4%)	127(42.6%)
My thoughts are clearer on medication.	250(83.9%)	48(16.1%)
By staying on medication, i can prevent getting sick	254(85.2%)	44(14.8%)
I feel weird on medication.	236(79.2%)	62(20.8%)
Medication make me feel tired and sluggish.	237(79.5%)	61(20.5%)

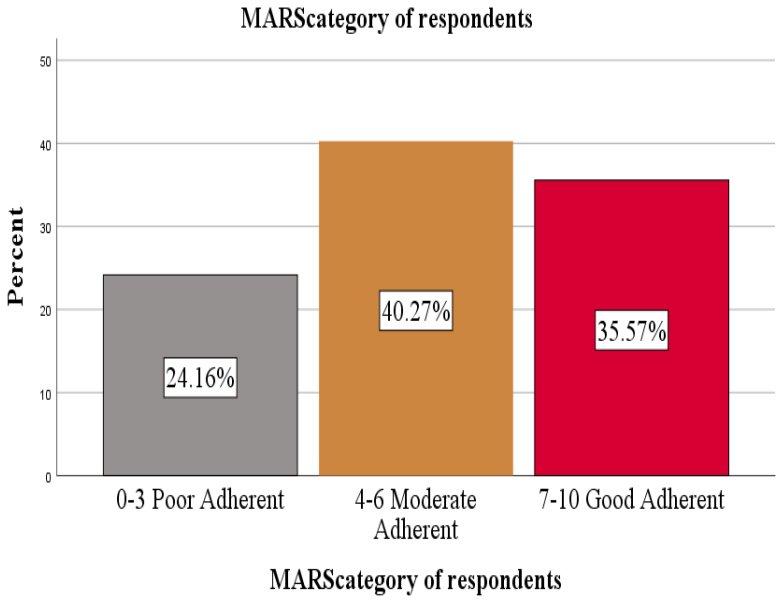

Figure 8: MARS category of Respondents

DISCUSSION

The present study evaluated medication adherence among patients with diabetes mellitus attending a tertiary care hospital in Nawabshah. The findings were interpreted in relation to demographic characteristics, socioeconomic status, lifestyle factors, and adherence levels, and compared with previous research.The results

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

showed that most participants were aged 41–60 years, with a mean age of 52.75 ± 14.109 years. This age group is particularly vulnerable to diabetes-related complications and requires long-term pharmacological management. Similar age distributions have been reported in earlier studies, where middle-aged and older adults constituted the majority of diabetic populations due to increased disease prevalence with advancing age.[18]

Female participants slightly outnumbered males, suggesting greater healthcare utilization among women. Previous research also indicates that women demonstrate better health-seeking behavior and are more consistent in attending follow-up visits for chronic disease management. Most participants belonged to rural areas, reflecting the hospital's function as a referral center for surrounding rural communities. Rural residence may negatively affect medication adherence due to limited healthcare access, transportation barriers, financial constraints, and lower health literacy. Earlier studies in similar settings have reported comparable challenges among rural populations. The majority of participants were married. Marriage often provides emotional and practical support that enhances adherence to medication regimens. Family members frequently assist in medication reminders and lifestyle management, which has been identified as a positive influence on adherence in chronic illnesses.[19]

The religious distribution largely reflected the regional population, with most participants being Muslims. Although religion does not directly determine adherence, cultural and religious practices may influence dietary habits, fasting patterns, and health beliefs that affect diabetes management. Most participants belonged to the middle-income group, while fewer were from low- and high-income groups. Socioeconomic status is a key determinant of medication adherence. Financial stability enables consistent medication purchase, whereas cost-related barriers can reduce adherence among lower-income individuals. Previous studies have confirmed that affordability significantly influences adherence behavior. Ethnic distribution showed a predominance of Sindhi participants, followed by Siraiki, Punjabi, Balochi, and Pashto groups, reflecting the ethnic diversity of the study area.Occupational status indicated that housewives constituted the largest group, followed by unemployed individuals, farmers, and retired persons. Occupation affects daily routines and medication-taking habits. Individuals with flexible schedules may demonstrate better adherence compared to those with demanding work schedules. Similar findings have been reported in previous studies.[20]

Educational status revealed a high proportion of illiterate participants. Education plays a critical role in understanding disease processes, medication schedules, and the importance of adherence. Low literacy levels are strongly associated with misunderstanding treatment instructions and poor adherence. These findings align with previous literature highlighting education as a major predictor of adherence. Lifestyle factors showed that one-quarter of participants were smokers. Smoking is considered a negative health behavior and has been associated with lower adherence to medical treatment due to reduced health risk perception and poor compliance with medical advice Participants belonged to both single and joint family systems. Family structure can influence adherence depending on the level of supervision, emotional support, and shared responsibility for care. Previous studies suggest that supportive family environments improve adherence outcomes. Alcohol consumption was reported by very few participants, likely due to cultural and religious norms. Although minimal, lifestyle behaviors remain important in overall diabetes management.[21]

Medication adherence was assessed using the Medication Adherence Rating Scale (MARS-10). Participants were categorized as having poor (0–3), moderate (4–6), or good adherence (7–10). The majority demonstrated moderate adherence, followed by good adherence, while a smaller proportion showed poor adherence. Similar adherence patterns have been reported nationally and internationally, where moderate adherence is more common among patients with chronic diseases. The predominance of moderate

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

adherence suggests barriers such as forgetfulness, irregular medication intake, and incomplete understanding of treatment regimens. Previous studies have identified similar factors contributing to suboptimal adherence.[22]

The relatively smaller proportion of patients with good adherence may be attributed to complex medication schedules, long disease duration, and inadequate patient education. Long-term therapy often leads to treatment fatigue, and patients may skip doses once symptoms improve or due to misconceptions about medication dependency .Although fewer patients demonstrated poor adherence, this group is clinically significant. Poor adherence is strongly associated with poor glycemic control, increased risk of complications, frequent hospital admissions, and higher healthcare costs. Targeted interventions such as patient counseling, reminder systems, and close follow-up are essential to improve adherence and outcomes.[23]

Overall, the findings are consistent with studies conducted in Pakistan and other low- and middle-income countries, which report suboptimal medication adherence among diabetic patients despite regular follow-up at tertiary care hospitals. Socioeconomic limitations, low health literacy, and inadequate patient–provider communication remain major contributors to non-adherence in these settings.[24]

CONCLUSION

This study was conducted to evaluate medication adherence among patients with diabetes mellitus attending a tertiary care hospital using the Medication Adherence Rating Scale-10 (MARS-10). The findings demonstrated that medication adherence among diabetic patients was predominantly at a moderate level, with a smaller proportion of patients showing good adherence and a noticeable percentage exhibiting poor adherence. These results indicate that although patients are receiving treatment, adherence to prescribed antidiabetic medications remains suboptimal. Medication adherence is a critical component of effective diabetes management, as poor adherence can lead to inadequate glycemic control, increased risk of acute and chronic complications, frequent hospital admissions, and higher healthcare costs. The observed levels of moderate and poor adherence in this study suggest the presence of multiple barriers, including behavioral factors, lack of adequate patient education, forgetfulness, and possible misconceptions regarding long-term medication use. Overall, the findings highlight a significant gap between prescribed treatment and actual medication-taking behavior among diabetic patients. Addressing this gap is essential to improve clinical outcomes, enhance quality of life, and reduce the burden of diabetes-related complications. This study provides valuable baseline data that can be used to inform future interventions aimed at improving medication adherence in diabetic populations.

REFERENCES:

Joha S, Gupta AK, Mukherjee S, Era N. Medication Adherence and Quality of Life Among Type 2 Diabetes Patients: A Cross-Sectional, Observational Study in an Eastern India Set Up. Clinical Diabetology. 2025;14(2):68-73.

David R, Singh D, Mendhe H. Evaluation of Treatment Adherence and Uncontrolled Blood Sugar Prevalence in Type 2 Diabetes Mellitus Patients at a Tertiary Care Centre in Rajnandgaon, Chhattisgarh, India. 2025.

Shah S, Barot P, Patel H, Shukla A, Patel Sr HJ, Shukla AB. Assessment of Medication Adherence in Diabetes Mellitus Patients at a Tertiary Care Teaching Hospital in India. Cureus. 2025;17(2).

Khalili Azar K, Mirzaei A, Babapour A-R, Fathnezhad-Kazemi A. The mediating effect of self-efficacy on the relationship between social support and medication adherence in adults with type 2 diabetes. SAGE Open Medicine. 2024;12:20503121231221446.

Cramer JA. A systematic review of adherence with medications for diabetes. Diabetes care. 2024;27(5):1218-24.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Bashir MB, Ijaz S, Farooq U, Kahar A, Quan WZ. Diabetes educator-led education intervention to improve the medication adherence and quality of life in type 2 diabetes patients: a pre-and post-analysis. Romanian Journal of Diabetes Nutrition and Metabolic Diseases. 2025;32(2):119-27.

Doya IF, Yahaya JJ, Ngaiza AI, Bintabara D. Low medication adherence and its associated factors among patients with type 2 diabetes mellitus attending Amana Hospital in Dar es Salaam, Tanzania: a cross-sectional study. International health. 2024;16(2):200-7.

Alfian SD, Sukandar H, Lestari K, Abdulah R. Medication adherence contributes to an improved quality of life in type 2 diabetes mellitus patients: a cross-sectional study. Diabetes Therapy. 2022;7(4):755-64.

Boddepalli D, Jadhav A. Medication Adherence Among Type 2 Diabetes Patients on Multidrug Therapy: A Cross-Sectional Study.

Wahyuni as, marwa d, oktasari sr, yulianti t, nugraheni ay, al-samea ra. Determination of factors affecting medication adherence in type 2 diabetes mellitus patients in a tertiary hospital: case-control study. 2025.

Uttangi S, venkatesh j, reji ar, jacob ag, bhoomika k, aju d. Appraisal of knowledge, attitude, practice and medication adherence towards antidiabetic drugs among diabetic patients in tertiary care teaching hospital, davangere. 2025.

Kumar P, Singh A, Lamba M, Garg M. A Cross-Sectional Study Assessing Medication Adherence to Diabetes Mellitus Treatment Among Adults in A Tertiary Care Hospital in the National Capital Region, Delhi.

Din MU, Siddique U, Ishaq T, Awan BAS, Javed MU, Ahmad MS. Medication adherence and its association with daily living performance activities and health literacy in diabetic patients. Rawal Medical Journal. 2024;49(2):402-.

Alsahabi H, Almousa O, Alsahabi B, Aljasser N, Kofi M. Barriers to medications adherence among uncontrolled type 2 diabetic patients in PHCs, Riyadh, Saudi Arabia. J Family Med Prim Care Open Acc. 2022;6:178.

Putri rr, setiyadi a, wiratmo pa. The relationship between family support and adherence to anti-diabetic medication in patients with type 2 diabetes mellitus. Indonesian nursing journal of education and clinic (injec). 2025;20(1):12-7.

Sendekie AK, Netere AK, Kasahun AE, Belachew EA. Medication adherence and its impact on glycemic control in type 2 diabetes mellitus patients with comorbidity: A multicenter cross-sectional study in Northwest Ethiopia. PLoS One. 2022;17(9):e0274971.

Pourhabibi N, Mohebbi B, Sadeghi R, Shakibazadeh E, Sanjari M, Tol A, et al. Determinants of poor treatment adherence among patients with type 2 diabetes and limited health literacy: a scoping review. Journal of diabetes research. 2022;2022(1):2980250.

Ali S, Maqbool A, Amin F, Jogezai N, Uttra AA, Begum S, et al. Evaluating the impact of clinical pharmacist interventions on medication adherence and clinical outcomes among heart failure patients in cardiology practice. Pakistan Journal of Medical & Cardiological Review. 2025;4(4):993-1002.

Patel S, Huang M, Miliara S. Understanding treatment adherence in chronic diseases: challenges, consequences, and strategies for improvement. Journal of Clinical Medicine. 2025;14(17):6034.

Worrall C, Shirley D, Bullard J, Dao A, Morrisette T. Impact of a clinical pharmacist-led, artificial intelligence–supported medication adherence program on medication adherence performance, chronic disease control measures, and cost savings. Journal of the American Pharmacists Association. 2025;65(1):102271.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Hisni D, Pramesti ED, Lubis R. Factors Related to Drug Adherence in Type 2 Diabetes Mellitus Patients. Journal of Applied Holistic Nursing Science. 2025;1(2):65-72.

Kassaw EA, Sendekie AK, Enyew BM, Abate BB. Machine learning applications to classify and monitor medication adherence in patients with type 2 diabetes in Ethiopia. Frontiers in Endocrinology. 2025;16:1486350.

Prasad Reddy KK, Vinutha S, Mattam BN, Dimma S, Anitha Kumari UP. A survey on adherence to the medication and causes of non-adherence among the Diabetic patients attending tertiary healthcare hospital in Visakhapatnam. European Journal of Cardiovascular Medicine. 2025;15(3).24

Velmurugan P, Thirulochandar JC, Sadiqbasha MF, Moorthy J. Evaluating the Impact of Personal Habits on Medication Adherence in Patients with Diabetes Mellitus and Hypertension: A Prospective Cross-Sectional Study. Biomedical and Pharmacology Journal. 2025;18(2).