ASIAN JOURNAL OF PHARMACEUTICAL AND CLINICAL RESEARCH

INNOVARE ACADEMIC SCIENCES
Knowledge to Innovation

Vol 18, Issue 4, 2025

Online - 2455-3891
Print - 0974-2441

Research Article

IMPACT OF MEDICATION ADHERENCE ON THE SAFETY AND EFFICACY OF ANTIDIABETICS IN WORKING-AGE TYPE II DIABETES PATIENTS: A LONGITUDINAL STUDY

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Received: 10 February 2025, Revised and Accepted: 22 March 2025

ABSTRACT

Objective: The objective of the study was to provide valuable insights into the importance of adherence in achieving optimal therapeutic outcomes, this study will analyze adherence trends, glycemic control, and the incidence of adverse drug reactions (ADRs) across time.

Methods: In this longitudinal observational investigation, working individuals (30–60 years old) with Type 2 diabetes are evaluated for medication adherence, safety, and effectiveness of antidiabetic medications. With informed consent and ethical permission guaranteed, and evaluate data on ADRs, glycemic control, and treatment results.

Result: A total of 460 patients are enrolled and split into adherent group (n=276) and non-adherent group (n=184) according to the proportion of days covered method. It was found that the non-adherent group had a slightly longer duration of diabetes (6.57±4.59 years) than the adherent group. Diabetes-related problems are directly impacted by medication adherence. More reductions in hemoglobin A1C (HbA1c) (7.22–6.54% vs. 7.59–6.97%), fasting glucose (181.35–148.68 mg/dL vs. 178.45–150.48 mg/dL), and postprandial glucose (213.41–187.14 mg/dL vs. 232.67–188.19 mg/dL) were observed in the adherent group than in the non-adherent group over a 12-month period. These results imply that a higher prevalence of certain ADRs, like hypoglycemia, is linked to non-adherence to diabetic treatments, and that experiencing ADRs may also be a contributing factor to medication non-adherence.

Conclusions: In working-age patients with Type 2 diabetes, medication adherence significantly enhances the safety and effectiveness of antidiabetic medications, improving glucose control and lowering adverse drug responses.

Keywords: Medication adherence, Antidiabetic drugs, Glycemic control, Working-age population, Pharmacotherapy, Adverse drug reactions

 DOI: http://dx.doi.org/10.22159/ajpcr.2025v18i4.54152. Journal homepage: https://innovareacademics.in/journals/index.php/ajpcr

INTRODUCTION

The working-age population is significantly affected by Type 2 diabetes mellitus (T2DM). This chronic metabolic disease is becoming more common worldwide and is marked by insulin resistance and poor glucose regulation [1]. With a global incidence of 10.5%, the International Diabetes Federation projects that 537 million people globally will have diabetes in 2021; by 2045, that number is predicted to rise to 783 million [2]. This results in complications such as retinopathy, nephropathy, neuropathy, and cardiovascular disease (CVD) [3]. Effective management of Type 2 diabetes relies on pharmaceutical interventions, lifestyle changes, and routine monitoring to achieve glycemic control and prevent complications [2]. Medication adherence is essential to treatment success, impacting the safety and effectiveness of antidiabetic medications. The quality of life and overall prognosis of the condition can be negatively impacted by non-compliance with recommended medication regimens, which can result in insufficient glycemic control, a higher risk of comorbidities, and a higher probability of adverse drug reactions (ADRs) [4].

Individuals with Type 2 diabetes who are of working age encounter particular difficulties in controlling their condition, frequently as a result of intense work responsibilities, stress, uncertain work schedules, and restricted access to medical resources [5]. Inconsistent medication adherence, which can cause variations in blood glucose levels, is one of the factors that raise the risk of complications from diabetes [6]. Furthermore, adherence rates may vary depending on socioeconomic position, educational background, and other medical issues, which make managing disease in this population more difficult [7].

Adherence to prescribed regimens by patients is just as crucial to the safety and effectiveness of antidiabetic medications as their pharmacological characteristics. Commonly used medicines for glycemic management include sodium-glucose co-transporter-2 (SGLT2) inhibitors, biguanides, sulfonylureas, and dipeptidyl peptidase-4 (DPP4) inhibitors; however, their effectiveness may be compromised if patients do not follow their prescribed regimen [8]. Poor adherence can lead to less-than-ideal treatment results, a higher chance of ADRs, and more expensive medical care due to hospital stays and disease progression [9]. Therefore, enhancing treatment regimens for working-age persons with Type 2 diabetes requires assessing how medication adherence affects safety and efficacy.

This longitudinal investigation aims to evaluate how medication adherence affects the clinical results of antidiabetic drug therapy in working-age T2DM patients. This study aims to offer essential insights into the significance of adherence in reaching the best possible therapeutic results by examining adherence patterns, glycemic control, and the occurrence of ADRs across time. Understanding these correlations will help medical practitioners create targeted treatments to enhance patient education, improve adherence, and promote better disease management strategies in this population.

METHODOS

Study design

This study aims to assess the effect of medication adherence on the safety and effectiveness of antidiabetic medications in working adults with T2DM between the ages of 30 and 60 years. It is a longitudinal and observational analysis. ADRs, clinical efficacy, and medication adherence will all be evaluated at regular follow-ups throughout the 12-month study. A systematic methodology will be used for precise data collection, adherence evaluation, and treatment result analysis.

Study population

A total 460 number of patients are included in the study. Participants in the study will be working professionals with T2DM aged between 30 and 60 years who are receiving antidiabetic medication from community healthcare facilities, diabetes clinics, or tertiary care hospitals. To be eligible, participants must have been diagnosed with Type 2 diabetes for at least 1 year, be on insulin therapy or oral antidiabetic drugs (OADs), and be willing to provide informed consent. Individuals with severe renal or hepatic dysfunction, Type 1 diabetes, gestational diabetes, cognitive impairments, or those already enrolled in other clinical trials will not be permitted to participate.

Data collection and follow-up

A total 460 number of patients are included in the study. Participants in the study will be working professionals with T2DM aged between 30 and 60 years who are receiving antidiabetic medication from community healthcare facilities, diabetes clinics, or tertiary care hospitals. To be eligible, participants must have been diagnosed with Type 2 diabetes for at least 1 year, be on insulin therapy or OADs, and be willing to provide informed consent. Individuals with severe renal or hepatic dysfunction, Type 1 diabetes, gestational diabetes, cognitive impairments, or those already enrolled in other clinical trials will not be permitted to participate.

The incidence of hypoglycemia, weight changes, gastrointestinal disturbances, and patient-reported ADRs will all be used to track the safety of antidiabetic medications. Monitoring glycemic control (hemoglobin A1C [HbA1c], fasting, and postprandial glucose levels) and any therapeutic adjustments will be used to assess efficacy results.

Data analysis

A thorough statistical analysis will be conducted to interpret the results. Demographic and clinical characteristics will be collected up using descriptive statistics. The statistical analysis was conducted using Statistical Package for the Social Sciences V20.

Ethical considerations

Before starting the study, approval from the Institutional Ethics Committee will be obtained. Written informed consent will be obtained from each participant, and data will be de-identified to protect patient anonymity. Safety issues and adverse incidents will be tracked, and appropriate measures will be implemented to safeguard the participants' safety.

RESULTS

The proportion of days covered (PDC) method, a common technique in prescription-based research for assessing the continuity of medication use, was used to measure medication adherence. The majority of patients in the adherent group (n=276) fell into the high adherence category (PDC>80%), which suggests better disease management and consistent medication intake. On the other hand, a considerable percentage of patients in the non-adherent group (n=184) reported moderate to low adherence (PDC<80%), which indicated irregular medication-taking behavior.

Table 1 shows baseline characteristics of the study participants were analyzed by comparing the adherent and non-adherent groups. The mean age of participants in the adherent group was 45.38 years with a standard deviation of 9.31, whereas the non-adherent group had a younger mean age of 36.40 years with a standard deviation of 6.46. In terms of gender distribution, the adherent group comprised 131 males (47.46%) and 145 females (52.54%), while the non-adherent group included 86 males (46.74%) and 98 females (53.26%), indicating a nearly equal gender ratio in both groups. The duration of diabetes was slightly longer in the non-adherent group, with a mean of 6.57 years (Standard deviation [SD]±4.59) compared to 5.44 years (SD±4.26) in the adherent group.

Table 1: Baseline characteristics of study participants

Variable	Adherent group (n=276)	Non-adherent group (n=184)
Age (Mean±SD)	45.38±9.31	36.40±6.46
Gender (%)		
Male	131 (47.46)	86 (46.74)
Female	145 (52.54)	98 (53.26)
Duration of diabetes (years)	5.44±4.26	6.57±4.59
Family history of diabetes (%)		
Yes	97 (35.14)	59 (32.07)
No	179 (64.86)	125 (67.93)
Socioeconomic status (%)		
Low	95 (34.42)	74 (40.22)
Middle	124 (44.93)	87 (47.28)
High	57 (20.65)	23 (12.5)
Education level (%)		
Literate	217 (78.62)	128 (69.57)
Illiterate	59 (21.38)	56 (30.43)
Smoking status (%)		
Yes	86 (31.16)	49 (26.63)
No	190 (68.84)	135 (73.37)
Alcohol consumption (%)		
Yes	44 (15.94)	31 (16.85)
No	232 (84.06)	153 (83.15)

Values are expressed in terms of mean±SD and n (%). SD: Standard deviation

Family history of diabetes was reported by 35.14% (97 participants) in the adherent group and 32.07% (59 participants) in the non-adherent group, while 64.86% and 67.93% in the respective groups had no family history of diabetes. Socioeconomic status varied among participants, with 34.42% of the adherent group classified as having a low socioeconomic status, 44.93% in the middle class, and 20.65% in the high-income group. Comparatively, in the non-adherent group, a higher percentage (40.22%) belonged to the low socioeconomic category, 47.28% fell in the middle class, and only 12.5% were in the high-income category.

Education level also showed a difference between the two groups, with 78.62% of the adherent group being literate compared to 69.57% in the non-adherent group. Conversely, the percentage of illiterate participants was higher in the non-adherent group (30.43%) than in the adherent group (21.38%). Lifestyle factors such as smoking and alcohol consumption were also analyzed. In the adherent group, 31.16% of participants were smokers, whereas 26.63% in the non-adherent group reported smoking. The majority of participants in both groups were non-smokers, accounting for 68.84% in the adherent group and 73.37% in the non-adherent group. Alcohol consumption was reported by 15.94% of the adherent group and 16.85% of the non-adherent group, while 84.06% and 83.15%, respectively, reported no alcohol consumption.

The medication adherence assessment, based on the PDC method, categorized participants into three adherence levels: high, moderate, and low. Among the adherent group, the majority of participants (90.6%) exhibited high adherence, with a PDC of 80% or more, whereas only 10.9% of participants in the non-adherent group fell into this category. Overall, 58.7% of the total study population demonstrated high adherence to their prescribed medications. In the moderate adherence category, defined as a PDC between 60% and 79%, 9.4% of participants

from the adherent group were included, while a significantly higher percentage (32.6%) of the non-adherent group exhibited moderate adherence. When considering the entire study population, 18.7% fell into this category. The most concerning group was those with low adherence, having a PDC below 60%. Notably, none of the participants in the adherent group were classified in this category, while a substantial proportion (56.5%) of the non-adherent group exhibited low adherence. When looking at the overall study population, 22.6% of participants had poor adherence to their medications. With most adherent individuals sustaining high adherence and a sizable minority of the non-adherent group exhibiting poor or moderate adherence, these results show a clear disparity in adherence levels between the two groups (Table 2).

The comparison of different antidiabetic drug classes and medication adherence revealed variations in drug usage between the adherent and non-adherent groups. Biguanides, primarily represented by metformin, were the most commonly prescribed drug class across both groups. In the adherent group, 77.54% of participants were on biguanides, while a significantly higher proportion of the non-adherent group, 97.28%, used this class of drugs. Sulfonylureas were also frequently used, with 71.74% of the adherent group and 59.24% of the non-adherent group being prescribed these medications. DPP4 inhibitors showed a slight difference between the two groups, with 72.46% of adherent participants and 65.76% of non-adherent participants using these drugs.

SGLT2 inhibitors were prescribed to 63.04% of the adherent group and a slightly higher percentage of 71.74% in the non-adherent group, indicating a relatively increased use in the non-adherent population. Thiazolidinediones (TZDs) were prescribed to a smaller proportion of participants, with 14.86% in the adherent group and 15.76% in the non-adherent group, showing minimal difference between adherence levels. Similarly, alpha-glucosidase inhibitors were used by 13.41% of adherent participants and 16.85% of non-adherent participants. Insulin therapy was the least standard treatment across both groups, with only 7.97% of the adherent group and 5.98% of the non-adherent group using insulin for glycemic control (Table 3).

The analysis of risk factors for comorbid diseases in patients with Type 2 diabetes revealed significant differences between those who were adherent to their treatment and those who were not. Hypertension was notably more prevalent in the non-adherent group, affecting 57.6% of participants compared to 30.4% in the adherent group. Conversely, dyslipidemia was more common among adherent patients, with 47.8% affected, while only 31.0% of the non-adherent group had this condition. Although CVD was less common overall, it was more frequently observed in the non-adherent group, with 8.7% affected compared to 4.0% in the adherent group.

Chronic kidney disease (CKD) was slightly more frequent in the adherent group, affecting 6.2% of participants, while only 3.3% of the non-adherent group had CKD. Neuropathy, a common diabetes-related complication, was reported in 22.1% of the adherent group and was significantly higher in the non-adherent group, where 38.0% of participants were affected. Retinopathy was less frequent in both groups, with 2.9% of adherent participants and 1.1% of non-adherent participants experiencing this condition. Non-alcoholic fatty liver disease (NAFLD) was also relatively uncommon, with a similar prevalence in both groups – 2.2% in the adherent group and 2.7% in the non-adherent group.

About 5.4% of the non-adherent group and 6.2% of the adherent group reported having psychological disorders such as anxiety and depression, suggesting a similar prevalence in the two groups. The distribution of obesity was comparatively similar, with 25.7% of the adherent group and 23.4% of the non-adherent group being obese (Table 4).

The comparison of glycemic control between the adherent and non-adherent groups over a 12-month period demonstrated notable differences in key parameters, including blood pressure, HbA1c, and glucose levels. At baseline, the systolic blood pressure was slightly higher in the adherent group (137.11±23.14 mmHg) compared to the non-adherent group (129.86±14.39 mmHg). However, by the 6-month mark, the systolic blood pressure in the adherent group reduced to 130±14.51 mmHg, followed by a slight increase to 132±9.33 mmHg at 12 months. In contrast, the non-adherent group showed a minor fluctuation, reaching 131±11.48 mmHg at 6 months and further decreasing to 129±9.57 mmHg at 12 months. The diastolic blood pressure followed a similar pattern, with the adherent group starting at 85.49±9.15 mmHg, which gradually decreased to 82.51±8.94 mmHg by 12 months. The non-adherent group showed relatively stable readings, with minimal variations over time. Better control of blood pressure has been linked to adherence to prescribed antihypertensive and antidiabetic drugs.

HbA1c levels, a critical marker for long-term glycemic control, showed a more pronounced improvement in the adherent group. At baseline, the HbA1c level was 7.22±1.63%, which slightly decreased to 7.04±1.65% at 6 months and further improved to 6.54±0.91% at 12 months. The non-adherent group started with a higher baseline HbA1c of 7.59±1.41%, which reduced slightly to 7.12±1.86% at 6 months and reached 6.97±0.74% at 12 months. While both groups showed a decline

Table 2: Medication adherence assessment (based on PDC method)

PDC range (%)	Adherence level	Adherent group (%)	Non-adherent group (%)	Overall (%)
≥80	High adherence	250 (90.6)	20 (10.9)	270 (58.7)
60–79	Moderate adherence	26 (9.4)	60 (32.6)	86 (18.7)
<60	Low adherence	0 (0)	104 (56.5)	104 (22.6)

Values are expressed in terms of n (%)

Table 3: Comparison of different antidiabetic drug classes and medication adherence

Drug class	Adherent group (n=276) (%)	Non-adherent group (n=184) (%)
Biguanides	214 (77.54)	179 (97.28)
Sulfonylureas	198 (71.74)	109 (59.24)
Dipeptidyl Peptidase-4 inhibitors	200 (72.46)	121 (65.76)
Sodium-glucose co-transporter-2 inhibitors	174 (63.04)	132 (71.74)
Thiazolidinediones	41 (14.86)	29 (15.76)
Alpha-Glucosidase Inhibitors	37 (13.41)	31 (16.85)
Insulin Therapy	22 (7.97)	11 (5.98)

Values are expressed in terms of n (%)

Table 4: Risk factors for comorbid diseases in Type 2 diabetes patients

Comorbid disease	Adherent group (n=276) (%)	Non-adherent group (n=184) (%)
Hypertension	84 (30.4)	106 (57.6)
Dyslipidemia	132 (47.8)	57 (31.0)
Cardiovascular disease	11 (4.0)	16 (8.7)
Chronic kidney disease	17 (6.2)	6 (3.3)
Neuropathy	61 (22.1)	70 (38.0)
Retinopathy	8 (2.9)	2 (1.1)
Non-alcoholic fatty liver disease	6 (2.2)	5 (2.7)
Depression/anxiety	17 (6.2)	10 (5.4)
Obesity	71 (25.7)	43 (23.4)

Values are expressed in terms of n (%)

in HbA1c over time, the reduction was more significant in the adherent group, indicating better long-term glycemic control.

Fasting blood glucose levels also showed a greater improvement in the adherent group. Initially, fasting blood glucose in the adherent group was 181.35±74.52 mg/dL, which significantly reduced to 133.91±88.07 mg/dL at 6 months and stabilized at 148.68±47.11 mg/dL at 12 months. The non-adherent group, starting with a slightly lower baseline of 178.45±81.39 mg/dL, exhibited a similar trend but with less reduction, reaching 142.77±60.21 mg/dL at 6 months and 150.48±51.19 mg/dL at 12 months.

Postprandial blood glucose levels were higher in the non-adherent group at baseline, with an initial value of 232.67±70.47 mg/dL compared to 213.41±51.44 mg/dL in the adherent group. Over time, both groups showed a reduction, with the adherent group reaching 191.23±34.70 mg/dL at 6 months and 187.14±47.15 mg/dL at 12 months. Similarly, the non-adherent group exhibited a decline, with postprandial glucose levels reducing to 211.28±64.24 mg/dL at 6 months and 188.19±34.45 mg/dL at 12 months (Table 5).

The result depicted in Table 6 is the incidence of ADRs and assessed in both the adherent and non-adherent groups, revealing differences in the frequency and distribution of side effects. Hypoglycemia was observed in a slightly higher proportion of the non-adherent group, affecting 9.78% of participants compared to 8.70% in the adherent group. Recent research has looked at the connection between Type 2 diabetes patients' medication adherence and the frequency of ADRs. Gastrointestinal disturbances, including nausea, vomiting, diarrhea, and abdominal pain, were among the most frequently reported ADRs, affecting 44.57% of the adherent group and 41.85% of the non-adherent group, indicating that these symptoms were common across both groups but slightly more prevalent in the adherent group.

Urinary tract infections (UTIs) were rare but were more frequently reported in the non-adherent group, with 2.72% of participants affected compared to only 0.72% in the adherent group. Similarly, genital infections, including fungal and bacterial infections such as candidiasis and vaginitis, were more prevalent in the non-adherent group, occurring in 2.17% of participants compared to 0.36% in the adherent group. This suggests that medication adherence may have some influence on the risk of infections, possibly due to differences in drug exposure and hygiene practices.

Weight-related changes showed minor differences between the two groups. Weight gain was slightly more common in the adherent group, affecting 5.43% of participants compared to 4.89% in the non-adherent group. On the other hand, weight loss was also reported in both groups, with 6.88% in the adherent group and 6.52% in the non-adherent group, indicating a relatively similar impact of treatment on body weight regardless of adherence status.

Dizziness and headaches were among the most frequently reported ADRs, affecting 82.25% of the adherent group and 80.43% of the non-adherent group, showing a high prevalence across both groups. Fatigue and muscle weakness, often described as unexplained lethargy, were slightly more common in the non-adherent group, affecting 51.09% of participants compared to 46.38% in the adherent group. This suggests that a lack of adherence to medication may contribute to increased feelings of tiredness and weakness.

Blurred vision, which is often associated with diabetic retinopathy, was reported in 1.81% of the adherent group and 1.09% of the non-adherent group, indicating a relatively low occurrence in both groups. Hypersensitivity reactions, such as skin rashes, were slightly more prevalent in the non-adherent group, occurring in 4.35% of participants compared to 2.54% in the adherent group. This could suggest that inconsistent medication use may contribute to an increased likelihood of hypersensitivity reactions (Table 6).

DISCUSSION

By adherence status, the study participants' baseline characteristics were examined. The mean age of the adherent group was older than that of the non-adherent group, which was 36.40 ± 6.46 years. In both categories, the gender distribution was almost equal, with roughly 47% of the population being male and 53% being female. Compared to the adherent group (5.44 ± 4.26 years), the non-adherent group had a somewhat longer duration of diabetes (6.57±4.59 years). According to a previously published study that examines adherence rates across age groups, older patients typically follow their treatment plans more closely than younger ones [10]. Prior research indicates that individuals with diabetes for a longer period of time may become less compliant due to things like psychological burnout, perceived ineffectiveness of therapy, and the specifics of their regimen [11].

A small number of studies show that people with a family history of diabetes frequently have higher awareness, earlier diagnosis, and greater treatment adherence, all of which enhance disease management [12]. In our study, most people in both groups had no family history of diabetes, but the adherent group had a somewhat higher prevalence of a family history of the disease than the non-adherent group.

In our study, socioeconomic status differed between groups, with the non-adherent group having a higher proportion of individuals from lower-income backgrounds and fewer from high-income categories compared to the adherent group. Few studies highlight how socioeconomic differences have a major influence on diabetic patients' adherence to their prescription, with financial difficulties serving as a major obstacle to regular care [13].

The literacy rate was greater in the adherent group than in the non-adherent group, and the non-adherent individuals were more likely to be illiterate. According to the study, people with greater literacy levels exhibit better adherence since they have better knowledge of health issues and know how to manage their own health [14]. Although most people in both groups were not smokers, smoking was marginally more common in the committed group. The majority of participants reported never using alcohol, and there was little variation in alcohol intake between the groups.

Medication adherence, assessed using the PDC method, showed a clear disparity between groups. Most adherent participants exhibited high adherence, while a significant portion of the non-adherent group had moderate or low adherence. High adherence was seen in the majority of the study population, whereas poor adherence was primarily

Table 5: Comparison of glycemic control between adherent and non-adherent groups

Parameter	Adherent group (mean±SD)			Non-adherent group (mean±SD)		
	Baseline	6 months	12 months	Baseline	6 months	12 months
Systolic blood pressure (mmHg)	137.11±23.14	130±14.51	132±9.33	129.86±14.39	131±11.48	129±9.57
Diastolic blood pressure (mmHg)	85.49±9.15	84.34±8.23	82.51±8.94	84.42±10.21	85.14±8.74	82.69±8.58
Hemoglobin A1C (%)	7.22±1.63	7.04±1.65	6.54±0.91	7.59±1.41	7.12±1.86	6.97±0.74
Fasting blood glucose (mg/dL)	181.35±74.52	133.91±88.07	148.68±47.11	178.45±81.39	142.77±60.21	150.48±51.19
Postprandial blood glucose (mg/dL)	213.41±51.44	191.23±34.70	187.14±47.15	232.67±70.47	211.28±64.24	188.19±34.45

Values are expressed in terms of Mean±SD. SD: Standard deviation

Table 6: Safety outcomes: Incidence of ADRs in adherent versus non-adherent groups

ADR type	Adherent group (n=276) (%)	Non-adherent group (n=184) (%)
Hypoglycemia	24 (8.70)	18 (9.78)
Gastrointestinal disturbances (nausea, vomiting, diarrhea, abdominal pain)	123 (44.57)	77 (41.85)
Urinary tract infections	2 (0.72)	5 (2.72)
Genital infections (fungal/ bacterial, candidiasis, vaginitis)	1 (0.36)	4 (2.17)
Weight gain	15 (5.43)	9 (4.89)
Weight loss	19 (6.88)	12 (6.52)
Dizziness/headache	227 (82.25)	148 (80.43)
Fatigue/muscle weakness (unexplained lethargy)	128 (46.38)	94 (51.09)
Blurred vision (diabetic retinopathy related)	5 (1.81)	2 (1.09)
Hypersensitivity reactions (rashes)	7 (2.54)	8 (4.35)

Values are expressed in terms of n (%). ADRs: Adverse drug reactions

concentrated in the non-adherent group. This difference emphasizes the necessity of focused treatments to enhance medication adherence, especially for those in the non-adherent group [15].

Different antidiabetic medicine classes had different rates of medication adherence. The most often used drugs were biguanides, primarily metformin, and the non-adherent group took them more frequently. While SGLT2 inhibitors were marginally more common in the non-adherent group, sulfonylureas, and DPP4 inhibitors were prescribed more frequently in the adherent group. The groups' use of TZDs, alpha-glucosidase inhibitors, and insulin varied little; insulin was given the least in both groups.

With regard to our research, the comorbidity analysis revealed significant distinctions between individuals who adhered and those who did not. While dyslipidemia and CKD were marginally more prevalent in the adherent group, hypertension, and neuropathy were more prevalent in the non-adherent group. While retinopathy, NAFLD, psychiatric disorders, and obesity were equally prevalent in both groups, CVD was more common in non-adherent patients. Recent studies have shown that it can reduce related issues. Poor glycemic control was closely associated with low drug adherence, underscoring the importance of adherence in effective diabetes treatment [4]. Another research investigation found that medication adherence is essential for improving health outcomes related to diabetes and related conditions [16]. In addition, adherence is crucial in minimizing significant health repercussions, as evidenced by another study that found people with Type 2 diabetes who adhere to their prescription regimens have a lower risk of hospitalization and all-cause mortality [17].

A systematic review found that better disease management, including a decrease in blood pressure, resulted from treatments targeted at enhancing medication adherence in patients with coexisting diabetes and hypertension [18]. The systolic and diastolic blood pressures of the adherent group gradually decreased, whereas the non-adherent group just slightly fluctuated. Our study demonstrated a correlation between better blood pressure control and medication adherence.

Higher medication adherence has been linked to notable drops in HbA1c levels, according to studies. For example, studies showed that better HbA1c values across a range of oral glucose-lowering drugs were associated with medication adherence [19]. Compared to the non-adherent group, the adherent group demonstrated a more substantial improvement in glycemic control over the course of a year, as seen by a decrease in HbA1c, fasting blood glucose, and postprandial glucose levels. This demonstrates how medication adherence in our study has a good effect on long-term diabetes treatment.

According to one study, hypoglycemia accounted for 25.7% of suspected ADRs in non-adherent participants and 11.6% in adherent users [20]. Different groups experienced different rates of ADRs, with the non-adherent group experiencing hypoglycemia somewhat more frequently. Our study indicates a connection between the frequency of ADRs in patients with Type 2 diabetes and medication adherence. The most frequent ADRs were gastrointestinal problems, which were somewhat more common in the adherent group. The non-adherent group experienced higher rates of infections, such as vaginal infections and UTIs. There were minor differences in weight growth and reduction between the two groups, but overall weight changes were comparable. Both groups experienced fatigue, headaches, dizziness, and muscle weakness; however, the non-adherent group experienced slightly more weariness. Hypersensitivity reactions were somewhat more common in the non-adherent group, while blurred vision was uncommon. Furthermore, it was discovered that patients with ADRs had a lower quality of life and were 7 times more likely to not take their medications as prescribed [21].

CONCLUSION

The safety and effectiveness of antidiabetic medications in working-age patients with Type 2 diabetes are significantly influenced by medication adherence, as demonstrated by this longitudinal study. Patients who adhered to their medication schedules experienced significant long-term decreases in HbA1c, fasting blood glucose, and postprandial blood glucose levels, leading to improved glycemic control. Furthermore, adherence was associated with better blood pressure management and a reduced risk of complications related to diabetes, underscoring the importance of consistent medication use for long-term management of the condition. In contrast, non-adherent patients exhibited poorer glycemic outcomes, more significant variability in blood glucose levels, and a higher frequency of ADRs, including fatigue, gastrointestinal issues, and hypoglycemia. In addition, the study highlights how socioeconomic status, educational attainment, and disease awareness influence adherence behavior.

In considering these results, lifestyle modifications focused patient education, and adherence-boosting tactics are essential for improving treatment results and reducing complications in working-age people with Type 2 diabetes. Prioritizing adherence evaluation and putting customized treatments into place can help healthcare providers guarantee diabetes patients' long-term treatment success and enhanced quality of life.

ACKNOWLEDGMENT

The Authors acknowledge Siksha 'O' Anusandhan (Deemed to be University) for providing necessary support to carry out the present work.

AUTHOR'S CONTRIBUTIONS

Conceptualization, Design, Data collection, Manuscript Preparation, Manuscript Editing, and Data interpretation: Durga Madhab Kar, Karmajeet Rath, Prabhudatta Mohapatra; Statistical analysis, Manuscript Editing: Prabhudatta Mohapatra, Ashrumochan Debata.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

FUNDING

Nil.

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