



EVALUATING MEDICATION COMPLIANCE IN INDIVIDUALS MANAGING TYPE II DIABETES MELLITUS

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Abstract

Background: Type II Diabetes Mellitus (T2DM) is a chronic metabolic disorder that demands lifelong treatment and lifestyle modification. Despite the availability of effective pharmacological therapies, maintaining optimal glycaemic control remains a challenge for many patients due to poor adherence to prescribed medications. Non-compliance contributes significantly to disease progression, complications, and increased healthcare costs. Understanding the extent and reasons for medication non-adherence is therefore essential for improving patient outcomes and designing effective intervention strategies.

Aims & Objectives: This study is aimed at evaluating the medication compliance and adherence levels of patients with Type II Diabetes Mellitus.

Methods: A total of 183 participants, comprising 95 males and 88 females, diagnosed with Type 2 Diabetes Mellitus were provided the Morisky 8-item medication questionnaire to assess medication adherence, categorised as low, medium, or high. Additionally, awareness of the disease and reasons for compliance or non-compliance were evaluated. Categorical data was analysed using chi-square test.

Results: Among the participants, 68.4% of patients were aware of their prescribed medications, 81% were aware of the correct dosage and administration method, 87% were informed about the frequency of medication intake, 81% were aware of precautions, and 79% recognised the importance of medication compliance. However, 37 participants discontinued their prescribed medications, and 31 ceased treatment due to adverse effects. Medication adherence levels were categorised as high (12%), medium (29%), and low (59%), with significant differences ($p < 0.05$). The most common reasons for non-adherence were forgetfulness (38%), high medication costs (28%), lack of awareness about the necessity (25%), and misconceptions (9%), with non-significant differences ($p > 0.05$).

Keywords: Adherence, Compliance, Awareness, Diabetes Mellitus

Introduction

Type II Diabetes Mellitus (T2DM) is a chronic, progressive metabolic disorder characterised by elevated blood glucose levels due to insulin resistance and relative insulin deficiency. It represents more than 90% of all diabetes cases worldwide and has emerged as one of the most pressing global health challenges of the 21st century [1]. The International Diabetes Federation estimates that over 537 million adults were living with diabetes globally in 2021, and this number is projected to reach 643 million by 2030. India, often referred to as the “diabetes capital of the world,” contributes significantly to this burden, with an estimated 77 million adults currently affected [2].

Despite major advances in pharmacological therapy, the global rates of glycaemic control among patients with T2DM remain suboptimal. The World Health Organization (WHO) recognises medication adherence as a key determinant of treatment success and defines it as “the extent to which a person’s behaviour—taking medication, following a diet, and/or executing lifestyle changes—corresponds with agreed recommendations from a healthcare provider” [3]. The WHO report *Adherence to Long-Term Therapies: Evidence for Action* estimated that only about half of patients with chronic diseases in developed countries adhere to long-term therapy, and the situation is likely to be worse in developing nations [3].

Medication adherence is a complex behaviour influenced by multiple inter-related factors, including patient characteristics, disease perceptions, medication complexity, side-effects, cost, and the quality of the patient-provider relationship [4]. In diabetes care, adherence becomes even more challenging due to the chronic nature of the condition, asymptomatic periods of hyperglycaemia, and the requirement for polypharmacy in the presence of comorbidities such as hypertension and dyslipidaemia [5]. Poor adherence has been linked to inadequate glycaemic control, higher rates of hospitalisation, increased risk of microvascular and macrovascular complications, and elevated healthcare costs [6].

Globally, adherence to oral hypoglycaemic agents and insulin therapy varies widely, with reported rates ranging from 35% to 80% depending on study design and population characteristics [7]. Direct methods of measuring adherence, such as drug assays or electronic monitoring, are often impractical in routine care, while indirect methods—such as patient self-reports or pill counts—though feasible, may be subject to bias [8]. Among indirect tools, the Morisky 8-Item Medication Adherence Scale (MMAS-8) has gained wide acceptance due to its simplicity and validity across different populations [9].

Several studies have highlighted the magnitude of non-adherence in patients with diabetes. For example, Rwegerera et al. reported that only 36% of patients with Type II diabetes in Tanzania exhibited good adherence to anti-diabetic medication [10]. Similarly, Garber et al. found that nearly 70% of patients were non-adherent to prescribed regimens, citing forgetfulness, medication costs, and lack of understanding as the main reasons [6]. In the Indian context, Raj et al. observed that 51% of patients reported financial barriers to maintaining therapy, and non-adherence was significantly associated with poor glycaemic control [11].

Understanding why patients fail to adhere to therapy is crucial to improving diabetes management. The factors underlying non-adherence can be categorised into five domains as per the WHO framework—social/economic factors, healthcare system factors, condition-related factors, therapy-related factors, and patient-related factors [3]. In low-resource settings, financial constraints and inadequate access to regular medical review often play a central role. Additionally, lack of disease awareness, limited health literacy, and prevailing cultural beliefs about medications exacerbate poor adherence [12].

In India, several studies have attempted to quantify adherence among diabetics, yet most have been conducted in tertiary-care or urban hospital settings [4] [11] [13]. However, patients in peripheral or sub-district healthcare facilities often differ in terms of socioeconomic background, access to healthcare, and continuity of care. These populations are typically more vulnerable to poor adherence and its consequences due to limited counselling, high medication costs, and irregular follow-up.

In this context, the present study was designed to assess medication adherence among patients with Type II Diabetes Mellitus attending the Sub-District Hospital, Pampore, Jammu and Kashmir. The study employed the Morisky 8-item questionnaire to categorise adherence levels and explored patient awareness and reasons for non-compliance. By identifying prevalent patterns and barriers, this study aims to contribute region-specific evidence to support tailored interventions that can enhance treatment adherence and ultimately improve diabetes outcomes in similar resource-limited settings.

Materials and Methods

This was a cross-sectional, observational study conducted in the outpatient department of the Sub-District Hospital, Pampore, Jammu and Kashmir, from July 2022 to December 2022. The study included 183 adult participants (95 males and 88 females) previously diagnosed with Type II Diabetes Mellitus and attending the outpatient clinic for routine follow-up.

Inclusion criteria

- Patients aged ≥ 18 years diagnosed with Type II Diabetes Mellitus for at least six months.
- Those receiving oral hypoglycaemic agents (OHAs), insulin, or combination therapy.
- Patients willing to provide informed consent.

Exclusion criteria

- Type I Diabetes Mellitus.
- Pregnant or lactating women.
- Patients with severe cognitive impairment or psychiatric illness precluding informed participation.

Ethical clearance was obtained from the Institutional Ethics Committee prior to initiation of the study. Written informed consent was obtained from all participants after explaining the study objectives and ensuring confidentiality of data.

Data collection tool

Medication adherence was assessed using the Morisky 8-item Medication Adherence Scale (MMAS-8), a validated self-reported instrument widely used in chronic disease management. Scores were categorised as follows:

- High adherence: Score = 8
- Medium adherence: Score = 6–7
- Low adherence: Score < 6

Participants were also interviewed regarding their awareness of the prescribed medications, correct dosages, frequency of administration, precautions, and perceived importance of compliance. Reasons for non-adherence were documented and classified under forgetfulness, cost, lack of awareness, and misconceptions.

Statistical analysis

Categorical data were expressed as percentages and proportions. Associations between categorical variables were analysed using the chi-square test, with a p-value <0.05 considered statistically significant. Statistical analysis was performed using SPSS version 22.

Results

Demographic characteristics

The study comprised 183 participants, with a near-equal distribution of males (52%) and females (48%). The mean age of participants was 54.8 ± 10.7 years (range 35–78 years). Most participants (60%) belonged to the 41–60 years age group, while 25% were above 60 years. The majority were married (91%), and about 64% resided in rural areas. Regarding education, 32% were graduates, 40% had secondary education, and 28% had only primary schooling. Employment status showed that 42% were unemployed or homemakers, while 58% were employed in various occupations. (Table 1)

Table 1. Socio-demographic characteristics of participants (n = 183)

Characteristic	Frequency (%)
Age (years)	
30–40	15 (8.2%)
41–60	110 (60.1%)
>60	46 (25.1%)
Gender	
Male	95 (51.9%)
Female	88 (48.1%)
Residence	
Urban	66 (36.1%)
Rural	117 (63.9%)
Education	
Primary or below	52 (28.4%)
Secondary	73 (39.9%)
Graduate and above	58 (31.7%)
Employment status	
Employed	106 (57.9%)
Unemployed/homemaker	77 (42.1%)

Clinical profile of participants

The mean duration of diabetes was 7.4 ± 4.3 years. Regarding therapy, 71% were on oral hypoglycaemic agents (OHA) only, 16% on insulin alone, and 13% on combination therapy.

The mean fasting blood glucose level was 146 ± 25 mg/dL, and HbA1c data (available for 112 participants) averaged $8.3 \pm 1.2\%$, suggesting suboptimal glycaemic control.

Comorbidities were common, with hypertension (48%), dyslipidaemia (33%), and obesity (29%) being the most frequent. A positive family history of diabetes was reported by 41% of participants. (Table 2)

Table 2. Clinical characteristics of participants

Variable	Frequency (%)
Duration of diabetes (years)	
<5 years	64 (35.0%)
5–10 years	80 (43.7%)
>10 years	39 (21.3%)
Type of therapy	
Oral hypoglycaemic agents (OHA)	130 (71.0%)
Insulin	29 (15.8%)
Combination (OHA + insulin)	24 (13.2%)
Comorbidities	
Hypertension	88 (48.1%)
Dyslipidaemia	60 (32.8%)
Obesity	53 (28.9%)
Family history of diabetes	75 (41.0%)

Awareness regarding medication

A considerable proportion of patients demonstrated moderate awareness about their prescribed medicines (Table 3). While over 80% knew their correct dosage and frequency, roughly one-fifth were unaware of necessary precautions or the impact of missing doses.

Table 3. Awareness about medication among participants

Parameter	Percentage (%)
Aware of prescribed medications	68.4
Aware of correct dosage and administration	81
Aware of frequency of intake	87
Aware of necessary precautions	81
Recognised importance of medication compliance	79

Medication adherence levels

Medication adherence, as per MMAS-8 scoring, was found to be high in 12%, medium in 29%, and low in 59% of participants (Figure 1).

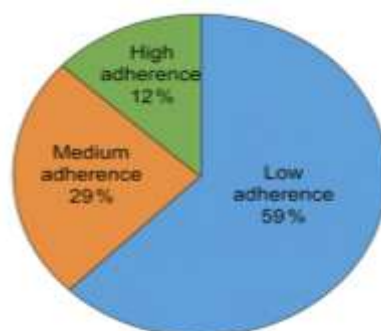


Figure 1. Distribution of medication adherence levels among participants based on the Morisky 8-Item Medication Adherence Scale (MMAS-8).

Adherence levels were significantly associated with educational status ($p < 0.05$) and duration of diabetes ($p < 0.05$), while gender and place of residence showed no significant relationship. (Table 4)

Table 4. Association between medication adherence and selected variables

Variable	Categories	High / Medium / Low Adherence (%)	p-value
Gender	Male (n=95) / Female (n=88)	13 / 30 / 57 11 / 28 / 61	0.42 (NS)
Educational status	Primary or below / Secondary / Graduate & above	5 / 21 / 74 11 / 29 / 60 19 / 38 / 43	0.03*
Duration of diabetes (years)	<5 / 5–10 / >10	17 / 33 / 50 11 / 30 / 59 6 / 18 / 76	0.02*
Place of residence	Urban (n=66) / Rural (n=117)	14 / 28 / 58 11 / 30 / 59	0.47 (NS)

Values expressed as percentage of participants within each category.

(NS = Not significant; $p < 0.05$ considered significant)

In addition, 37 participants reported discontinuing their prescribed medications altogether, and 31 participants ceased treatment due to perceived or actual adverse effects.

Reasons for non-adherence

The most commonly reported reason for non-compliance was forgetfulness (38%), followed by high medication costs (28%), lack of awareness (25%), and misconceptions about medication use (9%) (Figure 2).

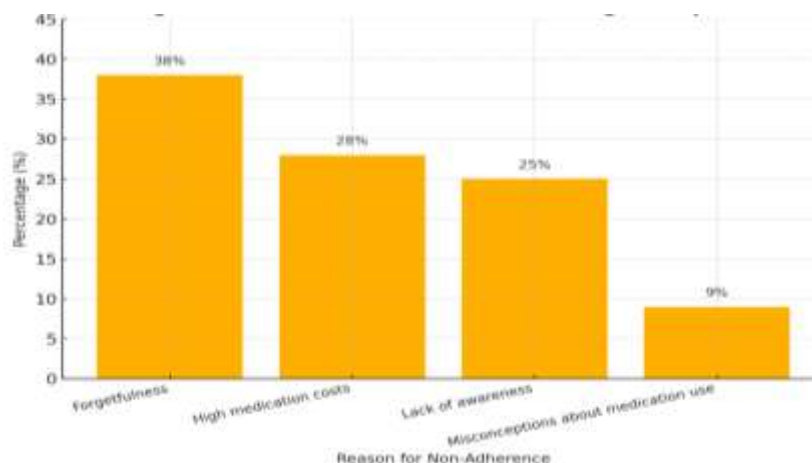


Figure 2. Reasons for Non-adherence among participants.

Discussion

Medication adherence is an essential determinant of therapeutic success in chronic diseases such as Type II Diabetes Mellitus (T2DM). In the present study, only 12% of participants demonstrated high adherence, while 59% showed low adherence to prescribed therapy. These findings underscore that poor adherence remains a significant barrier to effective diabetes management, echoing global trends reported in earlier research [1,3,7] .

Our findings are closely aligned with the study by Hasan and Sharma, who reported a 65% rate of low adherence among diabetic patients, with forgetfulness and lack of awareness being primary factors [7] . Similarly, Rwegerera et al. observed that only about one-third of diabetic patients in Tanzania adhered adequately to their medications, highlighting the universal nature of this challenge across diverse populations [10] .

Comparison with previous studies

The adherence pattern observed in our cohort mirrors data from various Indian and international studies. Garber et al. found that nearly 70% of patients failed to follow prescribed regimens consistently, attributing this mainly to forgetfulness and poor understanding of medication importance [6] . Likewise, Raj et al. demonstrated that financial barriers and polypharmacy were key contributors to non-adherence among Indian diabetics [11] . In our study, similar economic limitations were evident, as 28% of participants cited high medication costs as a reason for discontinuation. Osterberg and Blaschke reported that adherence among patients with chronic conditions generally averages around 50%, decreasing further when treatments are preventive or symptomless [1] . Given that diabetes often remains asymptomatic until complications arise, this psychological aspect—“absence of immediate illness perception”—may explain the gap between awareness and actual medication-taking behaviour in our participants.

Determinants of non-adherence

The leading cause of non-adherence in this study was forgetfulness (38%), followed by cost (28%), lack of awareness (25%), and misconceptions (9%). These determinants align with the WHO's multidimensional adherence model, which identifies socioeconomic, therapy-related, patient-related, and healthcare-system-related factors as the primary domains affecting treatment continuity [3] .

The strong association between forgetfulness and poor adherence has been emphasised across several studies. Paes et al. found that the frequency of dosage plays a key role in adherence, with more complex regimens leading to higher rates of omission [8] . Nau suggested that simplifying drug schedules and improving patient-provider communication can substantially improve adherence [4] . Implementing strategies such as single daily dosing, blister packaging, or reminder tools (e.g., mobile phone alerts) could therefore mitigate this issue, especially in primary and sub-district healthcare settings like Pampore.

Economic burden remains another critical barrier. Ayele and Tegegn observed that medication cost was among the strongest predictors of non-adherence in Ethiopian diabetic patients [12] , a finding echoed in our cohort. Cost-related discontinuation may reflect the limited financial resilience of patients attending public health facilities, underscoring the need for policy-level interventions to subsidise essential anti-diabetic drugs.

Role of awareness and patient education

Interestingly, while 81% of participants were aware of their medication dosage and administration schedule, nearly one in five still failed to comprehend the long-term necessity of continued treatment. This discrepancy suggests that awareness does not necessarily translate into adherence.

Similar observations were made by Clark, who noted that knowledge of therapy often fails to modify behaviour without adequate reinforcement and motivational counselling [5] .

Educational and behavioural interventions, when personalised and sustained, have shown considerable efficacy in improving adherence [9,12] . Integrating adherence counselling into every diabetic clinic visit, involving family members, and ensuring periodic re-education can foster a sense of shared responsibility between patients and providers.

Psychosocial and cultural dimensions

Non-adherence is rarely a purely cognitive failure; it is often intertwined with patients' psychological and cultural beliefs. Some patients discontinue treatment after temporary symptom relief, while others rely on herbal or home-based alternatives. These behaviours are influenced by local traditions and misconceptions about the “naturalness” or “toxicity” of modern drugs. Khunti et al. in their systematic review noted that psychosocial and cultural beliefs significantly mediate adherence behaviour, particularly in South Asian populations [13] .

Thus, a culturally sensitive approach—acknowledging patient beliefs while providing clear evidence-based explanations—can make adherence interventions more effective. Healthcare professionals must approach non-compliance empathetically, recognising it as a behavioural challenge rather than patient negligence.

Clinical implications

Poor adherence in diabetes not only worsens glycaemic control but also contributes to the early onset of complications, increased morbidity, and economic strain on both individuals and healthcare systems. Studies have shown that each 10% improvement in medication adherence is associated with a 0.1% reduction in HbA1c levels, translating into tangible long-term benefits [7] .

From a public health standpoint, the findings highlight the urgent need to integrate adherence assessment tools like the Morisky 8-Item Medication Adherence Scale (MMAS-8) into routine diabetic care at primary and secondary health facilities. Routine use of such validated tools would allow for early identification of at-risk patients and timely counselling.

Moreover, task-sharing models involving pharmacists and nursing staff for adherence monitoring can improve patient engagement. Regular pharmacist-led education sessions and follow-up calls have been demonstrated to enhance adherence and glycaemic control [4,9] .

Limitations

The present study was limited by its cross-sectional design and reliance on self-reported data, which may introduce response bias. Objective measures such as pill counts or pharmacy refill records were not used. Furthermore, other psychosocial determinants such as depression and social support were not assessed. Future longitudinal studies using mixed methods could provide deeper insights into adherence dynamics in diverse populations.

Conclusion

The study highlights that a substantial proportion of patients with Type II Diabetes Mellitus exhibit low medication adherence, despite having reasonable awareness of their prescribed therapy. Forgetfulness, cost of treatment, and inadequate understanding of disease severity remain key barriers.

Improving medication adherence requires a multifaceted approach involving patient education, simplified treatment regimens, affordability initiatives, and empathetic patient-provider communication. Continuous reinforcement of adherence importance should be integrated into every diabetic consultation. By recognising non-compliance as a shared challenge rather than patient negligence, healthcare systems can adopt more humane, supportive strategies for long-term diabetes care.

Conflicts of Interest

The authors declare no conflicts of interest.

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