**Case Study**

# Prevalence and Predictors of Non-Compliance with Pharmacological Treatment in Diabetes

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## ARTICLE INFO

## ABSTRACT

Although the incidence of failure to comply to prescribe drugs is very varied, it may be the most frequent cause of suboptimal treatment results in diabetic patients. In the research region, there are little data on the extent of non-adherence to medicines and related causes. **Objective:** To determine the prevalence of non-adherence to medications in patients with diabetes and the factors leading to such practices. **Methods:** A descriptive study designed was chosen to evaluate 191 patients with diabetes enrolled at the department of medicine, combined military hospital, Nowshera, during the period May 2022 to May 2023. Non-adherence was confirmed clinically by taking history and biochemically by poor glycemic profile. SPSS version 24 was used to analyze the data. **Results:** The age of the patients ranged from 18 to 60 years. The mean age of the patients was 36.17 years with standard deviation 7.53. Age group 18 to 40 years comprised of 113 (59.2%) participants. The male participants were 129 (67.5%) in number. Non-adherence was observed in 86 (45.5%) patients. Factors leading to non-adherence included financial constraints 32 (37.2%), medications related to complications 16 (18.6%). **Conclusions:** Diabetes patients often fail to comply with their prescribed prescriptions in the study region. To reduce disengagement among diabetes patients, public health programs should be reinforced.

## INTRODUCTION

Diabetes is a serious health issue with a rising incidence that is characterized by persistent metabolic illness and increased blood glucose levels. Along with rising rates of body fat and cardiovascular illnesses, it is acknowledged by the globe Health Organization (WHO) as being one of the most significant public health issues in the globe for early detection, treatment, and prevention. On a worldwide scale, diabetes is projected to affect 422 million individuals. Citizens of low- and middle-income nations make up the majority of these diabetes patients. Diabetes is specifically responsible for 1.5 million yearly fatalities [1, 2]. This chronic illness requires a lifetime of therapy, dramatically raising the possibility of severe, long-term effects. It is difficult for hospitals where controlling acute infections is given higher priority, to provide long-term surveillance and treatment in cases of diabetes [3]. Diabetes mellitus is an unsettling health issue, despite the fact that its incidence in the area is currently lower than that of affluent nations [4, 5]. According to the most current meta-analysis research the prevalence of diabetes

mellitus in Ethiopia is thought to be 6.5%, with regional differences in the percentage [6, 7]. Medication non-compliance encompasses a broad variety of behaviours, whether they are unintentionally engaged in or not, that either result in the inadequate utilization or misuse of prescription drugs [8]. Breaking tablets, missing dosages, discontinuing medicine early, and failing to renew a prescription are all indications of insufficient utilization of pharmaceuticals. Non-adherence to anti-diabetic treatment is often linked to poor metabolic control. Due to inadequate metabolic regulation, both immediate and long-term problems may arise [9]. Studies have shown that diabetic individuals had suboptimal compliance to their anti-diabetic drugs and hyperglycemia control [10]. The most frequent cause of deteriorating health among diabetics may be failure to comply with treatment. Poor patient adherence compromises the safety and efficacy of anti-diabetic drugs, increasing the risk of death and disability. This has an immediate or subsequent effect on the rising expenses of the healthcare system [11]. Anti-diabetic drug failure to comply percentages are known to be very varied; as a result, the effects on outcomes of therapy should be taken into account [12]. Many diabetes individuals take fewer of their prescriptions than are recommended for them, it has been observed.  Thus, increasing medication adherence for diabetes is a critical public health concern [13]. One of the most often mentioned factors influencing medication non-adherence to diabetes therapy is age, followed by medication awareness and the presence of co-morbidities [14]. Designing more effective treatments requires knowing how often diabetes patients don't take their prescriptions as prescribed and the accompanying causes. The prevalence of medication non-adherence, related variables, and its effects on treatment outcomes among diabetes patients in the research region are not described in any studies. Consequently, the purpose of this research was to evaluate medication non-compliance and related factors among diabetes patients.

## M E T H O D S

This descriptive analysis was carried out Combined Military Hospital, Nowshera, over the period of May 2022 to May 2023. The hospital is situated in the town of District Nowshera, located in the Khyber Pakhtunkhwa Province of Pakistan. The organization offers services throughout four primary clinical departments, namely internal medicine, surgery, pediatrics, and gynecology/obstetrics. Additionally, it provides a range of services in additional clinical departments including dentistry, orthopedics, diabetes, dermatology, and reproductive health. The study population comprised of patients visiting diabetes clinic with poor glycemic profile. Poor glycemic profile was

defined by persistently raised random blood glucose level >200mg/dl for two weeks. Both type 1 and type 2 diabetes patients in the age range 18 to 60 years were registered. Participants of either gender were enrolled. Non-compliance was defined by failure on the part of the patient to take antidiabetic medications in the prescribed frequency or strength deliberately [15]. Multi-morbidity including intellectual disabilities, failure to provide formal authorization, serious auditory and vision impairments, lack of willingness and patients with severe cardiopulmonary compromise were excluded [16]. Non probability consecutive sampling technique was employed. A total of 191 patients were recruited. Sample size was determined using WHO sample size formula taking the anticipated prevalence of non-compliance as 41.5%, margin of error 7% and confidence level 95% [15]. In order to make sure that patient rights were upheld and ethical norms were met, the research plan was presented to the research ethics committee of the hospital. Prior to starting data collection, ethical approval was obtained, and patient data were concealed to maintain confidentiality. Data were collected from outdoor diabetes clinic of the hospital. Patients with poor glycemic profile were registered. Detailed history was taken from the patient regarding the frequency and the strength in which medications were being taken. These observations were then compared with the prescribed frequency and strength. Deliberate reduction in the frequency or strength of the medications was noted. History was further elaborated to discover the factors leading to poor adherence. Software version 25.0 of the Statistical Package for Social Sciences (SPSS) was used to code and provide data for analysis. To provide an overview of categorical variables, descriptive statistics like frequencies and percentages were calculated and the results were shown as tables. The relationship between the predictors and the result variable was examined using binary logistic regression models. Statistical significance was defined as p-value ≤0.05 at 95% CI.

## R E S U L T S

The age of the patients ranged from 18 to 60 years. The mean age of the patients was 36.17 years with standard deviation of 7.53. Frequency of participants in the age group 18 to 40 years was 113 (59.2%) while rest of the patients 78 (40.8%) had age between 41 and 60 years. The number of male participants in the study was 129 (67.5%). Residence wise distribution of patients showed that 119 (62.3%) patients belonged to rural areas while the remaining 72 participants (37.7%) were living in urban areas. The monthly income of 140 patients (73.2%) was more than Rs. 50,000 per month. The mean duration of disease was 8.57 years with standard deviation 3.91. Majority of the participants (110, 57.6%) had disease

duration more than 5 years and the remaining 81 patients (42.4%) had disease duration less than 5 years. 175 patients (91.6%) had Type 2 DM while the rest of 16 patients (8.4%) had type 1 diabetes mellitus. 137 patients (71.7%) patients were advised oral antidiabetic medications on their prescription while rest of the 54 patients (28.3%) were advised injectable medication (insulin). Figure 1 illustrates that non adherence was observed in 86 patients (45.0%). Age wise distribution showed 56 patients (49.5%) had age 18 to 40 years while 30 patients (38.5%) were aging 41 to 60 years. Contingency table analysis for non-adherence versus age reveal chi square p value of 0.129 which was more than 0.05. Hence it was statistically not significant. Similarly gender wise non-adherence break up was 69 (53.5%) among male as compared to 16 participants (25.8%) among female participants. The chi square p value was 0.001 which was less than 0.05. Hence, the heterogeneity was statistically significant. 42 patients (77.8%) among those taking injectable oral antidiabetic were non-compliant as compared to 44 patients (32.1%) taking oral hypoglycemic were non-compliant. The chi square p value was 0.001 which was less than 0.05, hence it was statistically significant.
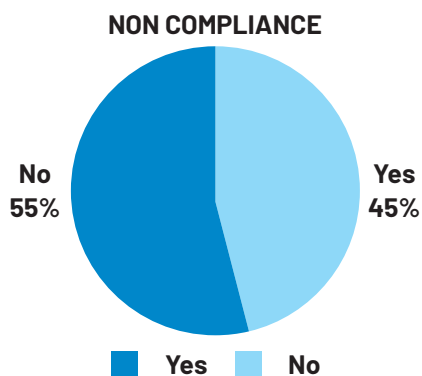
**NON COMPLIANCE**



**Figure 1:** Distribution of patients with respect to non-compliance

Table 1 shows that financial constraints were reported by 32 participants (37.2%), followed by fear of injection/injection related apprehensions in 20 patients (23.2%). Other causes included bad experience with medications such as adverse effects reported by 16 patients (18.6%), misconceptions about treatment described by 07 patients (8.1%) and lack of knowledge was observed in 11 participants (12.8%) who were non-complaint to medications.

**Table 1:** Factors leading to non-compliance

| Factors | Frequency (%) |
| --- | --- |
| Financial Constraints | 32 (37.2) |
| Injection Fear/Apprehensions | 20 (23.3) |
| Medications adverse effects | 16 (18.6) |
| Misconceptions | 07 (8.1) |
| Lack of Knowledge | 11 (12.8) |

## DISCUSSION

We discovered that 86 (45.5%) of the respondents in our study were non-adherent. The percentage of non-adherence to treatment in our research was comparable to the results of studies. Mitiku *et al.,* reported 41.0% non-adherence rate in their study [15]. Ali *et al.,* reported 45.2% non-compliance to antidiabetic medications [17]. Nevertheless, the observations in this research were substantially greater compared with the findings of research projects carried out by Bonger *et al.,* [18]. Nandini *et al.,* reported 21.6% non-adherence rate in a study carried out on Indian population [19]. In contrast, the results for non-adherence to antidiabetic medications were higher that the observations of this study [20]. This variability in the results of different studies may attributed to the different sample sizes and adherence testing methods may affect non-adherence levels and contribute to the variations in study outcomes [21]. Additionally, the amount of non-adherence as shown in various research settings may vary according on the participants' educational status, place of residence, income, and degree of medicine knowledge [22]. The majority of patients who sought medical attention in the current study were younger. Age and non-adherence do not significantly correlate, according to the current research (p-value = 0.129). However, non-compliance to medications was more common in patients aging more than 40 years. In a study by Mitiku *et al.,* the rate of non-adherence to medication was twice as common in patients aging more than 40 years compared to patients younger than 40 years [15]. This may be attributed to the fact that forgetfulness increases with age which was shown in a research, according to which the knowledge score drops by 3% for every 10 years increase in age after 40 years [23]. In our study, almost half of the male patients were non-compliant to medication as compared to one fourth females. There difference was statistically significant (p < 0.05). This finding is similar to the result of another study [24]. Imtiaz *et al.,* reported showed no evidence of a link between gender and non-adherence in diabetics [25]. The high rate of non-adherence in men may be because men often participate in outdoor pursuits in our nation, which may lead them to forget to take their prescriptions. Compared to urban inhabitants, rural residents less likely to adhere. This findings is comparable to the finding of Tiv *et al.,* [26]. This may attributed to the fact that in addition to communication deficiencies, patients in remote locations likely experience other difficulties like convenient access to healthcare services.

## CONCLUSIONS

There is a statistically significant high rate of medication non-adherence among DM patients. The higher risk of anti-diabetic medication non-adherence was substantially

correlated with male sex, living in a rural area, weak monthly income and patients who were advised injectable medications. Implementing strategies such as mental and emotional support, appropriate counselling and enhanced communication with healthcare experts, assistance from family members, and resolving financial restraints to meet their medical bills are all necessary to raise the adherence rate of diabetes patients. Furthermore, multicenter prospective trials that reduce recollection bias are advised in order to identify the true determinants of poor adherence.

## Authors Contribution

Conceptualization: SR, SH, JM
Methodology: ASJ, SR
Formal analysis: ASJ, SR, AM, AZ
Writing-review and editing: SH, JM, AZ

All authors have read and agreed to the published version of the manuscript.

## Conflicts of Interest

The authors declare no conflict of interest.

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