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Original Article

Medication Adherence and its Determinants among Type 2 Diabetic Patient in Tertiary Care Hospital

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Abstract

Background
Diabetes mellitus imposes vast social, health, and economic impacts on individuals and countries in the long term. Inadequate medication adherence is a major factor leading to poor and suboptimal glycemic control among patients with DM, which catalyzes the magnitude of this problem and leads to the development of diabetic-related complications.

Materials and Methods
A descriptive cross-sectional study was conducted in medicine and endocrine out patient department of Nobel Medical College Teaching Hospital. A convenience sampling technique was deployed using a structured interview schedule consisting of a medication adherence scale having a 4 Likert scale. Data was analyzed by SPSS version 20.0. Descriptive statistics including, frequencies, percentages, mean, and standard deviation were demonstrated by using tables and pie charts. Inferential statistics were used to find out the association between the level of adherence and selected variables and also determinants associated with non-adherence.

Results
From a total of 228 study respondents, more than half (59.65%) of them were non-adherent to their anti-diabetic medication. Glycemic control and the type of drug taken were found to be significantly associated with the level of medication adherence. Patients with tend to forgetfulness, far distance from health facilities, fear of dependency on drugs, and symptoms of hypoglycemia will likely have greater odds to be non-adhered to medications.

Conclusion
Medication adherence among diabetic patients in the present study is non-adherent. Glycemic control and the type of drug taken were associated with level of adherence.

Keywords: *Diabetes mellitus, Medication Adherence, Tertiary Care*

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Introduction

Diabetes mellitus is the most common endocrine and global public health problem characterized by elevated levels of blood glucose. In the past 3 decades, the prevalence of type 2 diabetes has risen dramatically in countries of all income levels [1]. Diabetes mellitus imposes vast social, health, and economic impacts on individuals and countries in the long term. However, much of these impacts can be lessened by reducing diabetes complicationsand can be done with anti-diabetic [2]. Medicationadherence is a widespread problem that causes high costs worldwide, especially in chronic conditions with long-term therapies, adherence is important to achieve target outcomes but is often low. Inadequate medication adherence is a major factor leading to poor and suboptimal glycaemic control among patients with DM, which catalyzes the magnitude of this problem and leads to the development of diabetic-related complicationslike theprogression of the disease,pre-mature disability, and mortality [3]. Most of the previous studies were done in developed countries only a few studies were found to be related to prevalence of non-adherence and contributing factors.

Inadequate medication adherence is a crucial leading to poor and suboptimal glycemic control among patients with DM, which catalyzes the magnitude of this problem and leads to the development of diabetic-related complications. Therefore, this present study is undertaken to assess the magnitude of non-adherence and the factors affecting the adherence among diabetic patientsin the tertiary care hospital.

Materials and Methods

A descriptive cross-sectional research design was conducted in medicine and endocrine OPD of Nobel Medical College and Teaching Hospital, Biratnagar from February 2023 to April 2023.This study was conducted after acquiring approval from the Institutional Review Committee of the NMTCH, the purpose of the study was explained to the respondents and they were explained about the study. Following this, informed consent was obtained from each respondent.

Type 2 diabetic patients who were on oralhypoglycemic medications for at least six months at the time of enrolment attending medicine and endocrine OPD and were willing to participate in the study were chosen as samples. A total of 228 respondents were taken as samples by using convenience sampling technique. The sample size was calculated using the formula by taking the proportion of non adherence to anti-diabetics medication, 55.14% from a previous study conducted in Kathmandu Diabetic and Thyroid Centre, Alka Hospital and Endocrine Care Centre, Nepal [5], n= Z^2pq /d2 sample size calculated to be 228.Data was collected using a structured interview schedule.Data were analyzed using SPSS (Statistical Package for Social Science) version 20. Respondents who obtained score of ≥27 were considered as adherent to medication whereas for good glycemic control, FBS≤126mg/dl and PP ≤200mg/dl. Reports of same day of visit were only taken in the study.Descriptive statistics such as frequency, percentage, mean, and standard deviation were calculated along with an appropriate graphical and tabular presentation. Inferential statistics such as the chi-square was used to find out the association between the level of adherence and selected socio-demographicand clinical variables**.**Multivariate analysis i.e., odd ratio was used for finding out the factor associated for non-adherence to medication.

Results

Table 1: Distribution of Respondents by Socio-Demographic variables (n=228)

Variables	Frequency (N)	Percentage (%)
Age (in years)		
= 50	116	50.9
>50	112	49.1
	Mean ±Sd = 50.3 ± 9.8	
Gender		
Male	113	49.6
Female	115	50.4
Religion		
Hindu	191	83.8
Others (Islam, Kirat and Cristian)	37	16.2
Education status		
No formal education	11	4.8
Formal education	127	55.7
Occupation		
Unemployed	117	51.3
Employed	111	48.7
Marital status		
Married	210	92.1
Others (widow/widower)	18	7.9
Living status		
Living with family	228	100.0
Family monthly income (NRs)		
less than 25000	92	40.4
25000-30000	94	41.2
More than 30000	42	18.4

Table 1 shows the Socio-Demographic characteristics of the respondents among which the average age of the participants was 50 years (standard deviation =9.8) and half of them were

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females (50.4%). The most of the participants were married (92.1%) and of them more than half (55.5%) had formal education attained.
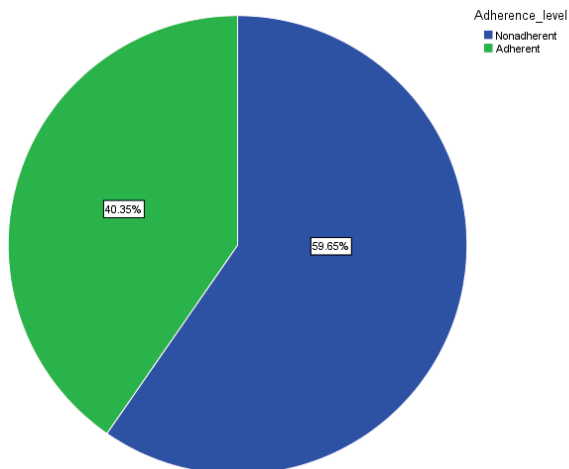

Figure 1: Prevalence of level of adherence to Diabetic medication (n=228)

Table 2: Association between level of medication adherence with clinical variables (n=228)

Variables	Adherence level		P value
	Non-adherent	Adherent	
DM Duration (year/s)			
<=5	81	60	
6-10	30	19	
>10	25	13	0.628*
DM medication Duration (year/s)			
<=5	86	64	0.564*
6-10	31	16	
>10	19	12	
Drug type			
OHA	110	73	**0.015***
Insulin	1	7	
Insulin with OHA	25	12	
Comorbidities			
Yes	86	53	0.393*
No	50	39	
Glycemic control			
Good glycemic control	25	40	**< 0.01***
Poor glycemic control	111	52	
Pays for DM drug			
Self	58	43	0.542*
Family member	78	49	
Patient attendant for visit			
Yes	115	76	0 .695*
No	21	16	
Family member reminding for drug intake			
Yes	70	50	0.669*
No	66	42	

Significant at P < 0.05   *Pearson chi square test

Table no 2 shows that there is statistically significant association between level of adherence with type of drug and glycemic control.

Table 3: Association between clinical characteristics with non-adherence to DM medication (n=136)

Variables	Odd ratio	95% CI	P value
Drug type			
OHA			
Insulin	0.723	0.342-1.530	0.05
Both OHA and Insulin	0.069	0.008-0.622	
Glycemic control			
Good glycemic control			<0.000
Poor glycemic control	3.415	1.877-6.214	

Table 4: Association between the determinants with non-adherence to DM medication (n=136)

Variables	N (%)	Odd ratio	95% CI	P value
Forgetfulness	122 (53.5)	0.152	0.267- 0.087	0.000
Dose being high	19 (8.3)	1.272	1.671 - 0.968	0.085
Complexity of drug	46 (20.2)	0.978	1.308- 0.732	0.882
Multiple medication	29 (12.7)	1.163	1.537- 0.880	0.288
Poor family support	4 (1.8)	2.253	7.540- 0.674	0.187
Regular monitoring of glucose	8 (3.5)	0.627	2.115- 0.186	0.451
Lack of information on importance of drug	4 (1.8)	0.436	4.250- 0 .045	0.475
Lack of information by physician on DM	2 (0.9)	1.207	0.074- 19.604	0.895
Lack of information by physician on DM drug	2 (0.9)	1.207	0.074- 19.604	0.895
Use of alternative medicine	21 (9.2)	1.250	1.644- 0 .950	0.111
Long duration of intake	45 (19.7)	0.989	1.322- 0.740	0.941
Availability of drug	36 (15.8)	1.087	1.443- 0.819	0.564
Symptoms of hypoglycemia	12 (5.3)	1.348	1.765 - 1.029	0.030
Far distance from health facility	25 (11.0)	8.278	19.301- 3.550	0.000
Fear of dependency on drug	70 (30.7)	0.091	0.224- 0.037	0.000

Discussion

The present study shows that more than half of respondents were nonadherent to diabetic medication among type 2 diabetic patients. The study also demonstrated a significant association between medication adherence with glycemic control and the type of drug used. The multivariate logistic regression showed that there is a statistically significant association between nonadherence with determinants like forgetfulness, far distance from health facilities, symptoms of hypoglycemia, and fear of dependency on the drug.

The proportion of high non-adherence in the present study supports the findings in a previous study conducted in Nepal which showed 55.14%

for nonadherence to medication. A similar result was demonstrated in other studies [4-6]. However, the results were in contrast to other studies which showed high proportion of good adherence [4, 7]. The variations in the results might have been attributed to difference of difference in sample size or the true difference in different populations.

In this study, patients who had good glycemic control had better adherence to anti-diabetic drugs compared to those who had poor glycemic control, which was in line with the studies conducted in Saudi Arabia, Rwanda. However, the finding was in contrast with the study conducted in Tanzania[4]where glycemic control was not associated with drug adherence, a possible explanation would be either patients were over-reporting their adherence or doctors were not giving strong enough doses to maintain glycemic control was a potential reason for the absence of connection.

The present study demonstrated a significant association between medication adherence with type of drug taken. The type of medication taken showed a significant association with adherence in the univariate analysis. However, the significance of the association between type of medication and adherence seen in the univariate analysis diminished in the multivariate analysis. This finding is consistent with the Saudi Arabia [8]. Study which found no association between the types of treatment with medication adherence. This finding could be an indication of ineffective communication between patients and health care professionals and inadequate knowledge of the disease medications or awareness of its complications.

Present study showed that there is statistically significant association between non adherence with factor like forgetfulness. Those respondents who tend to forget the medication will likely to have greater odds to be non-adhered to medications (OR=0.152 ,95%CI= 0.267- 0.087, p value=0.000). The study findings is similar to study conducted in Ethiopia[9].

There is association between non adherence with far distance from health facility. Those patient who lived far from the health facilities were 8.27 times more likely to have greater odds to be non-adhered to medications (OR=8.278, 95%CI=19.301- 3.550,p value =0.000).Similar to this finding, a study conducted in Ethiopia which showed that patients who traveled more than 24 KM to reach the hospital were 10.09 times more likely to be non-adherent to their medications than those who traveled less than 4 KM to reach

the hospital[8].The reason could be patients in rural areas in developing nations like Ethiopia and Nepal are more likely to not take their medications as prescribed because of a lack of resources and poor infrastructure, such as subpar roads and inadequate transportation.

Conclusion
The study concludes that a significant number of type 2 diabetic patients were nonadherent to diabetic medication. The findings of the study also revealed that the type of drug, poor glycaemic control, forgetfulness, having symptoms of hypoglycemia, far distance from health facility, and fear of dependency on medication were the major factors associated with non-adherence to medication.

Implication
Based on the findings, it is advisable the DM clinics within the healthcare facilities to enhance their chronic patient follow-up methods in light of the study's findings. The development of teaching programs by healthcare professionals that increase patient adherence to prescribed medications.

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