

A Cross Sectional Study on Medication Adherence and Factors Associated With Non-Compliance among Type-II Diabetic Patients From Udaipur, Rajasthan, India

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Abstract :

Introduction: Non-compliance, with long-term medication for chronic conditions, is a common problem that leads to compromised health benefits and serious economic consequences. In addition, it has also been identified as the predominant reason for the failure of medical therapy and disease progression.

Objectives: To evaluate medical adherence among Type-2 diabetes patients. To find out associated factors with non compliance in Type-2 Diabetic patients. **Method:** A cross sectional study using multistage sampling method was carried out between March to June 2019 in Udaipur city of Rajasthan. Total of 250 subjects having type-2 diabetes mellitus were included in study. **Results:** Compliance to diabetes treatment was almost 75% with female dominance (67.91%). The compliance was found statistically significant in married persons. Almost 60% of patients non adherent to their medication were on treatment for more than five years. Type of medication, complications of diabetes and comorbid conditions had not any significant association with compliance, whereas the number of doses and side effects of drugs were associated significantly with non compliance of treatment. Among all the reasons for non compliance, forgetfulness was found in 57.14% subjects. **Conclusion:** Compliance to type 2 diabetes mellitus treatment was suboptimal. Female gender and education level were significantly associated with adherence.

Key Words : Adherence, Self Care, Treatment Compliance, Type 2 Diabetes Mellitus

Introduction :

Diabetes mellitus is a serious, chronic disease that occurs either when the pancreas does not produce enough insulin (a hormone that regulates blood glucose), or when the body cannot effectively use the insulin it produces. World Health Organization (WHO) defines diabetes as: A metabolic disorder of multiple aetiology, characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism. Both the number of cases and the prevalence of diabetes have been steadily increasing over the past few decades.^[1]

Patient compliance or adherence is defined as the extent to which a person's behaviour coincides with health-related advice.^[2]

Non-compliance, with long-term medication for chronic conditions, is a common problem that leads to compromised health benefits and serious economic consequences. In addition, it has also been identified as the predominant reason for the failure of

medical therapy and disease progression.^[3]

According to a report from World Health Statistics 2018, there were an estimated 1.6 million deaths occurred due to diabetes in 2016.^[4] Number of adults living with diabetes worldwide were approximately 422 million in 2014.^[5] This rise in prevalence is more rapid in middle and low income countries.^[6] As per the Diabetic Atlas 2017, the figure of diabetics for South East Asia Region was around 82 million. India was at the second position after China with prevalence rate of 10.4%.^[7] If preventive steps are not taken at time, the disease will influence 1 out of 10 adults worldwide by 2040.^[8]

Diabetes is a major cause of blindness, kidney failure, heart attacks, stroke and lower limb amputation. Poor doctor-patient relationship increases the risk of non-compliance. Multiple drug therapy, multiple frequency of dosing and lack of a patient-friendly health care system also increase the risk of non-compliance.^[9]

With this background, the study will provide evidence about the treatment compliance among patients with diabetes mellitus which will help in further therapeutic research and to obtain measures for assessment of future trends in medicine compliance. Looking at current scenario and increase in number of diabetic conditions, this study will highlight the level of problem in community and thus will help health planner and policy makers to channelize resources to address the factors responsible for non-compliance.

Objectives:

- To evaluate medical adherence among Type-2 Diabetic patients
- To find out associated factors with non compliance in Type-2 Diabetic patients

Method:

A cross sectional study was carried out by Community Medicine Department, American International Institute of Medical Sciences (AIIMS), Udaipur, Rajasthan. Study was submitted to Ethical committee, AIIMS, Udaipur. After obtaining permission to conduct the study, data collection was started. Patients participating in this study were approached for informed consent.

Study period: March to June 2019.

Study Subjects: The study population included Type-II Diabetic patients aged 30 and above who were under medication for at least one year and permanent residents of the area and ready to give informed consent to be part of our study. Those not willing to participate in the study, mentally retarded, critically ill who were unable to respond to interview schedule and Gestational diabetes mellitus patients were excluded from the study.

Pilot study: Done by interviewing 45 type-2 diabetic patients.

Sampling technique: Multistage sampling method

Study tool: A pre formed, pre tested semi-structured questionnaire was used in this study.

Data collection: There are total five zones of Udaipur city. One ward was selected randomly by open Epi info software from each zone. Now, from each ward fifty participants were drawn by systematic random

sampling method from every 10th house and final sample size of 250 was attained. Personal interviews were done with all the subjects defined under study protocol. Compliance to treatment was determined by indirect methods, which included interviews and self-reporting by the patients. Non-adherence was assessed using patients self-reports of how they had been taking their medication in the week preceding the interview. Patients who reported taking less than 80% of their prescribed medicines were considered to be non-compliant to treatment. Whenever necessary, family persons were communicated for further clarification and getting right information.

Statistical analysis: Data entry and analysis were done using Epi info 7.0. A Chi-square test was used to compare the compliance considering the different demographic and socio-economic categories. Unadjusted odds ratio (OR) with the 95% confidence interval (95% CI) were calculated for the various socio-demographic characteristics against treatment compliance.

Results:

In our study, we found that the compliance to diabetes treatment was almost 75% (Figure 1) with female dominancy (67.91%). This difference was noted to be statistically significant ($P < 0.05$, adjusted OR = 2.48, 95% CI = 1.38 - 4.44) as mentioned in Table 1. Increase in compliance was found with increase in the level of education of subjects and it was found to be significant. Socio-economic background did not have any bearing on adherence to treatment. Compliance to therapy was more among housewives as compared to other occupational groups. The compliance was found statistically significant in married persons ($P < 0.05$, adjusted OR = 2.05, 95% CI = 1.03 - 4.06). (Table 1)

Figure 1: Compliance for medication among type 2 diabetics

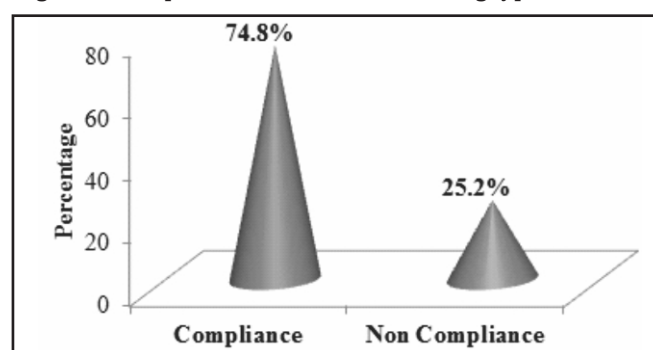


Table 1: Influence of Socio-demographic characteristics on treatment compliance among Type 2 Diabetic patients (n=250)

Socio-demographic variables	Compliance (n=187)	Non compliance (n=63)	OR (95% of OR)	P value
Age in years				0.57
30-39	8 (4.28)	5 (7.94)	1.00	
40-49	24 (12.83)	9 (14.28)	1.67 (0.43 - 6.46)	
50-59	50 (26.74)	13 (20.64)	2.40 (0.67 -8.59)	
60 & above	105(56.15)	36 (56.14)	1.82 (0.56 -5.93)	
Gender				0.01
Male	60 (32.09)	34 (53.97)	1.00	
Female	127 (67.91)	29 (46.03)	2.48 (1.38 -4.44)	
Literacy				0.0018
Illiterate	16 (8.56)	07 (11.11)	1.00	
Primary	25 (13.37)	16 (25.40)	0.68 (0.23 -2.03)	
Secondary	38 (20.32)	21 (33.33)	0.79 (0.28 -2.23)	
Higher	53 (28.34)	19 (30.16)	1.22 (0.43 -3.42)	
Secondary	55 (29.41)	0 (0.0)	-	
SE* status				0.31
Lower	34 (18.18)	17 (26.98)	1.00	
Middle	122 (65.24)	36 (57.14)	1.69 (0.85 -3.38)	
Upper	31 (16.58)	10 (15.88)	1.55 (0.62 -3.89)	
Occupation				0.03
Job	34 (18.18)	16 (25.40)	1.00	
Retired/unemp	40 (21.39)	12 (19.05)	1.57 (0.65 -3.77)	
Business	25 (13.37)	14 (22.22)	0.84 (0.35 -2.03)	
Housewife	77 (41.18)	14 (22.22)	2.59 (1.14 -5.89)	
Others	11 (5.88)	7 (11.11)	0.74 (0.24 -2.26)	
Marital status				0.04
Unmarried	39 (20.85)	18 (28.57)	1.00	
Married	122 (65.24)	30 (47.62)	2.05 (1.03 -4.06)	
Divorced	19 (10.16)	11 (17.46)	0.79 (0.31 -2.02)	
Widow/Widower	07 (3.75)	04 (6.35)	0.81 (0.21 -3.11)	

(*SE status - Socio economic status) according to Modified Prasad Ocassification

Table 2 : Factors associated with non-compliance

Factors	Compliance (n=187)	Non compliance (n=63)	P value
Duration			
< 5 years	112 (59.89)	27 (42.86)	0.018
>5 years	75 (40.11)	36 (57.14)	
Type of medication			
OHA*	105 (56.15)	33 (52.38)	0.82
Insulin	33 (17.65)	11 (17.46)	
Both	49 (26.20)	19 (30.16)	
No. of doses			
Once daily	58 (31.02)	15 (23.81)	0.015
Twice daily	107 (57.22)	31 (49.21)	
Thrice daily	22 (11.76)	17 (26.98)	
Side effects of drugs			
Yes	29 (15.51)	20 (31.75)	0.004
Complications of diabetes			
Yes	42 (22.46)	08 (12.70)	0.09
Co morbid conditions			
Yes	121 (64.71)	42 (66.67)	0.77

(OHA*=Oral hypoglycemic agents)

Figure 2: Forgetfulness as a reason of non compliance (N=63)

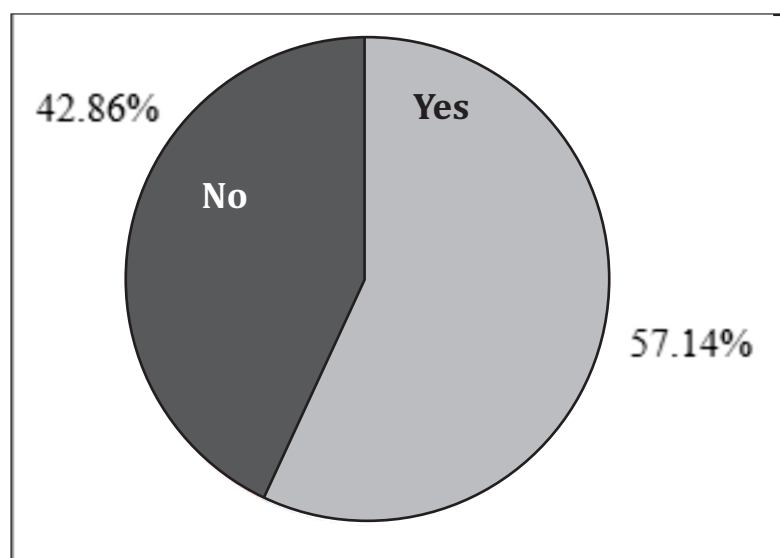


Table 2 revealed various factors associated with non compliance. Almost 60% of patients non adherent to their medication were on treatment for more than five years. This difference was statistically significant ($p=0.018$). Type of medication, complications of diabetes and co morbid conditions had not any significant association with compliance. Whereas the number of doses ($p=0.015$) and side effects ($p=0.004$) of drugs were associated significantly with non compliance of treatment. Among all the reasons for non compliance, forgetfulness was found in 57.14% subjects. (Figure2)

Discussion:

Compliance with medication has become a subject of much research, and various interventions have been suggested to enhance compliance of patients. But the scarcity of standard terminology and methodology has proved it difficult to compare studies of compliance.^[3] It is a general belief that diabetic patients are not adherent to their treatment. But present study result found 74.80% of the subjects to be compliant to their medication, which was inconsistent to that belief. Lashkar A and Rajasekharan D et al., in their respective studies noticed 91.5% and 60.5% compliance.^[10, 11] Approximately 57.3% of sample were considered adherent to their treatment in a study from Palestine.^[12]

In our study, several patient demographic and clinical factors exhibited lower odds of adherence while some were associated with higher adherence. This lower adherence to medication results in wastage of medicine and less than optimal outcomes. We detected that old age (≥ 60 years) was a predictor of good adherence. It suggests that acceptance of a chronic illness diagnosis and the potential consequences may be an important, but perhaps overlooked, determinants of medication taking behaviour. A recent study conducted by Elsous A et al. reported similar result. Being older was significantly associated with greater adherence in a study from Hawaii.^[13, 14] In current study forgetfulness was the reason for non compliance in more than half of patients, whereas one forth of subjects were forgetting to take medicine at intervals in a study from Eastern Nigeria.^[15] Gelaw BK et al. also witnessed

more than 20% diabetics with similar reason for non compliance.^[16] Women were found to be more compliant to treatment than men in our study, which was compatible with the finding of study carried out by Khan AR et al. in Saudi Arabia in 2010-11 and contrasting with the observation of study at Puducherry.^[17,18] Identical to composition of our study population, more than half subjects were belonged to socio economical class-II in a study from Maharashtra.^[19] Persistence and compliance were associated with low socioeconomic status in a study by Guénette L et al., which was inconsistent to our finding.^[20]

Education and awareness are important factors in disease prevention. Illiterate patients cannot read or distinguish their medications, which is one of the common obstacles to medical adherence. However, it was noted that people with education up to secondary level to be non-adherent as compared to other educational groups. Similar findings were observed by Santhanakrishnan I et al., while level of education was not associated with drug adherence in study carried out at Tanzania. A positive association between education level and adherence was attained by Farsaei S et al.^[21,22,23] It was found that the number of patients under business category were more non adherent, which may be due to their busy schedule. Similar finding was reported from study conducted by Mathew et al. at Tamil Nadu. The relationship between various aspects of compliances and occupation was not found to be significant in a study by Ibrahim NK et al.^[24, 25] Married persons were more adherent to their treatment and the variable was identified as a significant variable in our study. This finding was in congruence with study carried out by Arifulla M et al.. A study conducted at Uganda did not found any association between marital status and adherence to anti diabetic medication.^[26,27]

Co-morbid conditions did not have any bearing on adherence to treatment in our study. Kirkman MS et al. found that co- morbid conditions were associated with higher adherence to non-insulin anti diabetic medications. Results were mixed regarding the impact of comorbidities on medication adherence in a study by Curkendall SM. It indicates that health care providers should consider many factors beyond common wisdom when addressing the issue of medical adherence. They should not just assume that

to medication adherence. Infact, they may need more support to help them overcome the barriers. Patients with co-morbidities were found less adherent to their medication in a study from Malasiya.^[28, 29, 30] Positive association was found between side effects of drugs and non adherence in current study. It was similar to study by Kassahun A et al. and contrary to study from central Nigeria.^[31, 32] One third of patients gave side effects of drugs as a reason for non compliance in a study from Ethiopia.^[33] Number of doses and complexity of medication regimens had been shown to reduce adherence which was compatible with the study carried out by Garcia Perez LE et al.^[34] Study from Kolkata also showed that as compared to OHA alone, the insulin alone regimen had significantly higher association with non-compliance, while a combination of insulin and OHA had the highest association with non-Compliance to the Anti-Diabetic drugs.^[35] Duration of diabetes for five years or more was significantly associated with non-compliance. Similar observations were also made by Khattab M and Gimenes HT et al.^[36, 37] A Significant association was found between adherence and complications of diabetes in our study, which was consistent with the finding of study from France.^[38]

It is clear that medical adherence is a complex behavior and hence development of effective intervention can improve compliance only when mechanisms underlying the behaviors are better understood

Conclusion:

Preventive health interventions need to be tailor-made according to community and gender needs. In current study, compliance to type 2 diabetes mellitus treatment was suboptimal. Female gender and education level were significantly associated with adherence. Married persons and housewives exhibited higher odds of adherence. Socio-economic status, type of medication, co-morbid conditions and complications did not have any bearing on adherence to treatment. Duration of treatment, Number of doses, forgetfulness and side effects of the drugs were the most common reasons cited for non compliance in patients.

Recommendations:

It is warranted to increase awareness in community in order to foster better control of the

disease, improve compliance and there by outcomes. There is a great need to focus on individual health education and health promotive lifestyles. Ask-educate-ask approach can be a multipronged technique to ensure patients understanding of counseling provided during their visit to government or private healthcare facilities. Family members can be communicated and included in counseling sessions to overcome forgetfulness of patients and to get reliable information about patients self care and adherence. Further large scale studies on strategies to ameliorate adherence rate and to explore the effect of compliance on the quality of life of diabetic patients should be considered.

Declaration:

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Conflict of Interest: Nil

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