

# Therapeutic Non-Adherence to Type-2 Diabetes Management among Diabetics Treated in a Tertiary Care Hospital of Kolkata, West Bengal, India

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## ABSTRACT

**Background:** Diabetes mellitus is a major metabolic disorder. The word ‘adherence’ describes the extent to which the patient’s behaviour matches with health care provider’s recommendations. The aim of this study is to determine the rate of therapeutic non-adherence and its associated factors among diabetic patients at KPC Medical College & Hospital, Kolkata.

**Material and methods:** A descriptive cross-sectional study was conducted in the Diabetes clinic of KPC Medical College & Hospital, Kolkata during the period extending from 1<sup>st</sup> June 2017 to 30<sup>th</sup> November 2017, i.e. a period of 6 months. Systematic random sampling was done to select 576 male and female patients with fixed drug therapy for at least 3 months. Data was collected by a personal interview using structured open ended questionnaire in patient’s mother language and from patient’s medical history record. Analysis of non-adherence to medication was done using MMAS-8 (Morisky medication adherence scale).

**Results:** The overall non-adherence rate was about 45%. Factors that showed significant association with non compliance were age groups, sex, education levels, duration of disease, type of medication used, diet plan and knowledge about complications of diabetes.

**Conclusion:** Data indicates a high rate of therapeutic non-adherence among diabetic patients in KPC Medical College & Hospital, Kolkata which warrants a need for improvement in our healthcare delivery system.

**Keywords:** Type-2 Diabetes; Diabetes mellitus; Non-adherence.

## BACKGROUND

Diabetes is fast gaining the status of a potential epidemic in India with about 74 million <sup>[1]</sup> diabetic individuals currently diagnosed with the disease. India currently faces an uncertain future in relation to the potential burden that diabetes may impose upon the country. Unfortunately more than half (58%) of them have not been diagnosed and are at a higher risk of developing harmful and costly complications. <sup>[1]</sup> These complications have further tangled the situation by increasing the disease burden by manifold. And one of the major reasons

behind the development of diabetic complications is patients’ non-adherence to therapeutic strategies. This is widespread and has been reported from all over the world. <sup>[2]</sup> Adherence to diabetes management includes adherence to medications, life style modification and dietary changes. Non-adherence may also be due to factors that are patient-centered such as age, gender, patient education etc. or therapy-related such as route of administration, duration of treatment, complexity of treatment and the side effects of the medicines. <sup>[2]</sup> Type 2 Diabetes

Mellitus is poorly controlled due to lack of adherence to the treatment regimen. Prevalence of the poor adherence treatment ranges from 67% to 74%.<sup>[3,4]</sup> Poor glycemic control has consistently shown to be associated with long-term complications.<sup>[5]</sup> Here lies the importance of addressing the issue of non-adherence to therapeutic management.

#### **OBJECTIVES:**

1. To determine the non-adherence to medication among the Type 2 diabetes mellitus (DM) patients in a tertiary care hospital of Kolkata.
2. To assess the factors affecting the therapeutic non-adherence and to find out its correlation with different socio-demographic factors.

#### **METHODOLOGY**

**Study Design:** Observational descriptive study with cross-sectional design.

**Study Setting:** This study was conducted in the Diabetes clinic of KPC Medical College and Hospital, Kolkata, India.

**Study Period:** From 1<sup>st</sup> June 2017 to 30<sup>th</sup> November 2017, i.e. a period of 6 months.

**Study Population:** All Type 2 DM patients aged 20 years and above who attended the clinic in the above-mentioned period.

**Sampling Technique:** Systematic random sampling.

**Sample Size:** The sample size was determined by using the formula,  $Z^2PQ/L^2$ , where  $Z=1.96$ . Considering the prevalence of the non-adherence to anti-diabetic drugs to be 42.3%,<sup>[6]</sup> with the allowable error being 10% of the prevalence, the initial sample size came out to be 524. Adding a non-response rate of 10%, the final size came out to be 576.

**Study Technique:** The diabetes clinic in this institution runs on three days a week

(Monday, Wednesday and Friday) with a foot-fall of about 18-20 patients of type 2 diabetes each day, on an average. 08 patients were interviewed on each day where the participants were selected by systematic random sampling, considering the sampling interval on an average to be 2 (18/08). The patients, who met the inclusion criteria and gave informed consent to participate, were included in the study. In this manner, the full sample size of 576 was reached in six months time.

**Inclusion Criteria:** 1) Patients with type 2 diabetes who were under some kind of treatment for at least 3 months duration following the initial diagnosis.

**Exclusion Criteria:** 1) Those who were seriously ill. 2) Those who did not give informed consent to participate in the study. 3) The patients who were pregnant or puerperal at the time of the interview (for female patients).

Operational definition for the Diagnosis of Diabetes Mellitus: Symptoms of diabetes plus -- random blood glucose concentration  $\geq 11.1$  mmol/L (200 mg/dL) or Fasting plasma glucose  $\geq 7.0$  mmol/L (126 mg/dL) or HbA1C  $\geq 6.5\%$  or Two-hour plasma glucose  $\geq 11.1$  mmol/L (200 mg/dL) during an oral glucose tolerance test.

**Study Tool:** i) Eight-item Morisky Medication Adherence scale (MMAS-8)<sup>[7]</sup> was used to assess adherence and a ii) semi-structured open-ended questionnaire was used to collect information on factors influencing non-adherence.

**Data Collection:** By i) interviewing and ii) checking medical records.

**Data Analysis:** The data were analyzed using MS Excel 2010. Chi-square test was performed wherever applicable at 5% level of significance.

## RESULTS

**Table 1: Socio-demographic factors affecting therapeutic compliance (N=576)**

Socio-demographic factors		Adherence (%)	Non-adherence (%)	Total (%) N = 576	Chi-square	P - value
AGE (in years)	< 40	136 (72.34)	52 (27.66)	188 (32.64)	62.17	<0.05
	40 – 60	144 (57.37)	107 (42.63)	251 (43.58)		
	> 60	39 (28.47)	98 (71.53)	137 (23.78)		
SEX	Male	176 (51.01)	169 (48.99)	345 (59.90)	06.65	<0.05
	Female	143 (61.90)	88 (38.10)	231 (40.10)		
EDUCATION	Literate	304 (57.36)	226 (42.64)	530 (92.01)	10.49	<0.05
	Illiterate	15 (32.60)	31(67.40)	46 (07.99)		

Among the socio-demographic factors affecting therapeutic compliance to anti-diabetic treatment (Table 1), age, sex and education played major role. The compliance was found to decrease with increase of age ( $p<0.05$ ) and the lowest compliance was found in the age group of

>60years. The compliance rate was also found lower among males (49%) as compared to females ( $p<0.05$ ). Illiteracy also showed negative impact on therapeutic compliance with about 67% illiterates showing therapeutic non-compliance ( $p<0.05$ ).

**Table 2: Therapeutic & dietary factors affecting therapeutic compliance (N=576)**

Therapeutic & dietary factors		Adherence (%)	Non-adherence (%)	Total (%) N = 576	Chi-square	P - value
TYPE OF MEDICATION	OHA	188 (68.12)	88 (31.88)	276 (47.92)	98.51	<0.05
	INSULIN	48 (54.55)	40 (45.45)	88(15.28)		
	Both	83 (39.15)	129 (60.85)	212 (36.80)		
DURATION OF TREATMENT	<5 years	164 (65.08)	88 (34.92)	252 (43.75)	17.05	<0.05
	>=5 years	155 (47.84)	169 (52.16)	324 (56.25)		
FOLLOWED DIET PLAN	Yes	132 (59.73)	89 (40.27)	221 (38.37)	02.74	<0.05
	No	187 (52.68)	168 (47.32)	355 (61.63)		

The type of medication used for diabetic management also showed significant association with therapeutic compliance (Table 2). Significant non-adherence was found among those on combined oral hypoglycaemic agent (OHA) and insulin therapy (60.85%) than among those on either OHA or insulin alone ( $p<0.05$ ). Even duration of treatment affected therapeutic compliance – those on therapy for more than 5 years showed significant non-adherence ( $p<0.05$ ). It was also observed that only 38.37% of the study participants had followed the prescribed diet plan in the preceding week and those that

followed the diet plan also showed more therapeutic compliance ( $p<0.05$ ).

Other patient characteristics affecting therapeutic compliance included knowledge about complications of diabetes and tendency to follow exercise schedule (Table 3). In case of knowledge about complications of diabetes, those with some knowledge showed better compliance than those having no knowledge at all ( $p<0.05$ ). Similarly, patients who followed their exercise schedule showed better compliance to therapy than those not following exercise schedule ( $p<0.05$ ).

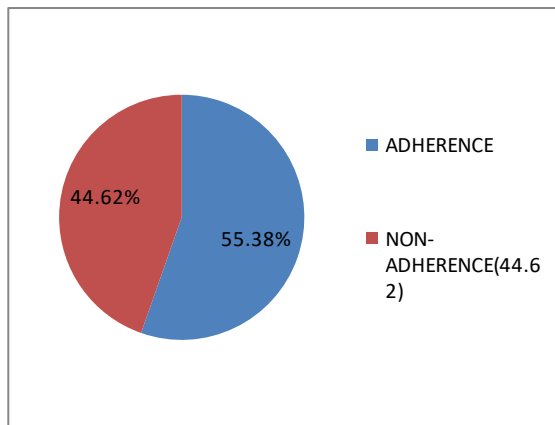
**Table 3: Patient characteristics affecting therapeutic compliance (N=576)**

Patient Characteristics		Adherence (%)	Non-adherence (%)	Total (%) N = 576	Chi-square	P - value
Knowledge about complications Of diabetes	No knowledge	103(45.18)	125(54.82)	228(39.58)	15.89	<0.05
	Some knowledge	216(62.07)	132(37.93)	348(60.42)		
Followed exercise schedule	Yes	114(62.64)	68 (37.36)	182(31.60)	05.66	<0.05
	No	205(52.03)	189 (47.97)	394(68.40)		

The overall prevalence of therapeutic non-adherence that is score  $>2$  with MMAS-8 scale was seen in 257 patients (44.62%) as is depicted in Fig.1.

The remaining study populations were somehow compliant to their therapeutic management.

Fig.1: Pie-chart depicting the distribution of diabetics showing therapeutic non-adherence (N = 576)



Among the non-adherent patients, forgetfulness (57.59%) and financial constraints (34.24%) were the major factors followed by feeling of well-being (21%), busy with work (14%), too many medicines (12%) and trying alternative medicines (10.11%) as is seen in Table 4.

Table 4: Distribution of reasons for non-compliance to anti-diabetic drugs among the non-adherent diabetics (n = 257)

REASONS	NUMBER (%)
FORGETFULNESS	148 (57.59%)
FINANCIAL CONSTRAINTS	88 (34.24%)
FEELING OF WELL BEING	54 (21%)
BUSY WITH WORK	36 (14%)
TOO MANY MEDICINES	31 (12%)
TRYING ALTERNATIVE MEDICINES	26 (10.11%)

## DISCUSSION

Therapeutic non-adherence to management of chronic diseases such as diabetes mellitus is reportedly variable. [8] An attempt was made in the present study, to find out the association of various socio-demographic factors and other patient characteristics with the compliance to medications and the reasons behind the non-adherence, as were reported by the patients.

In the present study, the non-adherence rate to the anti-diabetic drugs was found to be 45%. This, though quite undesirable, is lower than that (70%) reported by Shobhana R et al, (1999). [9] This difference could probably be due to improved patient awareness and availability

of better preparations and formulations of anti-diabetic medications over the years.

Economic problems to buy medications were one of the major patient-centric factors that were found to be higher in non-adherent patients (34.24%). Similar observations were made by Wabe et al. who observed that 37% of non adherent patients had financial limitations. [10] Affordability is a problem since many of the anti-diabetic medications cost high, and it is a recurring cost too. So, financial constraints being one of the common reasons behind the non-adherence, warrants actions like supply of free medicines from the hospital and the establishment of fair price shops in the government-run hospitals to make the drugs affordable to all.

The compliance rate was found to be significantly lower among males and among those who were illiterate. Khan AR et al., (2012) [11] from Saudi Arabia found no significant association between the age and the non-adherence to the anti-diabetic drugs. However, the study [11] reported the male sex and a poor educational status to be significantly associated with the non-adherence.

A more concerning fact was the association of the non-adherence with the types of drug regimens and lack of knowledge on the complications of diabetes, which indicated a need for a repeated patient counseling and education regarding the basic aspects of type 2 diabetes.

In addition to the rate of non-adherence to the medications, it was also observed in the present study, that only 38.37% and 31.60% of the study participants had followed the prescribed diet plan and the exercise schedule respectively in the preceding week. More or less similar observations were made by Shobhana R et al., 37% compliance with diet and 19% compliance with exercise. [9]

## CONCLUSION

This study is the first to assess the therapeutic non-adherence among the diabetic patients managed at the diabetes

clinic of KPC MCH. It shows that therapeutic non-adherence is quite high standing at 45% which warrants that immediate action must be taken by our healthcare delivery system to initiate strategies to reduce non-adherence rate and mortality rate of diabetes. Some of the ways by which it can be done are by improving the patient-physician interaction, self-care techniques, distributing health manuals, education and information through the electronic media, posters, etc.

#### STUDY LIMITATIONS:

This study was not without limitations, only a single method was used to assess patients' compliance to treatment. In addition, this study was conducted in one hospital in one city which limits the generalizability of the obtained results to all diabetic patients in the country.

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**Conflict of Interest:** None declared.

**Ethical Approval:** This study was approved by the Institutional Ethics Committee of KPC Medical College & Hospital, Kolkata.

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