

# Prevalence, perceptions and practices associated with non-adherence to diabetes medications in primary care setting: A cross sectional study in urban Bangalore



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Submitted: 22-07-2016

Revised: 23-08-2016

Published: 01-11-2016

## ABSTRACT

**Background:** Adherence to diet and drugs, blood glucose monitoring, foot care, exercise and early recognition of the complications, are the crucial elements for tertiary prevention of Diabetes Mellitus. Non compliance can lead to poor glycemic control which can eventually aggravate complications and lead to disability and mortality. **Aims and Objective:** This study aimed at estimating prevalence of non-adherence and identify perceptions and practices associated with non-adherence. **Materials and Methods:** A cross sectional study was conducted in a primary care clinic in a disadvantaged community hundred patients with Diabetes were recruited and interviewed using a semi-structured questionnaire. **Results:** Non adherence rate was 30%. Those who are unable to remember multiple doses (37.5%) were 2.77 (95% CI: 0.94-8.15) times more likely to non-adhere to the treatment than those who are able to remember multiple doses (16.7%). Similarly patients who often discontinued medications and switched over to alternative system medicines tended to be non-adherent 8.5 (95% CI: 1.6- 45.0) times more than those who continued treatment without interruption. Non adherence was not associated with age, gender, education level, and cost of medication and duration of diabetes. People who were illiterate and elderly did not know the consequences of missing doses and stopped medications when they felt better as well as resorted to traditional medicines. **Conclusions:** Counselling sessions should focus on perceptions and ideas about diabetes. Innovative health education modalities have to be developed for illiterate and elderly people.

**Key words:** Non adherence, Diabetes mellitus, Perception, Forgetfulness

## INTRODUCTION

According to the World Health Organization (WHO), adherence is the extent to which the patient follows medical instructions, takes medication, follows a prescribed diet and sticks to lifestyle changes which corresponds with recommendations from a health care provider.<sup>1</sup> Adherence to diet and drugs, blood glucose monitoring, foot care, exercise and early recognition of the complications, are the

crucial elements for tertiary prevention. Non compliance can lead to poor glycemic control which can eventually aggravate complications related to Diabetes Mellitus which will in turn increase direct and indirect cost to the healthcare system.<sup>2</sup> The objectives of this study was done to determine the non-adherence rate to pharmacological therapy and to identify perceptions and practices associated with non-adherence among patients with type 2 diabetes in a primary health care clinic of Bangalore.

### Access this article online

**Website:**

<http://nepjol.info/index.php/AJMS>

**DOI:** 10.3126/ajms.v7i6.15256

**E-ISSN:** 2091-0576

**P-ISSN:** 2467-9100

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## MATERIALS AND METHODS

A cross-sectional study was conducted at a primary care clinic in a disadvantaged community managed by Bangalore Baptist Hospital between March 2015 to June 2015. Diabetic patients who were more than 30 years of age with at least a one-year history of diabetes, and who were on pharmacological therapy for the last six months, were recruited by convenient sampling technique. Pregnant women and those who presented with serious illness requiring admission or referral were excluded. As per the study done in India, non-adherence rate was taken as 70%, and using the formula  $4PQ/D^2$  the sample size was calculated as 84 (d-10), however 100 patients were included in the study.<sup>3</sup> The interviewer administered a structured questionnaire to collect data. The questionnaire had three parts which included the demographic profile, Morisky's Instrument to measure the rate of non-adherence and the final part to assess factors and perceptions associated with non-adherence. Patients were asked to agree or disagree to 9 statements which indicated their attitude and practice regarding diabetes care.

- If the drug was provided free of cost I would have taken it more regularly
- I feel dietary restriction was difficult to maintain
- I think self monitoring of glucose is cumbersome
- I find it difficult to take too many drugs
- I am not aware of consequences of missing doses
- I am not able to remember too many doses
- I think there are side effects with medications
- I often discontinue the prescribed medications on my own and switch over to alternate medicine.

Morisky's Instrument has high reliability and validity, and the patient was considered to be adherent if they answered in the negative to all four questions.<sup>4</sup> BMI and recent fasting (FBS) or post prandial blood sugars (PPBS) were also recorded. Being engaged in a physical activity of moderate intensity for 3-5 days a week was considered as compliance to physical activity. A patient was considered to be compliant to his/her diet, if they had reduced the quantity and increased the frequency of vegetables and fruits intake after the diagnosis and was following it at least 3-5 days a week. Data was entered in MS-Excel 2003 and analyzed by using the SPSS for Windows (Statistical Package for Social Sciences) version 17.0. The findings were expressed in terms of proportions. Chi-square test was used to study the association between socio-demographic factors, perceptions with compliance. A p value less than or equal to 0.05 was considered as statistically significant. This study was approved by Institutional Review Board of Bangalore Baptist Hospital.

Informed consent was obtained from all individual participants included in the study.

## RESULTS

Hundred diabetic patients were enrolled in the study. The mean age was 55.6 +/-10.1 years and majority were from the age group of 51-60 (38%) years. More than two third of the patients were women (63%) and most of them (38%) were illiterate (Table 1). Mean BMI of the patients was 26.9 +/-2.9 kg/m<sup>2</sup> with a significant proportion (60%) being either obese or over-weight. More than one third (38%) had diabetes for more than 6 years. Nearly half of the patients (47%) were involved in semi-skilled occupation. The average monthly income was Rs. 8727.2/month, which ranged from 2000-25000. The average money spent on medications was Rs. 345.98 ± 173.6/month. Diabetic patients were spending an average of 4.7% of their monthly income on medications. A quarter (24.3%) of the males were smokers and 5.4 % occasionally consumed alcohol. Majority of the patients were only on oral hypoglycaemic agents (93%).

Seventy percent of the study population has responded in the negative to all 4 questions in Morisky's questionnaire (Table 2) giving a non-adherence rate of 30%. Non adherence rate for non-pharmacological therapy such as exercise and diet was 41% and 49% respectively.

More than a third (34%) exercised (brisk walking for half an hour) 5 days a week. Almost half (59%) of the patients modified their diet after being diagnosed with diabetes. The most common diet change reported was replacement of

**Table 1: Demographic profile**

Characters	Variables	Total (100%) N=100
Age in years	30-40	7
	41-50	28
	51-60	38
	61-70	23
	>70	4
Gender	Male	37
	Female	63
Educational status	None	38
	Primary	28
	Secondary	12
	Graduation	12
Marital status	Single	2
	Married	93
	Widow(er)	5
BMI	Normal	40
	Overweight	38
	Obese	22
Duration of DM	<1	14
	1-3	24
	3-5	24
	>6	38

simple carbohydrates with complex carbohydrates (rice to ragi or wheat chappati) and addition of more servings of vegetables.

Many patients hoped that they will get cured in 5- 8 years. When asked how long they need to continue diabetic medications, only 60% answered 'lifelong'.

A quarter of patients reported that they would have taken medications more regularly if they were provided free of cost. Majority (77%) of them said that is difficult to take many medications and remember the doses correctly (70%). 39% were unaware of the consequences of missing doses and 88% believed that there were no side effects to the diabetic medication. A small proportion (8%) of patients confessed that they often discontinued the prescribed medications by themselves and switched over to alternative system of medicine. Among them, 50% were unaware of the consequences of missing medications. Most common side effect quoted by them was liver problem. Patients who often discontinued medications and switched over to alternative system medicines tended to be non- adherent 8.5 (95% CI: 1.6- 45.0) times more

than those who continued treatment without interruption. Non adherence was not associated with age, gender, education level, cost of medication and duration of diabetes (Table 3).

Patients who perceived that dietary restrictions were difficult to maintain were likely to non adhere to the medications than those who perceive it's easy to maintain (48.9% Vs 17.5%) and this was statistically significant ( $p < 0.05$ ) with odd's ratio of 5.62 (95% CI: 2.17-14.5). Those who are unable to remember multiple doses (37.5%) were 2.77 (95% CI: 0.94-8.15 times more likely to non-adhere to the treatment than those who are able to remember multiple doses (16.7%) (Table 4).

## DISCUSSION

Our study revealed 30% of the patients were non-adherent to therapeutic treatment. The majority of the non-adherence was unintentional. This is much lower than the earlier study done in Divya et al in Karnataka and by Shobana et al who reported 50% and 70% non adherence rate respectively.<sup>5,6</sup> This may be due to the improved awareness on diabetes over the years and availability of better preparations at an affordable cost in the primary care clinic and better provider-patient communication.

Forgetfulness was the most common reason for of non-adherence reported in this study population. All of them who reported forgetfulness were above 40 years and almost half (52.9%) of them were above 60 years. Among the people who reported to be careless in taking medicines, 50% were illiterate and an addition 30% had only a primary education. 60% of them belonged to the age group of 61-70 years. Half of them were not aware of the consequences of missing doses.

People tend to discontinue medications when they felt better compared to worse. Majority of patients who

**Table 2: Morisky's instrument**

Questions	No. of patients who said 'No'	No. of patients who said 'Yes'
1. Did you ever forget to take your medication?	83	17
2. Were you careless at times about taking your medication?	90	10
3. When you felt better, did you sometimes stop taking your medication?	89	11
4. Sometimes, if you felt worse when you took your medicine did you stop taking it?	93	7
The number of patients who said 'No' to all four questions were considered adherent to the prescribed anti-diabetic treatment	70	

**Table 3: Factors associated with non-adherence**

Factors	Variables	Adherence		Non adherence		Total	P value	OR ( 95% CI)
		No	%	No	%			
Gender	Male	26	70.3	11	29.7	37	0.96	9.8 (0.40-2.37)
	Female	44	69.8	19	30.2	63		
Age (years)	<60	23	62.6	14	37.8	37	0.19	0.55 (0.23-1.34)
	>60	47	74.6	16	25.1	63		
Education	Lower*	61	70.9	25	29.1	86	0.61	1.35 (0.41-4.44)
	Higher	9	64.3	5	35.7	14		
Duration of DM (months)	<=24	18	66.6	9	33.3	27	0.65	0.8 (0.31-2.08)
	>24	52	71.2	21	28.8	73		
Cost (INR)	<=345	45	73.8	6	26.2	51	0.30	1.57 (0.66-3.75)
	>345	25	26.4	14	35.9	49		

**Table 4: Perceptions and practices and its association with non adherence**

Perception and practices	Response	Adherence		Non adherence		Total	P value	OR ( 95% CI)
		No	%	No	%			
Perceptions								
Financial burden	Yes	52	70.3	22	29.7	74	0.92	0.95 (0.3-2.51)
	No	18	69.2	8	30.8	26		
Diabetes is curable	No	33	66	17	34	50	0.38	0.68 (0.28-1.61)
	Yes	37	74	13	26	50		
Missing medications cause problem	No	27	69.2	12	30.8	39	0.89	1.06 (0.44-2.54)
	Yes	43	70.5	18	29.5	61		
Diabetic medications have side effects	Yes	7	58.3	5	41.7	12	0.34	1.80 (0.52-6.2)
	No	63	71.6	25	28.4	88		
Practice								
Too many drugs	Yes	53	68.8	24	31.2	77	0.64	1.28 (0.45-3.62)
	No	17	73.9	6	26.9	23		
Too many doses	Yes	45	64.3	25	37.5	70	0.05*	2.77 (0.94-8.15)
	No	25	83.3	5	16.7	30		
Switching to traditional medicine	Yes	2	25	6	75	8	0.00*	8.5 (1.6-45.0)
	No	68	73.9	24	26.1	92		

discontinued their medications when they felt better were elderly (63.6%) and illiterate (83% had a schooling of less than 3 years). The educational status of the patients who discontinued the medications when they felt worse were poorer (illiterate 100%) compared to the earlier group.

In our study, non-adherence was not associated with cost of medications. This was in contrast to the findings of the other studies.<sup>7,8</sup> This may be because our setting the medications were subsidized based on the patient's ability to pay.

## CONCLUSION AND RECOMMENDATIONS

The prevalence of non-adherence among diabetic was relatively low in our primary care clinic. Multiple drugs and multiple dosages along with forgetfulness resulted in non-adherence to medication. People who were illiterate and elderly did not know the consequences of missing doses and stopped medications when they felt better as well as resorted to traditional medicines. Apart from subsidising medications, innovative health education modality has to be developed for illiterate and elderly people.

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### Authors Contribution:

**LRI** - Concept and design of the study, reviewed literature, statistically analyzed and interpreted, prepared the first draft the manuscript; **CEJ** - Conceptualized the study, reviewed the literature and involved in critical revision of the manuscript; **NLK** - Collected the data, data entry and reviewed the manuscript; **GN** - Concept and design of the study, interpreting results and critical revision of the manuscript.

**Source of Support:** Nil, **Conflict of Interest:** None.