

Adherence to medications among adults with diabetes mellitus in the urban field practice area of Raja Rajeswari Medical College and Hospital, Bangalore, Karnataka, India

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Introduction: Poor adherence is likely to lead to increased complications of diabetes resulting in increased costs of health care and increased morbidity and mortality for the population in the long term. The present study was designed to assess the socio-demographic profile and adherence to medications among adults with diabetes mellitus on treatment residing at urban field practice area of a private medical college in Bengaluru, Karnataka. **Materials & Methods:** This was a cross-sectional study comprising of 150 adults with Diabetes Mellitus residing at Urban Field Practice Area of RajaRajeswari Medical College and Hospital, Bangalore. Data entry was done in MS excel and analyzed in SPSS software. **Results:** Out of 150 study subjects, it was observed that majority 54(36%) of the study subjects had disease duration of more than 5 years. High, moderate and low adherence to medication was found among 25 (16.67%), 91(60.67%) and 34 (22.66%) of the study subjects respectively. Low adherence was observed to be higher 20(58.8%) among study subjects with disease duration of more than 5 years as compared to other categories. Co-morbidity was absent in majority 24(70.6%) of the study subjects with low adherence. **Conclusion:** It is evident that there is a great need on the part of health care providers to not only prescribe medications to the patients with diabetes mellitus but also make a conscious effort to address the issue of non-adherence to the prescribed medications and other non-pharmacological measures.

Keywords: Adherence, Medications, Diabetes Mellitus, Urban

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Introduction

Low adherence to prescribed medication in patients with non-communicable diseases (NCDs) increases risk of hospitalization, development of complication and premature mortality. Adherence is defined as the extent to which a person's behaviour of taking medication, following diet, and/or executing lifestyle changes corresponds with agreed recommendations from the health care provider [1].

The management of diabetes mellitus is multi-pronged. Majority of patients with type 2 diabetes fail to control glycemia with diet and exercise and require pharmacotherapy-in general, initially monotherapy with oral hypoglycemic agents (OHA); however, owing to the progressive nature of the disease, most of the patients will eventually require combination therapy and ultimately injectable treatments as monotherapy or part of polytherapy. Glycemic control in type 2 diabetes is essential to prevent complications. Hence the holistic approach to the control of diabetes is vital. Adherence is directly related to various factors such as education, knowledge, economic status, forgetfulness, lack of will power & physician knowledge. Duration of the disease also bears a direct effect on the adherence of the patient to the treatment. The decline in adherence is most rapid after the first 6 months of therapy. Thus, the overall management of type 2 diabetes should address adherence as well as appropriate medications [2].

Assessing adherence to medications and its correlates among patients with non-communicable diseases (NCDs) can help in delivering targeted interventions. Non-adherence to medication plays an important role in increasing the all cause hospitalization, mortality, and out of pocket expenditure among patients with diabetes [3]. Poor adherence to recognized standards of care is the principal cause of development of complications in NCDs. Adherence to medication is essential in order to obtain full therapeutic benefit in diabetes. With this background, this study was undertaken among adults with diabetes mellitus in the urban field practice area of RajaRajeswari Medical College & Hospital (RRMCH), Bangalore.

Objectives

01. To assess the socio-demographic profile of diabetic patients in Urban Field Practice Area of RajaRajeswari Medical College & Hospital, Bangalore

02. To assess the level of adherence to prescribed medication among diabetic patients in the study area

Materials & Methods

Study setting: Urban Field Practice Area of RRMCH, Bangalore

Study Design: Cross-sectional Study

Study Duration: 3 Months (February 2019 –April 2019)

Sample Size: 150

Study subjects: Adults with Diabetes Mellitus in the Urban Field Practice Area of RRMCH

Inclusion Criteria: Adults, who are known cases of Diabetes mellitus (on treatment) in the urban field practice area of RRMCH, Bangalore

Exclusion Criteria: Pregnancy and lactation

Study Instrument: Pretested, Semi-Structured Questionnaire and MMAS-8 Questionnaire [4]

Method of data collection: This was a cross-sectional study conducted in the urban field practice area of RRMCH among 150 study subjects selected by purposive sampling technique. After getting informed consent, relevant data was collected by interview method using pre-tested, semi-structured questionnaire and MMAS-8 Questionnaire.

Categorization of study subjects according to adherence: Adherence was assessed through eight-item Morisky Medication Adherence Scale (MMAS-8) that has high reliability and validity, and the patients were categorized as follows:

High adherence - a score of 8

Moderate adherence - scores of 6-7

Low adherence–scores<6

After categorization the different variables were expressed as percentages

Ethical clearance: This study was granted approval from institutional ethics committee of RRMCH, Bangalore

Statistical analysis: The data was compiled in Microsoft (MS) Excel worksheet and analyzed using SPSS (Statistical Package for Social Sciences) software version 20.0. The descriptive statistics- all quantitative and qualitative data were presented as frequency and percentages.

Results

Out of 150 study subjects, it was observed that majority, 70(46.7%) belonged to the age group of 45-59 yrs. The proportion of males was higher, 82 (54.7%) as compared to females 68(45.3%). Literates were 95(63.3%).

Occupation-wise, majority, 86 (57.34%) were employed. 134(89.3%) were married. Majority, 98(65.3%) of the study subjects belonged to lower middle class according to Modified Kuppuswamy Classification (2019) of Socio-economic status.

Of the total, study subjects who had not used alcohol, 121 (80.7%) and those who had not used tobacco, 114 (76%) in the past one month constituted the majority. [Table 1]

Table-1: Socio-Demographic characteristics of diabetic adults in the urban field practice area of RRMCH (N= 150)

Variable	Number	Percentage
Age (Years)		
30-44	37	24.7
45-59	70	46.7
≥60	43	28.7
Gender		
Male	82	54.7
Female	68	45.3
Literacy		
Literate	95	63.3
Illiterate	55	36.7
Occupation		
Unemployed	11	7.33
Employed	86	57.34
Housewife	53	35.33
Marital status		
Married	134	89.3
Separated/ Divorced/ Widow	16	10.7
Socio-Economic Classification		
Upper class	2	2.0
Upper middle	28	18.7
Lower middle	98	65.3
Upper lower	20	13.3
Lower	2	0.7

Disease duration more than 5 years was observed among 54(36%) of the study subjects. Co-morbidities was absent in majority, 112(74.7%) of the study subjects. Study subjects on twice daily regimen were found to be higher, 82 (58%) as compared to those on once daily and thrice daily treatment regimens.

Study subjects on two or three medications daily constituted the majority 89 (57.3%). [Table 2]

Table-2: Morbidity Characteristics and Treatment profile of diabetic adults in the Urban field practice area of RRMCH

Morbidity Characteristics	Frequency (%)
Disease duration (years)	
<1	16(10.7)
1-5	80(53.3)
>5	54(36.0)
Other co-morbidities	
Present	38 (25.3)
Absent	112 (74.7)
Regimen	
Once daily	59 (37.3)
Twice daily	82 (58.0)
Thrice daily	9 (4.7)
Number of Medication	
One	53 (37.3)
Two-three	89 (57.3)
More than Four	8 (5.4)

Table-3: Distribution of Socio-Demographic Characteristics with Adherence Levels among Diabetic Adults in Urban Field Practice Areas of RRMCH

Characteristics	Low Adherence	Moderate Adherence	High Adherence	Total (N=150)
Age (years)				
30-44	7(20.4)	21(23.1)	9(36)	37(24.66)
45-59	10(29.6)	50(54.9)	10(40)	70(46.67)
>60	17(50)	20(22.0)	6(24)	43(28.67)
Gender				
Male	18(52.9)	50(54.9)	14(56)	82(54.66)
Female	16(47.1)	41(45.1)	11(44)	68(45.34)
Literacy				
Literate	17(50)	64(70.3)	14(56)	95(63.34)
Illiterate	17(50)	27(29.7)	11(44)	55(36.66)
Occupation				
Unemployed	3(8.8)	5(6.6)	3(12)	11(7.33)
Employed	17(50)	52(57.1)	17(68)	86(64.66)
Housewife	14(41.2)	34(36.3)	5(20)	53(35.33)
Marital Status				
Married	25(73.5)	85(93.4)	24(96)	134(89.34)
Separated/Divorced/ Widow	9(26.5)	6(6.6)	1(4)	16(10.66)
Socio-economic classification				
Upper class	0	0	2(8)	2(1.34)
Upper middle	10(29.4)	11(11.1)	7(28)	28(18.66)
Lower middle	15(44.2)	71(78)	12(48)	98(65.34)
Upper lower	8(23.5)	8(8.8)	4(16)	20(13.33)

Lower	1(2.9)	1(2.1)	0	2(1.33)
Alcohol use (past 1 month)				
Yes	10(29.4)	16(17.58)	3(12)	29(19.34)
No	24(70.6)	75(82.42)	22(88)	121(80.66)
Tobacco Use (Past 1 Month)				
Yes	9(26.5)	23(25.2)	4(16)	36(24)
No	25(73.5)	68(74.8)	21(84)	114(76)

High, moderate and low adherence to medication was found among 25 (16.67%), 91(60.67%) and 34 (22.66%) of the study subjects respectively.

The proportion of low adherence was found to be higher among study subjects aged more than 60 years. Lower middle class of socioeconomic status, male gender, married and employed categories constituted the majority of study subjects with low adherence. In this study, proportion of study subjects who had not used alcohol and those who had not used tobacco in the past one month constituted the majority across high, moderate and low adherence categories. [Table 3].

Table-4: Distribution of Treatment Profile with Adherence Levels among Diabetic adults in Urban Field Practice Areas of RRMCH

Characteristics	Low Adherence	Moderate Adherence	High Adherence	Total (N=150)
Disease duration(years)				
<1	3(8.8)	9(9.9)	4(16)	16(10.67)
1-5	11(32.4)	56(61.5)	13(52)	80(53.33)
>5	20(58.8)	26(28.6)	8(32)	54(36)
Other co-morbidities				
Present	10(29.4)	24(26.4)	4(16)	38(25.4)
Absent	24(70.6)	67(73.6)	21(84)	112(74.6)
Regimen				
Once daily	8 (23.5)	36(39.6)	15(60)	59(39.33)
Twice daily	22 (64.7)	52(57.1)	8(32)	82(54.67)
Thrice daily	4 (11.8)	3 (3.3)	2 (8)	9(6)
Number of Medication				
One	8(23.5)	33(36.3)	12(48)	53(35.33)
Two-three	22(64.7)	55(60.4)	12(48)	89(59.34)
More than Four	4(11.8)	3(3.3)	1(4)	8(5.33)

Low adherence was observed to be higher among study subjects with disease duration of more than 5 years 20(58.8%) as compared to the study subjects in disease duration <1 & >5 years categories. Co-morbidity was absent in majority, 24(70.6%) of the study subjects with low adherence. The proportion of low adherence was found to be higher among study subjects on twice daily drug regimen as compared to once & thrice daily treatment regimens. Study subjects taking two or three medications daily constituted the majority 22(64.7%) in the low adherence category. [Table 4]

Discussion

Diabetes mellitus has become an important public health concern which needs immediate attention of the healthcare professionals. Its optimum control is a major challenge to patients and poses a great burden on the health care system and national economy [2].

This study conducted among adults with diabetes mellitus on treatment consisted of details of socio-demographic characteristics, morbidity profile, treatment received and adherence to medication. In this study, 70(46.7%) of the diabetics belonged to the age group of 45-59 yrs. Similar findings were observed in the study by Shukla P et al [2] wherein the mean age of the participants was 57.52±12.33 years.

Substance abuse often compromises the glycemic control of patients further reducing their quality of life [2]. In this study, majority of the study subjects 121 (80.7%) and 114 (76%) had not used alcohol and tobacco in the past one month respectively. Similar findings were observed in the study by Thekkur P et al [5] wherein, 12.8% and 10.3% of the participants reported current use of alcohol and tobacco respectively.

Majority, 80(53.3%) had a disease duration of 1-5 yrs. However, in a study conducted at Patiala [2],

29% of the patients were diagnosed with diabetes between the period of 1-5 year. Thekkur P et al [5] observed that co-morbidities was absent in 93.2% of the participants similar to our study (74.7%). However in the study by Shukla P et al [2] at least one associated co-morbidity such as hypertension, asthma or osteoarthritis, etc. was present in 57% of the study population.

In this study, patients taking twice daily treatment regimen were found to be higher 82 (58%) however, in a study conducted at Puducherry [5], majority, 114 (40.6%) were consuming drugs only once in a day.

In the present study, patients on two to three medications daily constituted the majority 89 (57.3%) similar to the findings of Thekkur P et al [5] who observed that, of the total, 114 (40.6%) were consuming drugs only once in a day and around 164 (58.4%) had to consume two to three drugs per day.

In this study, high, moderate & low adherence to medication was found among 25(16.67%), 91(60.67%) & 34 (22.66%) of the study subjects respectively. In the study by Shukla P et al [2], analysis of MMAS- 8 item scores of patients showed that 52% of patients had low adherence, 29% had medium while 19% had high adherence to the treatment.

Arulmozhi et al [6] in a study at Puducherry using MMAS-8 scale reported low adherence to medication in 39% patients. However, in a community based cross-sectional study conducted in rural village of Kerala [7] it was observed that 74% of diabetic patients were less adherent to medication (according to MMAS-8).

The proportion of low adherence in our study was found to be higher i.e., 17 (50%) among patients aged more than 60 years. Similarly Shaimol T et al [8] observed that when the age of the patient increased, medication adherence decreased. However in the study by Thekkur P et al [5] low adherence was observed in 19 (12.8%) of the participants above 60 yrs.

Gender-wise, in a study conducted by Shaimol T et al [8] adherence was observed to be more among males (24%) as compared to females (20.8%), this finding is similar to our study. In the same study [8] the unmarried group (78.3%) showed higher adherence compared to married group (18.3%) this is in contrast to the present study.

The proportion of low adherence was higher among the employed. Thekkur P et al [5] observed that lesser age, higher education, being housewife and tobacco use were significantly associated with low adherence to medication on univariate logistic regression.

In this study, low adherence was observed to be higher i.e., 20(58.8%) among study subjects with disease duration of more than 5 years as compared to the other disease duration categories. However, Arulmozhi et al [6] reported that shorter duration of disease (<1 year) was found to be associated with low adherence to medication. Co-morbidity was absent in majority, 24(70.6%) of the study subjects with low adherence in our study. Similar findings were observed by Thekkur P et al [5] wherein having only diabetes was significantly associated with low adherence to medication.

Majority, 24(70.6%) of the patients in the category of low adherence in this study had not used alcohol in the past one month. Similarly, majority, 25(73.5%) had not used tobacco in the past one month. Whereas in the study at Puducherry [5], factors related to lifestyle like smoking and alcohol were associated with low adherence.

In the present study, beyond the twice daily and two or three drug treatment regimens, there was no increase in the proportion of study subjects with increase in the number or frequency of medication in the low adherence category. However, in the study by Thekkur P et al [5], factors related to medication like increase in number and frequency of drugs was associated with low adherence.

This was a cross-sectional study, measures of adherence, diagnosis of diabetes and other factors were self-reported. As described in the study by Sankar U V et al [7], self-reported compliance usually overestimates true adherence rates. So, it is possible that the rate of low adherence in the community maybe higher than the estimates found in this study. However, this study highlights that low adherence to medications poses a significant challenge to the control of diabetes mellitus in the community.

Conclusion

Studies conducted in the past have reported that adherence rates can be improved by disease and treatment specific instructions to the patients along with adequate motivation and constant reinforcement by the health care providers.

The present study has shown that low adherence to medications was observed among 22.66% of the patients while high adherence was found in only 16.67% of the diabetic adults. Hence there is a need for targeted education programs for health care providers and for patients in order ensure that the patients obtain full benefit of the treatment which would help in improving the quality of life.

Relevance of the study: In view of the significant public health challenge posed by Diabetes Mellitus, this study highlights the importance of good adherence to the prescribed medications among the patients which would help in reducing the burden of the disease on the individual and the community.

Authors' Contribution

Srividya V- Concept, design, data review, preparation & finalization of the manuscript and revising it for intellectual relevance. R. S. Neshant Balaje – Literature search, collection, analysis, interpretation & presentation of data.

Limitation

Sample size was relatively small hence generalizability of this study to other population groups is limited.

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