Treatment compliance among previously diagnosed type 2 diabetics in a rural area in Southern India

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Abstract

Background: Treatment adherence will help to achieve good glycemic control among diabetics and will lead to lesser complications associated with the disease. This study was carried out to determine the compliance to treatment among previously diagnosed diabetic patient and their level of glycemic control, in a rural area. **Materials and Methods:** This cross-sectional study was conducted among all previously diagnosed diabetics above 30 years, on treatment for more than 6 months. Nonadherence was defined as "missing more than 2 doses" in the last 15 days. Glycemic control was assessed by performing glycated hemoglobin (HbA1c). **Results:** Among 155 people interviewed, 140 (90.3%) were found to be compliant to the treatment. Treatment compliance was significantly associated with duration of Diabetes and age. However gender, literacy status, occupation, and socioeconomic status were not significantly associated with compliance. The most common reasons for noncompliance was the asymptomatic nature of the disease (60%) and the high cost of treatment (33.3%). Forty-two percent of participants were found to have poor glycemic control (HbA1c >8%). **Conclusion:** Treatment compliance was found to be good among diabetic patients. The treatment compliance increases with increase in the duration of the disease. Many have poor glycemic control, which is a matter of concern. They need more regular follow-up to adjust the treatment label for better glycemic control.

Keywords: Adherence, diabetes, rural, treatment

Introduction

Type 2 diabetes is a major public health problem affecting 425 million people worldwide, out of which over 72 million are in India in 2017, as per International Diabetes Federation.[1] It is predicted that by 2030 diabetes mellitus may afflict up to 79.4 million individuals in India, while China (42.3 million) and the United States (30.3 million) will also see significant increases in those affected by the disease.[2,3]

Patient compliance or adherence is defined as the extent to which a person's behavior coincides with health-related advice.[4] Noncompliance has also been identified as the predominant reason for disease progression and the onset of complications in chronic diseases.[5,6]

Agrawal *et al.* observed many complications such as neuropathy in 30.1%, nephropathy in 32.5%, and retinopathy in 28.9% among diabetic patients in India.[7]

Studies have shown that good glycemic control in diabetics is achieved by good compliance to treatment and this, in turn, delays the onset of many complications of diabetes.[8]

This study was conducted to determine treatment compliance among patients with previously diagnosed type 2 diabetes mellitus and the level of glycemic control achieved by them in a rural population in southern India.

Materials and Methods

This cross-sectional community-based study was conducted at one village within the field practice area of the department of community medicine of a medical college in the northern part

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of Andhra Pradesh, India. Out of four villages within the field practice area, this village was selected randomly. This study was carried out in January 2018, after obtaining necessary permission from the Institutional Ethical Committee. All permanent residents of this village above 30 years, with previously diagnosed type 2 diabetes mellitus and on treatment, either oral hypoglycemic drugs or insulin, for more than 6 months were included in the study. Data were collected by personal face-to-face interview, using a semi-structured questionnaire, after taking informed written consent from the participants. Data collection was carried out by trained interns and social workers under the supervision of the investigators. Bedridden or seriously ill patients were excluded from the study. Compliance to treatment was determined through self-reporting by the patients. Patients who reported to have missed more than two doses in the last 15 days were considered as noncompliant.[9] The first part of the questionnaire contains sociodemographic details. Socioeconomic status was assessed by using a modified BG Prasad Scale. Time since diagnosis, type, source, and regularity of treatment were included in the second half of the questionnaire. The level of glycemic control by each patient was assessed by performing glycated hemoglobin (HbA1c).

Chi-square test (Pearson's Chi-square or Fisher's exact test) was used to find out the statistical association between compliance and different demographic and socioeconomic variables. A P value <0.05 was considered significant. All statistical analysis was performed using Statistical Package for Social Sciences (SPSS) version 15.0. Chicago, IL, USA: SPSS Inc.

Results

A total of 155 previously diagnosed cases of type 2 diabetes mellitus were studied. Among them, 89 (57.4%) were males and 66 (42.6%) were females. The mean age of study participants was 58.7 years. Most of the participants were in the age group of 60–69 years (36.1%)) and 50–59 (30.3%). The overall compliance to treatment was found to be 90.3% (140). The compliance among men and women was 88.7% and 92.4%, respectively.

Gender, religion, and literacy status did not have any association with compliance to the treatment [Table 1]. Univariate analysis also showed that occupation and socioeconomic status did not significantly influence treatment compliance [Table 1]. Treatment compliance was significantly associated with the duration of diabetes (Chi Square 8.681, P = 0.008) and age (Chi Square 11.979, P = 0.017) [Table 1]. Those with more than 10 years of diabetes had full compliance. Moreover, 131 (84.5%) patients took treatment from private sector while only 24 (15.5%) availed government services [Table 1].

Asymptomatic nature of the disease 09 (60%) and the high cost of treatment 05 (33.3%) were the most common reasons cited for noncompliance by the patients [Table 2]. Thirty-eight percent participants had good glycemic control while 42.6% had a poor glycemic as defined by the ICMR criteria.[10] [Table 3].

Discussion

Previously diagnosed cases of type 2 diabetes mellitus who were on medication for more than 6 months were included in our study. The average age of our study population was 58.77 years with a majority being male patients. Contrary to the findings of some other studies that diabetics are nonadherent to their treatment,[11,12] this study demonstrated 90% of the subjects to be compliant to the treatment. Studies done in southern Karnataka and rural Maharashtra, which employed self-reported compliance by patients, reported a compliance of 83.6% and 76.2%, respectively, among diabetics.[13,14] Further studies by Bansal *et al.* in rural Ludhiana and Santhanakrishnan *et al.* in urban Puducherry also reported a compliance of 82.5% and 76%, respectively.[9,15] Both these studies employed self-reporting by the patients as their primary method.

Some other studies that have employed different methods for the assessment of compliance have shown different results.[16,17] In a study done in a tertiary care center in Kerala, employing Morinsky Medication Adherence Scale, reported a compliance of 64.8%.[16] Another study done in a rural block of Vellore, which relied on pill count to find out the compliance, reported an overall compliance of 52%.[18]

This study showed that compliance is affected by age. As age increases, especially in the age groups beyond 60 years, the compliance improves. This association between increasing age and compliance is found to be statistically significant (Chi-square 11.979, P = 0.017). This finding is similar to the findings from the study in rural Vellore, where the mean compliance among those aged more than 60 years was more than that among participants below 60 years and with findings from the study in coastal southern India where the compliance improved in the age group above 60 years as compared to the age group below 60 years.[13,18]

In this study, it was seen that compliance improves significantly with increase in years since diagnosis of diabetes (Chi square 8.681, P = 0.008). Divya *et al.* observed that each passing year since diagnosis of diabetes resulted in a statistically significant 2.1% increase in the level of compliance.[18]

One of the important aspects of chronic disease conditions, such as diabetes, is adherence to drugs, over a period of time. It is, therefore, necessary to find out the reasons for noncompliance so that corrective initiatives can be put in place. Past study has documented some common reasons for noncompliance in diabetes treatment such as the asymptomatic nature of the disease, high cost of the drugs, and side effects of drugs.[19] The findings of this study also point in the same direction. This study showed that 60% of the noncompliance was due to the asymptomatic nature of the disease and another 33% was due to the high cost of the drugs.

Another important finding is related to the type of service provider. In spite of government-run public healthcare centers

Table 1: Socioeconomic characteristics associated with treatment compliance

Variable	Compliance to treatment		Chi-square/Fisher's exact test	P
	Good	Poor		
Gender	No. (%)	No. (%)		
Male	79 (88.7)	10 (11.3)	0.581	0.446
Female	61 (92.4)	5 (7.6)		
Age Group (years)				
30-39	2 (40)	3 (60)	11.979	0.017
40-49	17 (850	3 (15)		
50-59	44 (93.6)	3 (6.4)		
60-69	50 (89.2)	6 (10.8)		
70-79	19 (100)	0 (0)		
≥80	8 (100)	0 (0)		
Religion				
Hindu	138 (90.1)	15 (9.9)	1.620	1.00
Muslim	1 (100)	0 (0)		
Christian	1 (100)	0 (0)		
Literacy				
Illiterate	55 (87.3)	8 (12.7)	1.180	0.788
Primary	10 (100)	0 (0)		
Secondary	61 (91)	6 (9)		
Graduation and above	14 (93.3)	1 (6.7)		
Occupation				
Unskilled	21 (87.5)	3 (12.5)	8.403	0.051
Unemployed or retired	27 (100)	0 (0)		
Skilled	43 (82.6)	9 (17.4)		
Service	6 (85.7)	1 (14.3)		
Housewife	43 (95.5)	2 (4.5)		
Socioeconomic status				
Lower	35 (94.5)	2 (5.5)	3.684	0.446
Lower middle	43 (91.4)	4 (8.6)		
Middle	32 (84.2)	6 (15.8)		
Upper middle	18 (85.7)	3 (14.3)		
Upper	12 (100)	0 (0)		
Diabetic since				
More than 10 years	36 (100)	0 (0)	8.681	0.008
5-10 years	28 (96.5)	1 (3.5)		
6 months-5 years	76 (84.4)	14 (15.6)		
Service provider				
Private	117 (89.3)	14 (10.7)	0.987	0.321
Government	23 (95.8)	1 (4.2)		

Table 2: Reasons for noncompliance

Reasons	Number (%)
Signs and symptoms	09 (60)
High cost	05 (33.3)
Medicine not available locally	01 (6.7)

Table 3: Glycemic Control

HbA1c Level	Number (%)
Good (HbA1c <7%)	59 (38)
Satisfactory (HbA1c 7%-8%)	30 (19.4)
Poor (HbA1c >8%)	66 (42.6)

providing free consultation and medicines, most (84%) of the study participants opted for the private service provider.

Thirty-eight percent of the study participants had achieved a good level of HbA1c (<7%) and another 19% had satisfactory glycemic control (HbA1c between 7% and 8%) as per the ICMR guidelines published in 2005.[20] This result is consistent with the ICMR-INDIAB study among individuals with self-reported diabetes, which showed that only 31% had good glycemic control (HbA1c <7%).[10]

As evident from the study result, about 85% of the patients are taking treatment from the private sector. This assumes significance in the context of free consultation, investigations, and medicines being given in the government sector. It goes on to show the trust the people have in the private medical practitioner/private set up as far as diabetes is concerned. Here, the role of the family physician becomes significant in providing proper services

to the patients. The family physicians can provide scientifically appropriate and ethically correct diagnostic and management services to the patients. They can also help in putting across the importance of self-care and adherence to treatment among the patients and their family members.

Our study has certain limitations. Although only 15 days recall method was adapted to measure compliance, still there is a chance of recall bias. Due to certain constraints, the other ideal method of pill count was not undertaken, which could have given a more accurate estimation of compliance. The other limitation is the selection of only one village for undertaking the study due to resource constraint.

Treatment compliance was found to be good among type 2 diabetes mellitus patients in this study. Increasing age and time since diagnosis of diabetes is found to be significantly associated with good compliance. Asymptomatic nature of the disease and high cost of the drugs were found to be the most important reasons among noncompliant patients. Glycemic control among the patients was low. More emphasis through awareness campaigns and counseling by health workers is needed to improve some of the lacunas.

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Conflicts of interest

There are no conflicts of interest.

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