

A CROSS SECTIONAL STUDY OF TREATMENT INCLUDING LIFESTYLE MODIFICATION ADHERENCE IN PATIENTS WITH TYPE II DIABETES MELLITUS AND FACTORS AFFECTING TREATMENT ADHERENCE

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Article Info: Received 15 May 2019; Accepted 16 June. 2019

DOI: <https://doi.org/10.32553/ijmbs.v3i6.322>

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Conflict of interest: No conflict of interest.

Abstract

Diabetes mellitus is a growing cause of disease burden worldwide. In order to maintain the glycemic control, multifaceted management and pharmacotherapy are playing vital role. Data related to medication adherence among the affected patients are not much recorded in developing countries like India. In this study, the level of adherence and factor influencing non-adherence to diabetic medication among patients with type II diabetes was assessed. This is a hospital based cross sectional study among adult patients receiving diabetic care. The medication adherence was assessed using the Medication compliance questionnaire. Factors associated with non-adherence to medication were determined using basic and adjusted multivariable logistic regression models. A total of 101 patients with type II diabetes were recruited for this study. Most of the patients told that they practiced both aerobic exercises and diet along with their medication for diabetic management. Nearly 90% of the patients adherent to diet and maximum of 73% patients took oral hypoglycemic agents (OHA) alone followed both combination of OHA and insulin. Out of 101 patients, 67 had co-morbid psychiatric illness including mood disorders, neurotic stress and somatoform disorder. Adherence to treatment with diabetic is moderate in this study with more than half of participants being non-adherent. Urgent interventions are required to tackle this problem in combined efforts to stem this looming diabetes epidemic.

Keywords: Diabetes mellitus, life style modifications, treatment adherence

Introduction

Globally, Diabetes mellitus is considered as the one of the fastest growing public health issue that largely affecting psychologically. According to the International Diabetes Federation (IDF), more than 500 million people are living with diabetes in 2018,¹ with on increased peak to reach 642 million by 2040.² It was observed that the more than 75% of the global burden of diabetes is observed in low and middle income countries and also considerably distressing low socioeconomic and rural populations. Surprisingly, more than 50% of the diabetic patients are in middle aged whose age ranged between 40 and 59 years than geriatrics.³

The non-communicable disease is also sensationally causing huge nutritional, infectious and psychiatric

diseases.⁴ The incidence of mortality due to diabetes is also increasing worldwide, which has been far greater than deaths due to malaria, HIV/ AIDS, tuberculosis, etc.⁵ According to the 2016 study, it was revealed that diabetes mellitus accounted for over 132,000 disability adjusted life years and about 4000 deaths.⁶ These data have been increased the fear among the general population and high risk groups and cause the significant impact on the economy and healthcare systems.^{2,4}

Once affected by diabetes, most of the individuals feel that they are in the tasteless life where to sacrifice many of their likes and also always conscious in taking any diet. Further, the diabetic treatment and management are considered as multifaceted workouts thereby lifestyle modifications, diet restrictions and pharmacotherapy push them to think

themselves as sick always. The non-adherence to treatment has been expressed as most important snag in the management of diabetes. Many studies highlighted the importance of explaining and improving the adherence of patients towards treatment; but most of the tasks were not effective.^{3,4,7}

The ability of the patients to follow the prescriptions appropriately is defined as adherence but while explaining to them also lot of non-adherence scales and stages were recorded and documented.⁸ The major non-adherence scales are not easy to initiate the treatment procedures, taking the inappropriate drug and dosage, incompleteness of course or discontinuation of the treatment, sudden stoppage of drugs and move to complementary or alternative therapy or natural healing process.^{9,10} Further the treatment adherence is clearly depending on the environment and type of treatment, mode of drugs obtained, pill counts, patients and caregiver reports.

The exploration of medication adherence to diabetic management varied from physician to physician, hospital and hospital and country to country. The studies from United Arab Emirates,⁸ Ethiopia,⁹ Uganda¹¹ revealed the prevalence of adherence to diabetic treatment to be 84, 85.1 and 83.3% respectively. On the other hand, in Switzerland¹² and Botswana¹³ and it was recorded as 40 and 52% respectively. Other factors that also mainly connected with non-adherence to antidiabetic drugs are low income to meet the cost of the treatment, inattentiveness, age, education, diabetes complications, inadequate knowledge about side effects and sometimes over-consciousness towards drug intake.^{11,13}

In India, a study revealed the overall prevalence of non adherence among respondents was 30% and among them nearly 77 and 44% were males and females respectively.¹⁴ The non-adherence of medications among type 2 diabetes patients (T2DM) has resulted in poor glycemic control, that provide different multiorgan/ system complications like cardiovascular, cerebrovascular, nephropathy, neuropathy and retinopathy related illness.^{14,15,16} The blooming of newer drugs by various companies with dose variations, efficiency and side effects may also alter adherence.¹⁷ Hence the present was having the objectives to analyze the treatment adherence in patients with T2DM and determining the factors affecting the treatment adherence.

Methods

This is a prospective and cross sectional study carried out after getting informed written consent from the patients involved in this study. A total of 101 T2DM patients attending Medicine OPD of Trichy SRM Medical College Hospital and Research Centre, Tiruchirapalli who were fulfilling the inclusion criteria were recruited in this study.

The known T2DM patients of both genders, aged above 18, who are taking antidiabetic medication for at least 3 months and patients associated co-morbid diseases including hypertension, dyslipidemia were included in this study. Patients with gestational diabetes, with or without antidiabetic medication and those who are not willing to participate in this study were excluded.

For data collection and documentation, the socio demographic details, presenting complaints, social habits, past medical history and current medication details were collected using detailed notification form. Two variant questionnaires were designed and validated for assessing the treatment adherence and factors affecting non-adherence. The Morisky medication adherence questionnaire was used to assess the medication adherence which includes the following questions.

1. Do you sometimes forget to take your medicine?
2. Over the past two weeks, were there any days you did not take medicines?
3. Due to side effects, have you stopped your course ever without the knowledge of the Physician?
4. Do you sometimes forget to take your medicines, when you travel or leave your residence?
5. Did you take all your prescribed medicines yesterday?
6. Do you stop taking medicine, if you feel the symptoms under control?
7. Do you ever feel hassled about sticking to your treatment plan?
8. How often do you have difficulty to remember taking the prescribed medicines?
a. Never/ rarely b. Once in a while c. sometimes
d. usually e. all the time

The results obtained were analyzed based on the scores including 0 (high adherence); 1 or 2 (medium adherence) and above 2 (low adherence). Another set of questions was designed to collect the information related to probable factors that mainly affecting the non-adherence of the medications

(Table 1). Those who had completed both the questionnaires were considered for further statistical analysis. The medium and high adherence were considered as adherent and low adherence as non-

adherent. All the data obtained were entered in Microsoft Excel and analyzed by simple descriptive statistics (percentages).

Table 1: Probable factors that affecting the non-adherence of drugs and its related issues

Patient centered factors	Aerobic exercise related
Therapy related factors Healthcare system related Economic factors	Awareness about aerobic exercise in management and control of T2DM Adherence of any form of exercises (Brisk walk and cycling), often doing and duration per session Reason for non-adhering exercises
Diet related	Non-adherence to drugs
Awareness about diet in management and control of T2DM Types of diet followed Reason for non-adhering diet	How long you have been on treatment? What type of therapy? Oral, insulin or both Are you aware about importance of drugs? Do you take the drugs on time? Do you go for regular health check-ups? Evaluation of psycho diagnosis

Results

In this study, a total of 101 patients were included and all the recruiters were completed the questionnaire. Out of them, 46 and 55 were males and females respectively. Maximum patients belonged to the age group between 46 and 65 years (55.5%) followed by 25 to 45 years. The marital status were collected thereby 81 out of 101 were married. Nearly 60% of the patients were un-occupied. The maximum patients were literate whose education ranged from 1st to 6th standard (37%) followed by 7 to 12th standard (36%) and only 7% of the patients were graduated. Majority of the patients are from rural background (50%) followed semi-urban and urban. The detailed socio-demographic details were summarized in table 2.

Table 2: Socio-demographic details of patients (n=100)

Variables	Category	Number
Age (in years)	25 - 45	24 (23.8)
	46 - 65	56 (55.4)
	66 - 85	21 (20.8)
Gender	Males	46 (45.6)
	Females	55 (54.4)
Education	Illiterate	21 (20.8)
	1 st to 6 th standard	37 (36.6)
	7 th to 12 th standard	36 (35.7)
	Graduate	7 (6.9)
Occupation	Unoccupied	60 (59.4)
	Professional	3 (2.9)
	Service industry	3 (2.9)
	Agriculture	7 (6.9)
	Business	5 (4.9)
	Unskilled	14 (13.9)
	Skilled	9 (8.9)
Marital status	Unmarried	1 (0.9)
	Married	81 (80.2)
	Separated	3 (2.9)
	Divorced	3 (2.9)
	Widowed	13 (12.9)
Family type	Living alone	1 (0.9)
	Nuclear	79 (78.2)
	Joint	21 (20.8)
Residence	Urban	35 (34.7)
	Semi-urban	16 (15.8)
	Rural	50 (49.5)

[Figure in parenthesis indicated percentage]

The assessment of the patient’s responses to the 8-item modified Morisky adherence scale showed that 63.4% patients were high adherent to anti-diabetic treatment (Table 3).

Table 3: Eight item Morisky’s adherence scale

Distribution of scores	No. of patients	Percentage (%)	Inference
High	64	63.4	Adherent
Medium	30	29.7	
Low	07	6.9	Non-adherent

Among the patient centric factors; therapeutic, healthcare system and economic factors played vital role in assessing between the adherent and non-adherent group of patients. Table 4 highlighted various factors related to diabetic control and management among adherent and non-adherent group of patients.

Table 4: Patients’ centric factors affecting adherent and non-adherent groups

Factors	Adherent group (n=94)	Non-adherent group (n=7)
Duration of diabetes (in years)		
2 – 10	62 (65.9)	03 (42.9)
11 – 20	17 (18.1)	02 (28.5)
21 - 30	11 (11.7)	01 (14.3)
31 - 40	04 (4.3)	01 (14.3)
Therapy related		
- Lack of knowledge about drugs	49 (52.1)	04 (57.1)
- Lack of knowledge about side effects	79 (84)	07 (100)
Treatment and follow-up		
Taking drugs at prescribed time	90 (95.7)	6 (85.7)
Reason for not taking drugs in time (n=4)		
- Careless	03 (75)	04 (57.1)
- Forget	02 (50)	03 (42.9)
- Going out from home	02 (50)	03 (42.9)
Regular follow ups to the doctors	90 (95.7)	05 (71.4)
Regular blood sugar checking	85 (90.4)	02 (28.5)
Healthcare system related		
- Non-availability of hospitals nearby	02 (2.1)	01 (14.3)
- Non-availability of pharmacy nearby	03 (3.2)	01 (14.3)
- Long waiting time	20 (21.3)	04 (57.1)
- Unhappy clinical visits	39 (41.5)	04 (57.1)
- Treatment complexity	19 (20.2)	02 (28.5)
Psychological relates		
Superstitious belief	02 (2.1)	02 (42.9)
Uneasiness	05 (5.3)	02 (28.5)
Hopelessness	14 (14.9)	05 (71.4)
Donot care	05 (5.3)	01 (14.3)
Finance related		
Feel costly	65 (69.1)	06 (85.7)
No income	59 (62.8)	01 (14.3)
Dependent to kids	31 (33)	02 (28.5)
Happy if free	73 (77.6)	07 (100)

Aerobic exercises are largely helpful in the control and management of T2DM. But most of the people donot know about the importance of that. Thus a detailed survey related to aerobic exercises and T2DM management was done among patients and depicted in table 5.

Table 5: Analysis of life style modifications – Aerobic exercises

Factors related to Aerobic exercises	No. of patients adhered	Percentage (%)
Knowledge about the importance of aerobic exercise in T2DM management	88 (n=101)	87.1
Knowledge about the control and management of blood glucose level by aerobic exercise	98 (n=101)	97
Adherence of any form of aerobic exercise	70	69.3
- Brisk walking alone	65	92.8
- Cycling alone	01	1.4
- Both	02	2.8
- Others	02	2.8
Frequency of aerobic exercises		
- Daily	64	91.4
- Weekly twice	02	2.8
- Weekly	04	5.7
Duration per session (in minutes)		
- Less than 10	4	5.7
- 11 to 20	8	11.1
- 21 to 30	11	15.7
- 31 to 40	29	41.4
- Above 40	18	25.7
Reason for non-adhering for exercises	31	30.7
- Too busy	20	64.5
- Weather (in winter)	8	25.8
- Lacking exercise partner/ spouse	3	9.7

Diet with balanced nutritional materials is playing a vital role in the management of T2DM. Media including newspapers, television and social media are providing necessary information about the need an importance of diet in the diabetic control. Thus a detailed survey related to diet related to T2DM management was done among patients and depicted in table 6.

Table 6: Analysis of life style modifications – Diet

Factors related to Diet	No. of patients adhered	Percentage (%)
Knowledge about the importance of diet in T2DM management	100	99
Knowledge about the control and management of blood glucose level by diet	97	96
Adherence to any form of health dietary habits	91	90.1
Kind of dietary habits (n=91)		
- High starch and fiber diets	16	17.6
- Low saturated fat and caloric intake	68	74.7
- Fruits and vegetables	1	1.1
- Regulated alcohol intake and smoking cessation	6	6.6
How often adhere the diet?	91	90.1
- Once daily	82	90.1
- Once weekly	8	8.8
- Atleast thrice weekly	1	1.1
Reason for non-adhering for dietary habits	10	9.9
- Eating outside	4	40

- Financial constraints	3	30
- Poor self control	3	30
Receipt of dietary habit details	91	90.1
- Oral	83	91.2
- Written	2	2.2
- Both	7	7.7

The comorbid psychiatric illnesses were also diagnosed thereby 67 (66.3%) patients had some illness and 34 (33.7%) did not have any illnesses. Interestingly, 27 (40.3%) patients had more than one poly psychiatric illnesses and 14 (20.9%) had previous history of such illness. The detailed co-morbid psychiatric illnesses observed among the patients included in this study are depicted in table 7.

Table 7: Description of Co-morbid psychiatric illness

Psychiatric disorders	No. of patients adhered (n = 67)
Mood disorders	28 (41.8)
Mental and behavioral disorders due to alcohol	22 (32.8)
Mental and behavioral disorders due to tobacco	25 (37.3)
Neurotic stress related and somatoform disorders	17 (25.4)
Organic depressive disorders	3 (4.5)
Non-organic sleep disorders	1 (1.5)
Paranoid schizophrenia	1 (1.5)
Menopausal and other perimenopausal disorders	1 (1.5)

[Figure in parenthesis denoted percentages]

Discussion

For successful diabetic treatment and management, routine and advanced pharmacotherapy with dietary and life style modifications are very much useful to get rid from the clinical complications. Clinical experience tells that glycemic control is not possible without patient adherence to medication and treatment adherence is a key component for patients with diabetes.¹⁴

The patient response to eight item distribution score showed that 63.4% patients were highly, 29.7% moderately and 6.9% poorly adherent to their anti-diabetic medications which is very controversially compared with other studies revealed 28, 42 and 30% respectively.^{14,18} Contradicting the other study reported very high prevalence of poor adherence (75%) due to low socioeconomic status.^{3,7,19} This difference compared could probably be due to availability of free medications available in their health care set up and improved patients’ awareness and availability of better preparations.

The association of adherence with sociodemographic factors showed that males predominated and were poorly adherent to treatment compared to females in the study population similarly analyzed,²⁰ where the data has been contradictory to other studies.^{15,21} The

most possible reasons for the poor adherence among males in this study might be due to smoking, alcohol habits and other life style changes. Most of our subjects were elders with no/ lesser formal education whereas good adherence was observed among young age and educated patients.

Awareness regarding disease and its complications through social media, magazines and other resources might be plausible reasons for increased adherence observed among elderly age groups;²² this data has some disagreement with other students where younger age group with lesser adherence was found.²³ The locality of the patients also plays an important determinant where majority of patients in our study were from rural area and were highly adherent to treatment; comparatively a study suggested that urban patients are better adherent than rural population.^{18,20,21}

The questionnaire validated and circulated in this study are having all the three above factors and predominantly identified as forget to take medication as one of the major patient-centric factors that were found to be higher in non-adherent patients since most of respondent were of elderly patients.²⁴ The cordial relationship between Physician and patients plays a major role in keeping the patient well

informed about the medications and avoid the non-adherence²⁵ The major factors that are very importantly studied with reference to adherence and compared with the data obtained in study areas are

1. Patient centric
2. Physician dependent
3. Health care establishment factors.

While interacting with the non-adherent group of patients, many of them revealed that they had to wait for long time to visit their physician, lack of communication between doctor and patients and costly medications. Very few of them had awareness about the side effects and clinical complications while using the anti-diabetic pills. Thus it is very important to provide better awareness in their vernacular language about the drug regimens, dosages and side effects by appointing as separate pharmacists in every health care units. Financial issues are also identified in this study to buy medications that leads to found to be higher in non-adherent patients.^{17,21,25} These issues may be sorting out by providing the free medical care and drugs to all diabetic patients by the government.

Conclusion

The patients in the study area were moderately adherent to their anti-diabetic medications thereby various factors that are affecting the adherence to medication were evaluated. In this study, it was clearly identified about the life style modifications, treatment adherence and co-morbid psychiatric illnesses. Further, we recommend that improving awareness about the importance of adherence in diabetic management by interventions like educating patients, medication counseling, communication between doctor and patient, simplifying drug regimen by reducing number of drugs will address these factors and improve adherence among patients.

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