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Study of medication adherence to insulin therapy in type II diabetic patients

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***Abstract*---**Non adherence is the major and unrecognized risk factor for the uncontrollable reduction for blood sugar.Type-2 diabetes mellitus and its complication are becoming more prevalent in India. Evidence abound that the most important predictor of reduction of morbidity and mortality due to diabetes complication is the level of glycemic control achieved through medication adherence. The purpose of this study was to evaluate the Medication adherence of patients with T2DM who received Insulin therapy and to identify other factors that can affect the medication adherence. A cross-sectional, observational study which was carried out for 6 months on Paul Moses Hospital in Chennai. A total of 100 patients with type 2 DM on insulin therapy for atleast 1 year were recruited. Blood Glucose level and other details of comorbidity were noted. 84% of patients were administered Insulin subcutaneously. Most common comorbidity observed in the diabetic patients was hypertension. Medication Adherence was assessed using validated predefined questionnaire and adherence scores were calculated. The most common factors for non-adherence in male were too busy with their work (62.79%) and in female was inconvenience (62.79%). The p-value is < .05 reports that its significance incomparison of adherence and non-adherence. The study concludes that majority of the male patients(57%) and aged above 50years were diabetic. The major factor for non-adherence was found to be inconvenience cost, forgetfulness, too busy and the side effect of the drug. Thus Non adherence plays a vital role in reducing their quality of life. The clinical pharmacist can create awareness among diabetic patient about the impact of non-adherence and the follow up may improve the adherence among the patients.

***Keywords*---**medication adherence, cross-sectional, comorbidity, hypertension.

Introduction

The group of common metabolic disorder that belongs to the phenotype of hyperglycemia is Diabetes mellitus. Impaired insulin secretion, increased glucose production and variable degree of insulin resistance is a heterogeneous group of disorders which is characterized for Type-2 DM [1].The incidence of type 2 diabetes is rapidly increasing, largely in older, overweight patients who have concomitant cardiovascular risks[2].The three fold of patients with type 2 diabetes is expiring due to cardiovascular diseases [3]. The hypoglycemic level control is achieved which is the evidence abound as a most important predictor of reduction of mortality and morbidity due to diabetes complication [4]. Excess mortality [5], higher health care costs [6], and reduced quality of life [7] are the associated factors of type 2 diabetes. The most efficacious treatment for patients with type 2 diabetes is widely recognized as insulin [8] however, for the successful treatment for those patients need regular glucose monitoring and insulin titration[9].

The American Diabetes Association and the American Association of Clinical Endocrinologists states on their treatment guidelines that insulin is the most effective glucose-lowering agent either in patients with severe hyperglycemia in the initial stage or for treatment intensification [10,11]. The patients' perceptions regarding insulin safety, cultural beliefs, social factors, health literacy, medication costs and physician-related attitudes are the barriers associated with the use of insulin [12]. The primary non-adherence of insulin may consider the failure to fill pharmacy prescriptions or poor persistence due to insulin dose omissions, either accidentally or deliberately [13]. Diabetes is a silent epidemics that affects 3.8% of the world's population[14]. Diabetes mellitus affect all aspects of the person's life.[15].For chronic diseases, the basis of treatment are behavioral changes, and common problem in type 2 diabetes is failure to adhere to treatment.[16]. Diabetes stands second rank in terms of low adherence to treatment, out of 17 chronic diseases. Due to non-adherence to treatment diabetes is the second leading cause of hospitalization [17]. The major hurdle in the management of diabetes by health care providers is non-adherence to therapeutic regimen [18]. Adherence is defined, accordingto Vrijens et al as the extent to which patients follow the recommendations for prescribed treatment [19]. The methods of assessing the adherence to medication depending on the environment and type of treatment include pill counts, patients and caregiver reports and electronic monitoring method. [20]

There are two types of Diabetes mellitus, either Type 1 DM which is immune mediated or idiopathic, Type 2 DM is Non-Insulin Dependent, where the later type is the most widely recognized by its characteristic such as Insulin resistance, hyperglycemia, and relative insulin deficiency[21]. In 2003, the fastest growing worldwide health problem is Diabetes mellitus which affects 177 millions of individuals, 221 million by 2010 in Asia and Africa. By 2025 it is expected to rise to 300 million with the highest rate. [22] In the management of Type 2 DM, the use of medication plays a key role. The degree of adherence toward medication endorsed the effectiveness of treatment. As per WHO guidelines, the adherence is up to the degree of an individual behavior, following the diet, receiving medication and executing life style changes corresponds with recommendation from health care provider [23].

In diabetic patients, non-adherence is the most basic factor which comprises ineffective treatment, leads to increased rate of mortality and morbidity.The factors associated with the poor adherence are inadequate glycemic control, increased use of health care resources, higher medical costs and markedly higher mortality rates [24].The factors which influence the adherence to medication such as emotional wellbeing, medication cost, complexity of regimen, concomitant disease, lack of information, perceptions of benefit and side effects [25]. Medication adherence to anti-diabetic patients was estimated using the validated Predefined Questionnaire. The Questionnaire comprises of ten inquiries intend to assess the medication adherence. The initial 9 inquiries are Yes/No questions, while the last tenth question is replied with a 5-point Likert scale. One point for each is given to the appropriate response. For the initial nine questions, one point is given for each 'No' answer except Question No. 6 for which one point is given for the 'Yes' answer. For the tenth question, one point is given for rarely/never, and for other response Zero points are given. The complete score of thequestionnaire is the summation of the score of all nine questions. The total scale score will be ranged from 0 to 9. In this assessment, patient with a total score ≥ 4 will be considered as non-adherent. The aim of this study is to evaluate the adherence to insulin therapy in patients with T2D treated at Paul Moses diabetichospital,Chennai and to identify the factors associated with non-adherence to the insulin regimen.

Materials and Methods

Study design

The study was Cross-Sectional and Observational study with 100 participants.

Study site

The study was conducted on Moses Diabetes and Medical Centre, in Chennai for 6 months from October to March. In this study we have evaluated DM, DM with comorbidities, Diabetesrelated knowledge along with medication adherence to the patients using Validated Questionnaire. The inclusive criteria for the study subject was that the participants aged >18years with type 2 DM of both genders and who are willing to participate in the study with their own consent. The patients with type 1 DM, patients who are not willingto participate in the study and Comatose patients were excluded.

Statistical methods

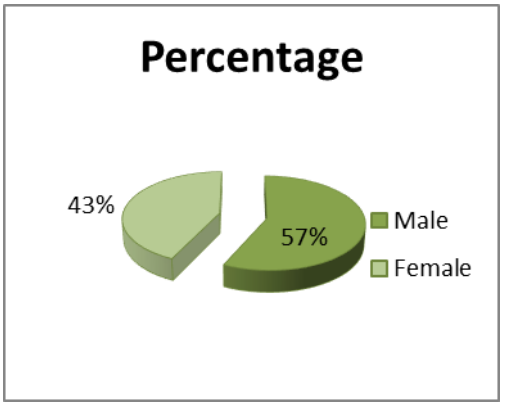
The data were collected, recorded and entered in Microsoft Excel 18 version and the data were expressed in actual numbers, mean±standard deviation and percentage. Chi-Square test was used to compare the Medication Adherence of type 2 DM. The probability p value<0.05 was considered as statistically significant.

Results

A total of 100 patients were recruited in the study. The gender distribution was shown in the Table 1 which depicts that most of the participants are male(57%) who were more prone for diabetes.The majority of participants were male (57%), the mean age was 61.5 ± 7.0 years, the mean duration of diabetes was 10.6 ± 8.7 years, and the median time since insulin initiation was 6 (3.25–10) years.

Table 1
Gender distribution of study population

Gender	No of Patient	Percentage
Male	57	57%
Female	43	43%



The study summarized geriatric patients of age group 51-60 years enclosed highest number of diabetic patients and the least number of patients was from age group 31-40 years, the distribution of study population according to age group has shown in Table 2. This study reveals that female of age group 51-60 years of 44.19% and male of age group 61-70 years were most frequently affected by type 2 diabetes mellitus.

Table 2
NO.of patient affected with type-II DM (AGEWISE)

Age	30-40	41-50	51-60	61-70	71-80	total
Male(%)	1.75	14.03	38.59	26.32	19.29	57
Female(%)	2.32	3.44	44.19	25.58	9.30	43

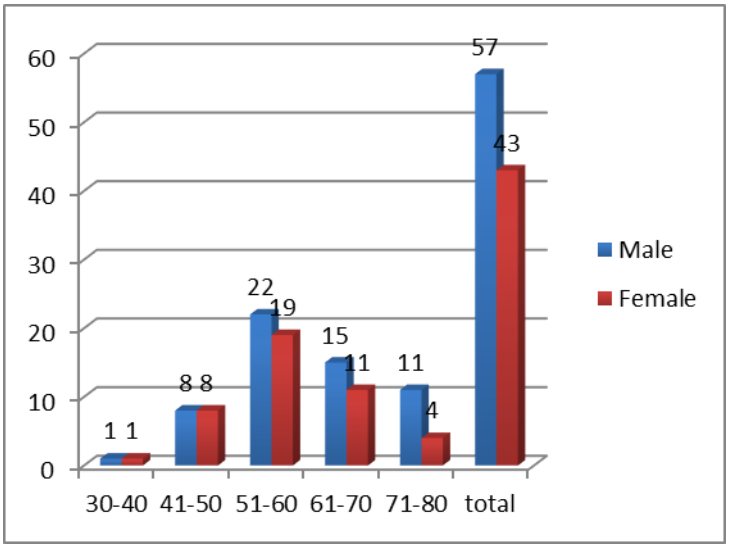


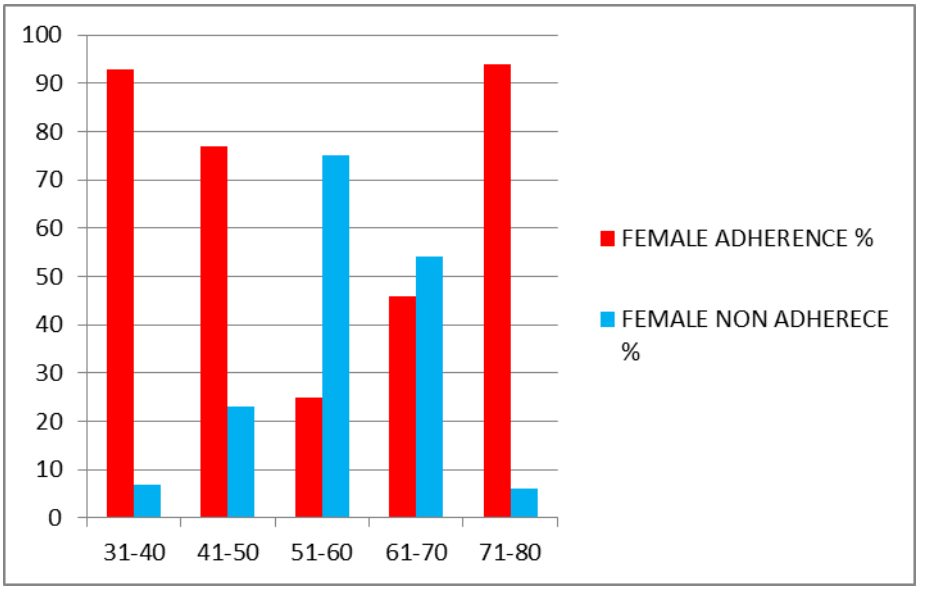
Table 3. depicts that according to the age group, adherence to insulin therapy is low in the age group of 51-60years in both the male and female with the non-adherence rate of 75% and the age group of 71-80years of female shows the high adherence rate of 94% and 31-40years of male has high adherence rate of 94%.

Discussion

In thisstudy we have evaluated the insulin adherence and explored the factors related to nonn-adherence. In our population the important characteristics was the average duration of DM is almost 10years±8.6, but the commencement of insulin therapy was only from 6 years, it suggests the delay for commencing insulin. This is due to the fact of psychosocial barriers, myths regarding insulin treatment and negative attitude towards insulin therapy. In our population 33% ±27.2 of female and39% ±22 of male were non-adherent.

Table 3
Percentage of adherence and non- adherence for female and male

AGE	FEMALE		MALE	
	ADHERENCE %	NON ADHERECE %	ADHERENCE %	NON ADHERENCE %
31-40	93	7	94	6
41-50	77	23	58	42
51-60	25	75	25	75
61-70	46	54	58	42
71-80	94	6	67	33



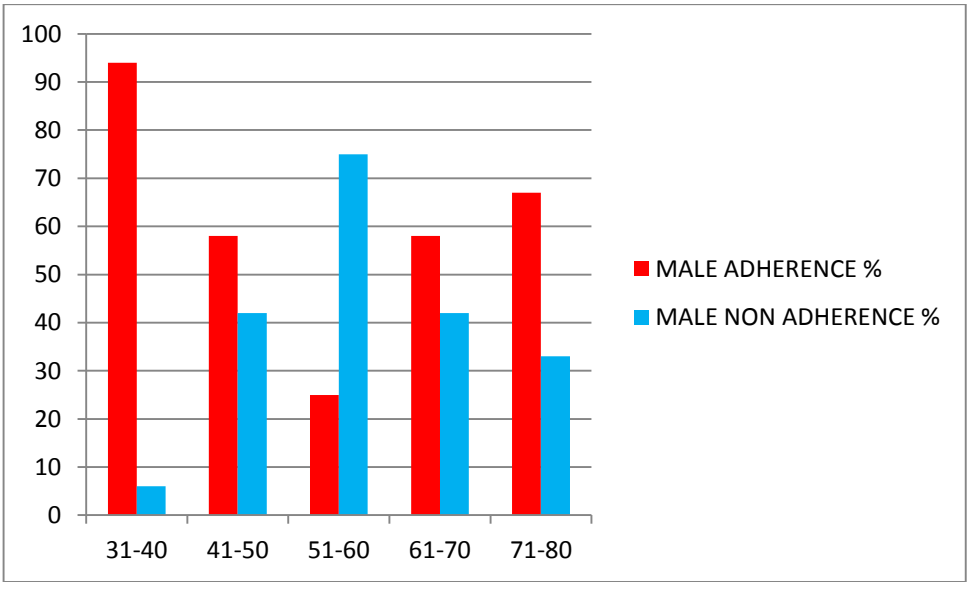


Table 4
Ranges of adherence for male

AGE	ADHERENCE FOR MALE		
	HIGH	MODERATE	LOW
31-40	0	33.33	66.66
41-50	25	25	50
51-60	23.8	9.5	66.66
61-70	35.71	21.42	42.85
71-80	25	33.33	41.66

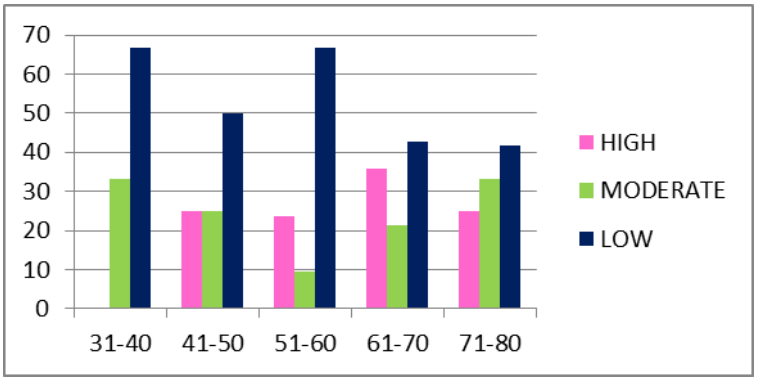


Table 5
Ranges of adherence for female

AGE	ADHERENCE FOR FEMALE		
	HIGH	MODERATE	LOW
41-50	33.33	22.22	44.44
51-60	5.55	16.66	77.77
61-70	9.09	9.09	81.81
71-80	40	40	20

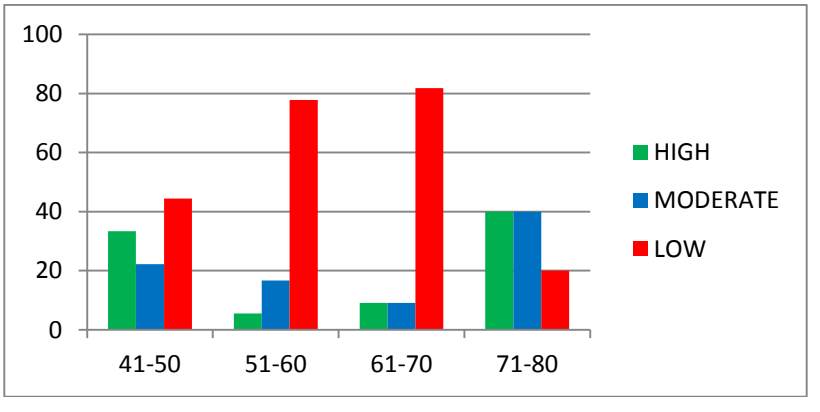
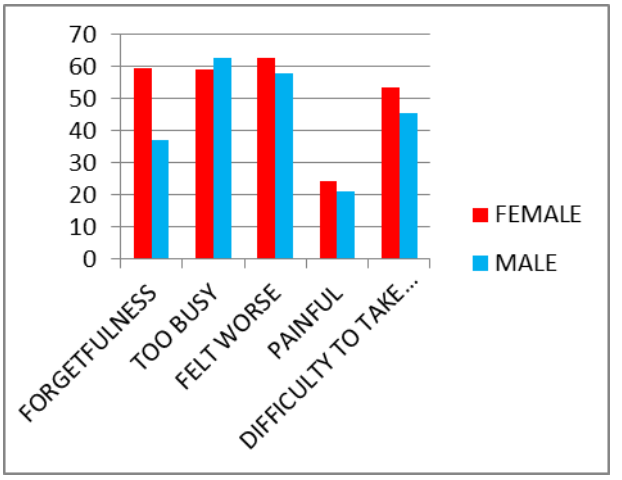


Table 6
Factors of non-adherence for female and male

FACTORS FOR NON ADHERENCE %	FEMALE(%)	MALE(%)
FORGETFULNESS	59.64	36.98
TOO BUSY	58.94	62.79
FELT WORSE	62.79	57.89
PAINFUL	24.36	20.93
DIFFICULTY TO TAKE INSULIN	53.48	45.61



Regarding factors associated with non-adherence, the p-value for male and female is <0.05 were significantly lower in the non-adherent group compared to adherent group. We can also speculate the older aged group patient and patient with longer duration of disease may have better adherence, as they have accept the disease to a greater extent. Insulin omission were more frequent among women of 77.77% and age group was 61-70years. The factors considered to be as they felt worse due to the side effect of insulin like tiredness, giddiness 62.79% for female and for male the low adherence age group were 51-60years(66.66%) considering the factor to be too busy in their work as they also forget to take insulin in their busy schedule.

Also younger age 31-40years (66.66%) due to the lower income and cannot afford for the cost of medicine. The simplicity of use and reducing the pain associated with pen device may promote improvisation in adherence. The results of this study may improve the actions to confront and the reduce thelack of adherence to insulin therapyin patients with T2DM. The clinical pharmacists and health care providers also should follow up the factors associated with the non-adherence of insulin treatment. Finally, implementation of education programs, regular follow-up by the pharmacists, patient endorsement and specific interventions to target on young and recently diagnosed individuals may be worth considering for improvement of medication adherence.

Conclusion

In this study, higher adherence was identified only in the minor participant with T2DM. The main factors for non-adherence is forgetfulness, too busy, felt worse, painful, difficulty to take insulin and economic factors. This should be addressed by designing the education programs to tackle the issues with the help of multi-disciplinary team setting. The present study shows that the clinical pharmacist has to play the vital role in disease management which bring the positive impact in creating the awareness about the disease. There should be continuous follow-up to be carried out to increase their quality of life constantly.

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