

**FACTORS CONTRIBUTING TO NON-ADHERENCE TO MEDICATION AMONG TYPE 2 DIABETES MELLITUS IN PATIENTS ATTENDING TERTIARY CARE HOSPITAL IN SOUTH INDIA**

DIVYA S\*, PRATIBHA NADIG

Department of Pharmacology, Vydehi Institute of Medical Sciences and Research Centre, Bengaluru, Karnataka, India.

Email: drdivyas1608@gmail.com

*Received: 10 January 2015, Revised and Accepted: 03 February 2015***ABSTRACT**

**Objective:** The aim was to determine the non-adherence to medication and to assess the factors affecting the same among the Type 2 diabetes mellitus (DM) patients in a tertiary care hospital in South India.

**Methods:** A cross-sectional study was carried out on 150 known Type 2 DM patients. Eight item Morisky Medication adherence questionnaire was used to assess adherence. A validated questionnaire was used to collect information on factors influencing non-adherence namely age, gender, literacy, duration of diabetes, complications, economic problems, patient awareness about their medication and side-effects, adverse drug reactions and advice on exercise and diet. The percentage of non-adherence and factors contributing to non-adherence were analyzed with descriptive statistics and Chi-square test using IBM SPSS version 21.

**Results:** More than two-thirds of the patients (69.3%) were males. The overall prevalence of therapeutic non-adherence was seen in 82 patients (54.66%). Among the non-adherent patients, 16 patients (17.08%) were illiterates. 32 patients (39.02%) had economic problems to buy prescribed medications, 53 (64.63%) of them had lack of information about prescribed medications was seen, 37 (45.12%) patients were not aware of the side effects of the prescribed medication, 59 (71.95%) patients were not aware of what happens on missing medications regularly, 39 (47.56%) of them were not able to visit physician regularly for consultation, 52 (63.45%) and 49 (59.75%) of patients were not performing exercise and not following advise on diet respectively.

**Conclusion:** Non-adherence to medications in Type 2 DM patients is due to inadequate patient knowledge and awareness about the importance of adherence in the diabetes management. Therefore, there is a definite need to improve patient adherence by improving the health care system and health education to patients and their families.

**Keywords:** Type 2 diabetes mellitus, Factors, Non-adherence.

**INTRODUCTION**

Diabetes mellitus (DM), the most common endocrine disease in the world, is a major global public health problem. As per the World Health Organization, there were around 31.7 million individuals in India affected by diabetes during the year 2000, which was expected to rise to 79.4 million by the year 2030 [1]. The term "DM" describes a metabolic disorder of multiple etiology characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both [2]. The most common form of DM is Type 2 DM. Management of DM includes pharmacotherapy, dietary changes and lifestyle modifications. Pharmacotherapy of Type 2 DM is with either oral anti-diabetic drugs (OADs) or insulin.

Patients' non-adherence to therapeutic strategies is a serious concern that poses a great challenge to the successful delivery of healthcare. This is widespread and has been reported from all over the world [3]. Adherence to diabetes management includes adherence to medications, life style modification and dietary changes. It depends on healthcare system factors such as availability and ease of accessibility of the physician. Non-adherence may also be due to factors that are patient-centered such as age, gender, patient education etc or therapy-related such as route of administration, duration of treatment, complexity of treatment and the side effects of the medicines [3].

Type 2 DM is poorly controlled due to lack of adherence to the treatment regimen. Prevalence of the poor adherence treatment ranges from 67% to 74% [4,5]. Poor glycemic control has consistently shown to be associated with long-term complications [6].

Number of studies have been published about non-adherence to medication in Type 2 DM. However it is essential to evaluate adherence on a regular basis due to changes in culture and life style. In addition, the introduction of new medicine in the market with their varied dosing schedule, efficacy and adverse drug profile may alter adherence. Very few studies have been done on determinants of non-adherence in South India. Hence, the present study was conducted to determine the prevalence of non-adherence to medications and factors affecting the same among the Type 2 DM patients. Observations from the above study may help physicians to identify the hindering factors in adherence. Addressing these factors may ensure better control of diabetes.

**METHODS****Patients and study design**

The present cross-sectional study was conducted after obtaining institutional ethics committee approval. A total number of 150 patients attending endocrine and medicine department at Vydehi Institute of Medical Science and Research Centre between May 2013 and August 2013 were approached. Sample size was based on 67% prevalence of non-compliance in published articles, a 5% confidence level with deviation of 10% from true prevalence. Based on this sample size of 150 was calculated.

**Inclusion criteria**

Known cases of Type 2 DM aged 25-60 years, on OADs for at least 6 months, not included in other studies and willing to give informed consent were included in the study. Patients with hypertension, coronary artery disease and dyslipidemias were also included.

**Exclusion criteria**

Patients with gestational diabetes and any psychiatric illness with or without medication were excluded from this study.

**Data collection**

An eight item Morisky Medication adherence questionnaire was used to assess medication adherence. Patients responded yes or no to each of the questions as shown in Table 1. Based on the scores obtained 0 was considered high adherence, 1 or 2 as medium adherence and >2 was low adherence. In this study, medium and high adherence were considered as adherent and low adherence as non-adherent for statistical purpose.

A separate questionnaire was designed to collect information on some of the probable factors affecting adherence. It was validated with inputs from expert diabetologists and clinical pharmacologists before use. The questionnaire used comprised of age, sex, literacy, duration of Type 2 DM. Questions used are shown in Table 2.

**Table 1: Eight item Morisky Medication adherence questionnaire**

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1. Do you sometimes forget to take your medicine
  2. Thinking over the past 2 weeks, were there any days when you did not take your medicine
  3. Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it
  4. When you travel or leave home, do you sometimes forget to bring along your medicines
  5. Did you take all your medicines yesterday
  6. When you feel like your symptoms are under control, do you sometimes stop taking your medicines
  7. Taking medicine every day is a real inconvenience for some people, Do you ever feel hassled about sticking to your treatment plan and by choosing one of the options for the question
  8. How often do you have difficulty remembering to take all your medicines,  
(A) Never/rarely, (B) Once in a while, (C) Sometimes, (D) Usually, (E) All the time
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**Table 2: Questionnaire to evaluate the factors associated with non-adherence**

**Questions**

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1. Have you ever had problem in buying prescribed medicines due to financial problems?
  2. Do you have information about the medicines you are prescribed from doctor?
  3. If yes, what are the medications you are prescribed?
  4. Are you aware what will happen if the medications are not taken regularly?
  5. If yes, describe?
  6. What do you think are the common side effects of your medications?
  7. Have you experienced any side effects with your prescribed drugs?
  8. If yes, then describe?
  9. Have you been asked to report if you develop any side effects?
  10. Recall if you have had missed any doses of medication on a day to day basis over last one week?
  11. What was the probable reason for missing the medication
  12. Are you able to visit the physician regularly for consultation?
  13. If no, explain why?
  14. How frequently do you get your blood glucose checked?
  15. Is it self-monitoring or at lab?
  16. Do you exercise every day?
  17. If yes, then how long?
  18. Is your sleep disturbed too much or u have broken sleep?
  19. Do you feel like failure?
  20. Do you follow the diet advised by your Doctor?
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Descriptive statistics test using IBM SPSS version 21 was used to find out the percentage of non-adherence and factors contributing to non-adherence. Chi-square test was applied to assess the association of factors with adherence using Graph-pad.

**RESULTS**

A total of 214 patients participated in this study while 64 refused to give written informed consent. Hence, 150 patients completed the questionnaire. Majority of patients were males (70%). The mean age of the participants was 49.10 years. And more than two-third of them were males (69.3%). The median duration of diabetes was 6.9 years with  $\pm$  standard deviation 5.15.

**Prevalence of non-adherence**

The overall prevalence of therapeutic non-adherence that is score >2 with eight item Morisky adherence scale among the participants was 82 (54.66%).

**Factors contributing to non-adherence**

Among the non-adherent patients (n=82), illiteracy was seen in 16 (17.08%, p=0.2640) patients, economic problems to buy prescribed medications was seen in 32 (39.02%, p=0.1695) patients, lack of information about prescribed medications was seen in 53 (64.63%, p=0.2422) patients, unawareness of the side effects of the prescribed medication were seen in 37 (45.12%, p=0.0018) patients, not aware of what happens on missing medications regularly were seen in 59 (71.95%, p=0.163) patients, not able to visit physician regularly for consultation were seen in 39 (47.56%, p=0.0001) patients, not performing exercise were seen in 52 (63.45%, p=1) and not following advise on diet was seen in 49 (59.75%, p=0.0327) patients. The details are shown in Table 3.

From Table 3, it is clear that factors such as illiteracy, economic problems to buy medications, lack of information on prescribed medications, not being aware of the importance of regular medications, not visiting physician regularly and not following advise on diet are the major ones affecting non-adherence.

Among these factors, in comparison with the adherant patients, statistically significant association was observed with lack of information regarding side effects of prescribed medications, not able to visit physician regularly for consultation and not following advise on diet (p<0.05).

**DISCUSSION**

Adherence to prescribed anti-diabetic medications is crucial to reach metabolic control as non-adherence with blood glucose lowering or lipid lowering drugs is associated with higher HbA1c and cholesterol levels respectively [7].

The study established that more than 50% of the participants were not adherent to diabetes treatment. A study on Indian population by Shobhana *et al.* reported a very high prevalence of 75% [8]. This difference could probably be due to improved patient awareness and availability of better preparations and formulations of anti-diabetic medications over years. The high prevalence of non-adherence in our study could also be due to the fact that it was conducted in a hospital where majority of the patients are usually from low socioeconomic background and are less educated.

Adherence could be affected by patient-centric, physician-dependent or health-care establishment factors. Our questionnaire addressed all the three factors.

Economic problems to buy medications was one of the major patient-centric factors that was found to be higher in non-adherent patients (39%). Similar observations were made by Wabe *et al.* who observed that 37% of non-adherent patients had financial limitations [9].

Table 3: Factors affecting both adherence and non-adherence

S. No	Factors	Adherence n (%)	Non-adherence n (%)	p value
1	Illiteracy	8 (11.76)	16 (17.08)	0.2640
2	Economic problems to buy prescribed medication	19 (27.94)	32 (39.02)	0.1695
3	Lack of information on prescribed medication	37 (54.41)	53 (64.63)	0.2422
4	Lack of information regarding side effects of prescribed medications	41 (20.58)	37 (45.12)	0.0018
5	Not aware of what happens on missing medications regularly	41 (60.29)	59 (71.95)	0.163
6	Not able to visit physician regularly for consultation	11 (16)	39 (47.56)	0.0001
7	Not following advise on exercise	43 (63)	52 (63.45)	1.00
8	Not following advise on diet	28 (41.17)	49 (59.75)	0.0327

Affordability is a problem since many of the anti-diabetic medications cost high, and it is a recurring cost too. Considering this as one of the major barriers to adherence, it has been minimized by provision of free drugs to patients when in the hospital [10].

Illiteracy can interfere with understanding of the disease and medication to some extent. Studies show that the risk of non-adherence is very high when patients cannot read and understand basic written medical instructions [11]. However, no significant difference was observed in adherent and non-adherent patients in our study. Another two factors that were related to patients were not following the advice on diet and exercise:

The physician-patient relationship plays a major role in keeping the patient well informed about the medications he consumes direct influence adherence [11]. Patients who did not have adequate information about their drug regimens well were probably at risk of non-adherence because they had not understood how to take their drugs causing them to miss on many occasions. Many of them also revealed that it was not told to them by their treating physician.

Furthermore, majority were unaware of adverse effects and importance of missing medications. Therefore, there is a need to create awareness on patients on their drug regimens and to make them clearly understand the same. This awareness will reduce the non-adherence due to adverse effects of their drugs.

The results on the dietary and exercise compliance in our study showed that patients were more compliant to dietary directions than instructions on exercise. The rate of compliance to diet was almost similar in the study done in Alexandria, Egypt where it was found to be 58.8%. However, the rate of compliance to the exercise regime was poorer than in the Egyptian study (51.7%) [12]. This difference in results may be due the easier to follow diet instructions than exercise regime. On the other hand, dietary adherence has been consistently viewed as the most difficult aspect of the diabetes regimen by Toljamo and Hentinen [13].

Therefore, patient education plays a very important role to improve the non-adherence rate. Further researches are needed to develop and refine interventions to improve adherence of diabetic patients and are to assess the effectiveness of removing perceived barriers on the adherence.

## CONCLUSION

Non-adherence to medications in Type 2 DM patients is due to inadequate patient knowledge and awareness about the importance of

adherence in the diabetes management. Therefore, there is a definite need to improve patient adherence by improving the health care system and health education to patients and their families.

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