

# Assessment of medication adherence in type-2 diabetes patients on poly pharmacy and the effect of patient counseling given to them in a multispecialty hospital

## Abstract

**Introduction:** The ability of physicians to recognize non-adherence is poor and interventions to improve adherence have had mixed results. Furthermore, successful interventions generally are substantially complex and costly. Poor adherence to medication regimens accounts for substantial worsening of disease; death and increased health care costs. The aim of this study is to assess the medication adherence in type-2 diabetes patients who are on polypharmacy and the effect of counseling provided for them in a multispecialty hospital.

**Materials and Methods:** The study was carried out at Kovai Medical Center and Hospital; Coimbatore Tamil Nadu, India. This is a 500-bedded modernized, multi-specialty tertiary care hospital with full-fledged diabetic department. It caters to the needs of both out-patients and in-patients. An assessment was made on type-2 diabetic patients who are receiving more than 5 drugs for their co-morbidities were included in this study. A medication adherence questionnaire was prepared based on the literatures. The study was approved by the Kovai Medical Center and Hospital ethics committee.

**Results:** Among 240 patients, 124 patients were adherent to medication whereas 116 patients were non-adherent. The non-adherent patients were given verbal counseling in a private counseling room regarding medication adherence.

**Conclusions:** Best way health professionals can tackle the adherence problem is through quality patient counseling as done in this study. With limited time most professionals have with a patient today this can be easier said than done. However, techniques such as the ask-educate-ask approach, the teach-back method and motivational interviewing can help ensure patient understanding of the counseling provided.

### Key words:


*Medication adherence, patient counseling, poly pharmacy*

## Introduction

Medication adherence is defined as the extent to which patients take medications as prescribed by their health care providers. The word “adherence” is preferred by many health care providers, because “compliance” suggests that the patient is passively following the doctor’s orders and that the treatment plan is not based on a therapeutic alliance or contract established between the patient and the physician.<sup>[1]</sup> Adherence rates are typically higher among patients with acute conditions when compared with those

with chronic conditions; persistence among patients with chronic conditions is disappointingly low.<sup>[2-4]</sup>

The ability of doctors to identify non-adherence is deprived and intercessions to improve adherence have had varied outcomes. Besides, efficacious intercessions mostly are considerably complex and expensive.<sup>[5-8]</sup> Deprived adherence to medication regimens is the reasons for extensive deterioration of illness; decrease and amplified well-being charges.<sup>[9-13]</sup> Diabetes mellitus is a chronic disease that requires long-term medical attention both to limit the development of its devastating complications and to manage

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them when they do occur. It is a disproportionately expensive disease. Type-2 diabetes is a chronic disease and this disease affects the majority of the population. It is commonly seen in the age group above 40 years. It may go unnoticed for years in a patient before diagnosis, since the symptoms are typically milder (e.g. Lack of keto acidotic episodes) and can be sporadic. However severe complications can result from unnoticed type-2 diabetes, including renal failure, vascular disease (including coronary artery disease), vision damage etc.

Methods that can be used to improve adherence can be grouped into four general categories: Patient education; improved dosing schedules; increased hours when the clinic is open (including evening hours) and therefore shorter wait times; and improved communication between physicians and patients. Educational interventions involving patients, their family members, or both can be effective in improving adherence.<sup>[14,15]</sup> Approaches to advance dosing plans comprise the use of containers to establish daily doses, abridging the routine daily dosing, and signals to the patients to take medicines. Patients who slip appointments are often those who need the most help to improve their ability to adhere to a medication regimen; Intercessions that conscript auxiliary health care workers such as pharmacists and nursing staff can increase adherence.<sup>[16,17]</sup> Finally, enhancing communication between the physician and the patient is a key and effective strategy in boosting the patient's ability to follow a medication regimen.<sup>[18,19]</sup>

Most methods of improving adherence have involved combinations of behavioral interventions and reinforcements in addition to increasing the convenience of care, providing educational information about the patient's condition and the treatment and other forms of supervision or attention.<sup>[20-22]</sup> Successful methods are complex and labor intensive, and innovative strategies will need to be developed that are practical for routine clinical use.<sup>[6]</sup> Given the many factors contributing to poor adherence to medication, a multifactor approach is required, since a single approach will not be effective for all patients.<sup>[23,24]</sup>

### Objectives

The objective of this study is to assess the medication adherence in type-2 diabetes patients who are on poly pharmacy and the effect of counseling provided for them in a multispecialty hospital.

### Materials and Methods

The study was carried out at Kovai Medical Center and Hospital; Coimbatore Tamil Nadu, India. This is a 500-bedded modernized, multi-specialty tertiary care hospital with full-fledged diabetic department. It caters to the needs of both out patients and in patients. An assessment was made on type-2 diabetic patients who are receiving more than 5 drugs for their co-morbidities were included in this study. A medication adherence questionnaire was prepared based on the literatures. The study was approved by the Kovai Medical Center and Hospital Ethics Committee.

### Development of questionnaire

Questionnaire items were constructed in accordance with the study objectives. The questionnaire consisted of total 14 questions. Questions evaluated the medication adherence of the patients using a Likert scale of 1-5, reflecting "every time" to "very rare." Higher values show increased medication adherence. The scores of the patients were taken initially and after 1 month interval. From the mean values of these scorings, the efficacy of the counseling was assessed.

### Validation of questionnaire

Information was collected by interviewing the respondents using a structured questionnaire. The content of the questionnaire was piloted among 30 patients. This was done to validate whether the patients are able to comprehend the questions being asked. As a result, the questionnaire was validated and modified accordingly. Furthermore, reliability of the questionnaire was assessed and the value of Cronbach-alpha was found to be 0.80, reflecting internally consistent items in a survey instrument.

### Study population

A total of 240 patients who met the study criteria were enrolled into the study. Using the medication adherence questionnaire the patients were categorized into adherent and non-adherent. Among 240 patients, 124 patients were adherent to medication whereas 116 patients were non adherent. The non-adherent patients were giving verbal counseling in a private counseling room regarding medication adherence. However, the laboratory value did not correlate with the patients' adherence. Hence they were grouped as follows:

- Group 1: 120 patients who are adherent and has normal fasting blood sugar levels
- Group 2: 14 patients who are adherent and has high fasting blood sugar levels
- Group 3: 116 patients who are non-adherent and have high fasting blood sugar levels.

Among this 20 people did not come for follow-up and all those 20 are from group 1 for a surprise. This may be because they are adherent and blood sugar levels are under control. Thus number of patients in group 1 had become 100 after 1 month interval. Hence the result of only those 100 patients from group 1 is replicated in this study. Thus, 220 patients actually completed the study.

- Group 1: 100 patients who are adherent and has normal fasting blood sugar levels
- Group 2: 14 patients who are adherent and has high fasting blood sugar levels
- Group 3: 116 patients who are non-adherent and have high fasting blood sugar levels.

### Results

In these groups, there were 65 patients who had 5 drugs; of which 54 were adherent with normal fasting blood sugar level and 11 were non-adherent with high fasting blood sugar. There were 44 patients on 6 drugs; of which 19 were adherent

with normal fasting blood sugar level, 4 were adherent with high fasting blood sugar and 21 were non-adherent with high fasting blood sugar. From the 42 patients on 7 drugs; 15 were adherent with normal fasting blood sugar levels, 5 were adherent with high fasting blood sugar and the remaining 22 were non-adherent with high fasting blood sugar levels. Among the 79 patients on 8 drugs, 12 were adherent with normal fasting blood sugar levels, 5 were adherent with high fasting blood sugar and the remaining 62 patients were non-adherent with high fasting blood sugar levels [Table 1].

Regarding the education levels in these groups, there were 31 patients who had secondary school level of education; of which 2 were adherent with normal fasting blood sugar level, 3 were adherent with high fasting blood sugar and 26 were non-adherent with high fasting blood sugar. There were 51 patients who had secondary school level of education; of which 24 were adherent with normal fasting blood sugar level, 2 were adherent with high fasting blood sugar and 25 were non-adherent with high fasting blood sugar. From the 68 patients who had pre university level of education; 34 were adherent with normal fasting blood sugar levels, 4 were adherent with high fasting blood sugar and the remaining 30 were non-adherent with high fasting blood sugar levels. Among the 80 patients who had graduate level of education, 40 were adherent with normal fasting blood sugar levels, 5 were adherent with high fasting blood sugar levels and the remaining 35 patients were non-adherent with high fasting blood sugar levels [Table 2].

Regarding the occupation in these groups, there were 74 patients who were retired people; of which 20 were adherent with normal fasting blood sugar level, 2 were adherent with high fasting blood sugar and 52 were non-adherent with high fasting blood sugar. There were 40 patients who were housewife; of which 25 were adherent with normal fasting blood sugar level, 5 were adherent with high fasting blood sugar and 10 were non-adherent with high fasting blood sugar. From the 47 patients who were employees; 27 were adherent with normal fasting blood sugar levels, 4 were adherent with high fasting blood sugar and the remaining 16 were

non-adherent with high fasting blood sugar levels. Among the 70 patients who were doing business, 28 were adherent with normal fasting blood sugar levels, 4 were adherent with high fasting blood sugar levels and the remaining 38 patients were non-adherent with high fasting blood sugar levels [Table 3].

Out of total 220 patients, 100 were adherent with normal fasting blood sugar level, 14 were adherent with high fasting blood sugar and 116 were non-adherent with high fasting blood sugar according to the questionnaire scores initially. After the exposure of counseling, when the patients came for the follow-up after 1 month the scorings showed that 90 patients were adherent whereas 26 were non-adherent in group 3 [Table 4].

### Discussion

It was observed that the number of adherent patients with normal fasting blood sugar levels decreased as the number of drugs increased with the maximum number of 54 in 5 drugs category and minimum of 12 in 8 drugs category. The number of adherent patients with high fasting blood sugar values remained the same whether they were on 7 or 8 drugs. However the number of non-adherent patients with high fasting blood sugar levels increased as the number of drugs increased.

It was found that the number of graduates were more in group 1. The number of graduates in group 2 was less than those in group 3 who were non-adherent. This had revealed that even though the patients were educated they were not adhering to the medication. Ironically, number of patients with a secondary school and pre university college level is more in group 1 which may be the reason for adherence to the medications.

It was also found that the number of retired patients were more in group 3 which was a non-adherent group. This may be because of age, as these patients come under retired category and probable they may have poor memory to take

**Table 1: Number of drugs used among the different groups of patients**

Number of drugs	Group 1	Group 2	Group 3
5	54	0	11
6	19	4	21
7	15	5	22
8	12	5	62

**Table 3: Occupational distribution among the different groups of patients**

Occupation	Group 1	Group 2	Group 3
Retired	20	2	52
House-wife	25	5	10
Employee	27	4	16
Business	28	4	38

**Table 2: Education level among the different groups of patients**

Education level	Group 1	Group 2	Group 3
Primary school	2	3	26
Secondary school	24	2	25
Pre-university college	34	4	30
Graduates	40	5	35

**Table 4: Changes in adherence before and after counseling among the different groups of patients**

Groups	Number of patients (initially)	Number of patients (after 1 month)	
		Adherent	Non-adherent
1	100	100	0
2	14	14	0
3	116	90	26

medications. It was also found that the number of patients under business category were also more in group 3 which was a non-adherent group. This had revealed that the patients whose occupation was business, they were not adhering to the medication may be due to their busy schedule.

Among group 1 (adherent with normal fasting blood sugar level) and group 2 (adherent with high fasting blood sugar) there was no significant change since these patients were already adherent to their medications. However, group 3 patients had shown a significant change in medication adherence due to counseling which has reflected that proper counseling by the pharmacist while dispensing the medication will increase the medication adherence rate.

## Conclusions

All of these highlights suggest that although adherence is a challenge, there are things that health professionals, can do to help improve adherence amounts strenuously. Although numerous pharmacists are making an effort to report the adherence topic, others are topping the approach by placing their pharmacists face to face of their patients. Patients' personal connection with a pharmacist or pharmacy staff and feeling well-informed were among top predictors of medication adherence.

Best way health professionals can tackle the adherence problem is through quality patient counseling as done in this study. With limited time most professionals have with a patient today this can be easier said than done. However, techniques such as the ask-educate-ask approach, the teach-back method and motivational interviewing can help ensure patient understanding of the counseling provided.

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