

## ASSESSMENT OF PHARMACIST MEDIATED EDUCATION ON KNOWLEDGE ATTITUDE AND PRACTICE IN TYPE 2 DIABETES MELLITUS PATIENTS IN RURAL SOUTH INDIAN POPULATION

SAI PAWAN RAMESH ADEPU<sup>1</sup>, STENY SAM<sup>1</sup>, CUCKOO OMANAKUTTAN<sup>1</sup>, RAMANATH KV<sup>1</sup>,  
YEGURLA YASHASWINI<sup>2\*</sup>

<sup>1</sup>Department of Sri Adichunchanagiri College of Pharmacy, Rajiv Gandhi University of Health Sciences, Bengaluru, Karnataka, India.

<sup>2</sup>Department of JSS College of Pharmacy, JSS University, Mysore, Karnataka, India. Email: yegurlayashaswini@gmail.com

Received: 10 May 2018, Revised and Accepted: 28 June 2018

### ABSTRACT

**Objective:** The objective of the study was to assess the influence of pharmacist mediated education on knowledge, attitude, and practice (KAP) in rural patients with Type 2 diabetes mellitus.

**Methods:** This is a prospective, randomized interventional study approved by the institutional Ethics Committee. Eligible Type 2 diabetic patients with written informed consent were enrolled and randomized into control and test group. Validated and local language translated KAP questionnaire was administered to all patients at baseline and three subsequent follow-ups. Patients in the test group received structured education at every follow-up whereas the control group patients received education only at the final follow-up. Statistical Package for the Social Sciences software was used to evaluate the data.

**Results:** Among the 72 patients enrolled, 35 were randomized into control group and 37 into test group. Majority of the study patients (65.2%) were males with an age range of 30–72 years and were from agricultural profession (34.72%) with school education (59.7%). The mean body mass index (BMI) of the study patients was 25.01. At baseline, the mean glycosylated hemoglobin value of patients was 6.48±1.39% in the control group and 6.23±1.16% in the test group. During the past follow-up, a significant ( $p<0.05$ ) improvement was observed in KAP scores in test group patients compared to control group patients which were supported by statistically significant ( $p<0.05$ ) improvement in capillary blood glucose values.

**Conclusion:** Pharmacist mediated structured education has shown a positive impact on KAP of test group patients toward their disease management.

**Keywords:** Diabetes, Therapeutic outcome, Knowledge, attitude, and practice.

### INTRODUCTION

Diabetes mellitus (DM) is a metabolic disorder characterized by hyperglycemia. Increasing at an alarming pace particularly in developing countries [1] and it is estimated that globally about 382 million people are suffering from diabetes [2]. According to the World Health Organization, diabetes will be the 7<sup>th</sup> leading cause of death in 2030 [3]. The global expenditure due to diabetes is estimated to be 548 US billion dollars, and in India, it is estimated to be 6 billion US dollars, and the mortality rate is about 55% [2].

Inadequate management of diabetes leads to several health problems with increased risk of complications. This is mainly associated with patient's poor knowledge about the disease and its management. Medication non-adherence is another multifaceted problem especially with chronic diseases which play an important role in determining the therapeutic outcomes. Studies have confirmed about the positive influence of pharmacist mediated education on knowledge, attitude, and practices about disease and therapy which has shown a positive impact on health-related quality of life [4].

Diabetic patients often develop complications due to inadequate glycemic control mainly due to poor practices regarding the disease and management [5]. Patient education is one of the most effective ways to improvise patient responsibility toward disease management and minimize the diabetes complications and improve the outcomes. Diabetic patients wishing to lead a normal healthy life should understand about their illness and the strategies to put the disease in control [6]. This corroborates the importance of awareness among diabetics on DM management.

Research evidence available is suggesting that the influence of pharmacist mediated patient education in improving the patient's awareness and thereby improving medication adherence, good glycemic control, and reduced diabetes-related complications [7].

In a study conducted by Adepu *et al.* on effect of patient counseling on quality of life in Type 2 DM patients in community pharmacy settings in Kerala, the research findings suggest that structured patient counseling has improved knowledge, attitude and practices (KAP) significantly ( $p<0.05$ ) and this has also improved significant health-related quality of life scores in test group patients suggesting the pharmacist mediated education has significant role in improving patients KAP [8].

In another prospective, an open-label randomized study conducted by Betsy *et al.* to assess the influence of patient counseling on diabetic patients in community pharmacy settings observed that post education on KAP scores was significantly improved ( $p<0.05$ ) and influence on glycemic control and health-related quality of life [9].

In another study conducted by Gangwar *et al.* suggest that structured patient education resulted in a mean increase in the scores of knowledge. The increase in the scores was from baseline to first follow-up (1.42) and from first follow-up to second follow-up (1.59). The study findings suggest a positive impact of pharmacist mediated patient education on glycemic control [4].

### METHODS

This is a prospective interventional study conducted in medicine Outpatient Department of Adichunchanagiri Hospital and Research Centre, Mandya, Karnataka, India, over a period of 6 months. Type 2 DM patients of both genders meeting the inclusion criteria were enrolled in the study using block randomization technique to avoid selection bias. Type 2 DM patients with disease duration of <3 years were included.

Pediatric, gestational diabetes, and psychiatric patients were excluded from the study.

This study was approved by the institutional human ethics committee and issued a letter to conduct the study.

Before initiating the study, the knowledge level of the surrounding community helps in selecting appropriate population and the level of awareness to be provided can be known.

A suitably designed data collection form was developed; details such as patient demographics, educational status, social habits, socioeconomic status, medical history and past medication history, family history, allergies, body mass index (BMI), diet, marital status, and smoking and alcohol status were obtained.

A suitably designed and validated KAP questionnaire was administered to the patients at baseline to assess the knowledge level about the disease and its management. The questionnaire covered three areas: Knowledge, attitude, and practice. There were a total of 16 questions, 4 questions related to knowledge about the disease, 7 questions to assess the attitude of the patient toward the disease, and 5 questions pertaining to practices. This questionnaire was filled by the patient or patient attendant at face-to-face interview with the investigator. One mark was given for correct answer and none for incorrect or do not know. Thus, a maximum possible score is 16.

Glycosylated hemoglobin (HbA1C) was performed at baseline to assess the diabetic status of the enrolled patients. All the enrolled patients were followed for 3 months from baseline with an interval of 30 days between the follow-ups. At every follow-up visit, BP and capillary blood glucose (CBG) were recorded (fasting blood sugar [FBS] and postprandial blood sugar [PPBS]). Test group patients received the pharmacist mediated structured education regarding the disease, medication, diet, and lifestyle modification at baseline and further follow-ups, and patient information leaflet (PIL). The control group patients received detailed education only at the final follow-up visit.

#### Statistical analysis

Results were analyzed using Statistical Package for the Social Sciences for Windows Version 20. The significance of the change in CBG at each follow-up visit compared to the first follow-up was assessed using independent t-test. The significance of the change in KAP scores from baseline to final follow-up was also assessed using paired t-test.  $p < 0.05$  is considered as significant.

#### RESULTS

A total of 72 eligible Type 2 DM patients meeting the inclusion criteria were enrolled in the study. These patients were randomized into control and test group, 35 patients were from the control group, and 37 patients were from the test group. 65.27% were males and 34.73% were females. The minimum age of the patients was 30 years and maximum age of the enrolled patients was 72 years. The mean ( $\pm$ standard deviation) age of test group patients was  $51.29 \pm 10.82$  years, and that of the control group patients were  $58.05 \pm 12.75$  years. Majority of the enrolled patients were literates (79.16%), with most of the patients having completed schooling education (59.7%), who were from agricultural and business profession.

The demographic details of the patients who had completed all of the follow-ups are presented in Table 1.

The mean BMI of male patients was 24.76% and BMI of female patients was 25.27%. Majority of the patients (62.5%) had an average annual income of Rs. 50,000–Rs. 1,00,000 and rest of the patients were homemakers. The percentage of smokers in control group was 11% and test group 24%, respectively. Alcoholic status of patients in control group was 39% and test group was 45%.

At baseline, HbA1C test was conducted to know the diabetic status of the enrolled patients. The mean HbA1C value was  $6.48 \pm 1.39\%$  in the control group patients and  $6.23 \pm 1.16\%$  in test group patients.

At first follow-up and subsequent follow-ups, CBG for FBS and PPBS was monitored to assess the influence of educational intervention on KAP and glycemic control. In the control group at the first follow-up, the mean FBS was 133 mg/dl and mean PPBS was 180 mg/dl. In the final follow-up, the mean FBS was 132 mg/dl, and the mean PPBS was 175 mg/dl. These values suggest that the glycemic control was inadequate in the control group patients. Whereas the mean FBS in first follow-up in the test group patients was 123 mg/dl, and mean PPBS was 175 mg/dl. In the final follow-up, the mean FBS was 105 mg/dl, and the mean PPBS was 133 mg/dl.

Patients' KAP play a key role in patients understanding the importance of disease control and prevention of complications. The validated KAP questionnaire was administered in both control and test group patients at each follow-up. Test of significance (t value) was calculated for both the groups comparing the baseline and final follow-up. Mean KAP scores in control group were found non-significant improvement ( $p = 0.587$ ). Whereas in the test group, mean KAP scores were found significantly ( $p < 0.05$ ) increased from baseline to final follow-up (Figs. 1-3).

Table 1:

Parameter	n (%)		p value
	Control (n=35)	Test (n=37)	
Gender			
Male	18 (25)	29 (40.27)	0.937
Female	17 (23.6)	8 (11.1)	
Age			
30–40	4 (5.5)	8 (11.1)	0.813
41–50	8 (11.1)	10 (13.8)	
51–60	9 (12.5)	10 (13.8)	
61 and above	14 (19.4)	9 (12.5)	
Educational qualification			
Illiterate	11 (15.2)	4 (5.5)	0.866
Primary school	11 (15.2)	9 (12.5)	
Secondary school	9 (12.5)	13 (18.05)	
PUC	3 (4.1)	4 (5.5)	
Graduate	0 (0)	6 (8.3)	
Postgraduate	1 (1.3)	1 (1.3)	
Profession			
Agriculture	14 (19.4)	11 (15.2)	0.900
Business	4 (5.5)	12 (9.72)	
Employment	2 (2.7)	7 (9.72)	
Housewife	15 (20.8)	7 (9.72)	
Smoking status			
Yes	2 (2.7)	7 (9.72)	0.844
No	33 (45.8)	30 (41.6)	
Alcoholic status			
Yes	7 (9.72)	13 (18.05)	0.874
No	28 (38.8)	24 (33.3)	

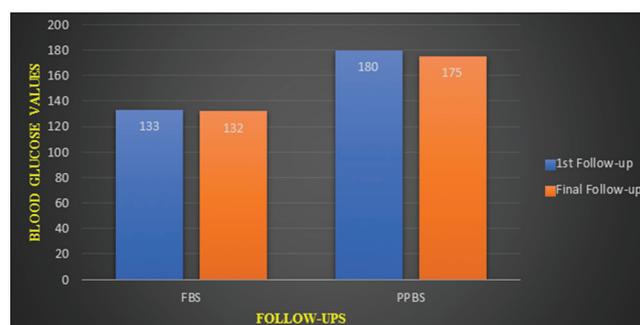


Fig. 1: Mean fasting blood sugar and postprandial blood sugar values in control group

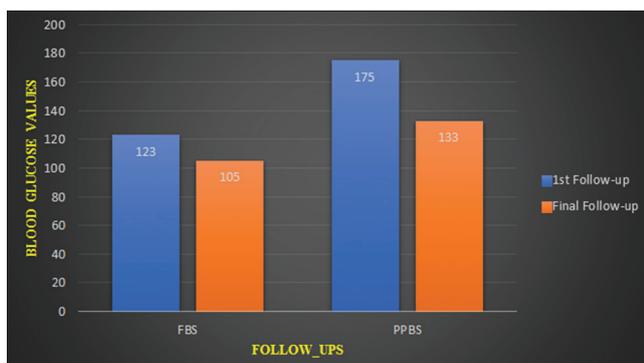


Fig. 2: Mean fasting blood sugar and mean postprandial blood sugar values in test group

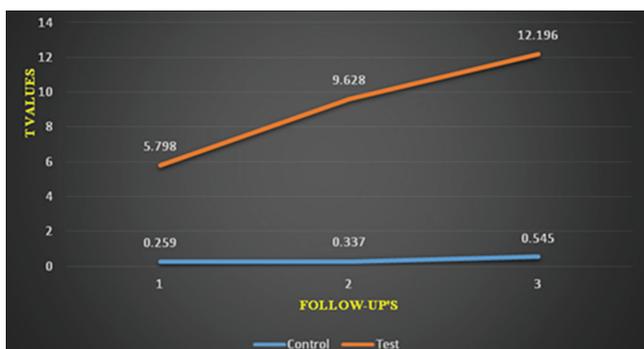


Fig. 3: Scores of knowledge, attitude, and practices

## DISCUSSION

Diabetes is a chronic disease and important public health problem nationally and internationally, and the global prevalence of diabetes is on the rise. Inadequate management of diabetes leads to several health problems with increased risk of complications. This is mainly associated with patient's poor knowledge about the disease and its management. Pharmacists by virtue of their professional status act as a liaison between the clinicians and patients not only by dispensing the prescribed medications but also assists the patients in the safe use of prescribed medicines and thereby enhancing their medication adherence behavior and thereby improving the health-related quality of life.

A total of 72 patients were included in the study. Males (65.27%) outnumbered females (34.73%), and a maximum number of patients 23 (31.9%) were in the age group of 61 and above which are similar to the study conducted by Ramanath *et al.*

Literacy rate in our study was 57 (79.16%) patients which eased structured patient counseling with the usage of PIL, as they could recall the information reading PIL at home, which was similar to the study conducted by Malathy *et al.*, Adepu *et al.*, and Ramanath *et al.* [5,8-11].

Medication non-adherence is another multifaceted problem especially for chronic diseases which play an important role in determining the therapeutic outcomes. Studies have confirmed about the positive influence of pharmacist mediated education on knowledge, attitude, and practices about the disease and therapy which has shown a positive impact on positive health-related quality of life [4].

Patients with family history of diabetes were much aware of the role and responsibility in keeping their glycemic status under control through proper diet, medication adherence, and lifestyle modifications, with 26 (36.11%) of patients having a family history of DM. A study conducted by Shobana *et al.* showed similar results. Similarly, educational status had a positive impact [12].

It is surprising to see 47 (63.8%) of the patients have no family history of diabetes and were in the age group of 40–60 years. This probably indicates diabetes is emerging rapidly in general population with various habits such as increased intake of fats, high-calorie diet, beverages, cool drinks, and junk food. A sedentary lifestyle with least or no exercise/physical activity, stressful, challenging corporate lifestyle with increased job demands, social status. Current younger generation possesses a greater risk due to stressful and sedentary lifestyle.

Nine (12.5%) patients in our study were smokers and 20 (27.7%) were alcoholic which has adverse effects on diabetes. Majority of the patients were neither alcoholic nor smokers which decreased the risk of complications which were similar to the study conducted by Ramanatha and Santhosh [11].

Diabetic patients often develop complications due to inadequate glycaemic control mainly because of poor practices regarding the disease and management [5]. Patient education is the most effective way to improve patient's responsibility toward disease management and minimize the diabetes complications and improve the outcomes. Diabetic patients who wish to lead a normal life should understand about their illness and the strategies to put the disease under control [6]. This corroborates the importance of awareness among diabetics on DM management.

Research evidence is available suggesting the influence of pharmacist mediated patient education in improving the patient awareness and thereby improving medication adherence and good glycaemic control and minimize the diabetes-related complications [7].

In a study conducted by Adepu *et al.*, on effect of patient counseling on quality of life in Type 2 DM patients in community pharmacy settings in Kerala, the research findings suggest that structured patient counseling has improved that KAP significantly ( $p < 0.05$ ) and this has improved significant scores of health-related quality of life in test group patients suggesting the pharmacist mediated education has significant role in improving patients knowledge, attitude, and practices [8]. In our study, test group patients KAP significantly improved from baseline to final follow-up ( $p < 0.05$ ) through structured patient education.

In another prospective, an open-label randomized study conducted by Adepu *et al.* to assess the influence of patient counseling on diabetic patients in community pharmacy settings, observed that post education on KAP scores was significantly improved ( $p < 0.05$ ) and influence on glycaemic control and health-related quality of life [9].

In a study conducted by Gangwar *et al.* suggest that structured patient education resulted in a mean increase in the scores of knowledge. The increase in the scores was found from baseline to first follow-up (1.42) and from first follow-up to second follow-up (1.59). Thus, the findings suggest a positive impact of pharmacist mediated patient education on glycaemic control [4].

In another study conducted by Adepu *et al.*, they have applied a validated KAP questionnaire (25 Questions) to assess the influence of pharmacist mediated patient education on diabetic patient's knowledge, attitudes, and practices. At the end of the study, a significant improvement was observed in KAP scores from baseline to final follow-up and also a statically non-significant improvement ( $p = 0.003$ ) was seen in CBG values. The decrease in CBG values suggests the positive influence of pharmacist mediated structured education that, in turn, improved medication adherence behavior and therapeutic outcomes [10].

## CONCLUSION

Diabetes is a chronic disorder that affects the social and emotional well-being of the patients if the glycaemic control is not adequately maintained. A structured education empowers the patients to take responsibility in adhering to their prescribed medication and thereby achieving the desired clinical outcomes. From the findings of our study, it can be concluded that structured education by a pharmacist

to patients in the test group has shown a significant improvement in knowledge, attitude, and practice. Thus supporting the educational interventional role of the pharmacist.

#### ACKNOWLEDGMENT

Authors are thankful to Principal Dr. B. Ramesh, SAC College of Pharmacy, for providing necessary support to the study. We express our thanks to Mr. KV Ramanath, Associate Professor, SAC College of Pharmacy, for guiding us with his valuable support throughout the study. We express our special thanks to Dr. Shashikantha Bhat, MD general medicine to support us throughout the study with his timely suggestions and Dr. Adepu Ramesh Principal cum Director to give his valuable inputs in bringing out our thesis.

#### CONFLICTS OF INTEREST

Sai Pawan AR, Steny Sam, Cuckoo Omanakuttan, Ramanath KV, Yashaswini Yegurla hereby declare that they have no conflicts of interest.

#### REFERENCES

1. American Diabetes Association. Diagnosis and classification of diabetes mellitus. *Diabetes Care* 2004;27 Suppl 1:S5-10.
2. International Diabetes Federation. *IDF Diabetes Atlas*. 6<sup>th</sup> ed. International Diabetes Federation; 2013. Available from: <http://www.idf.org/diabetesatlas>. [Last accessed on 2015 Apr 04].
3. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: Estimates for the year 2000 and projections for 2030. *Diabetes Care* 2004;27:1047-53.
4. Gangwar SS, Ahamed A, Patel I, Parimalakrishnan S, Balkrishnan R, Singh SP. Assessment of medication knowledge and counselling in type 2 diabetes mellitus patients attending community pharmacy in rural North India. *Afr J Pharm Sci Pharm* 2013;4:47-57.
5. Malathy R, Narmadha M, Ramesh S, Alvin JM, Dinesh BN. Effect of a diabetes counseling programme on knowledge, attitude and practice among diabetic patients in erode district of South India. *J Young Pharm* 2011;3:65-72.
6. Stam DM, Graham JP. Important aspects of self-management education in patients with diabetes. *Pharm Pract Manag Q* 1997;17:12-25.
7. Mazzuca SA, Moorman NH, Wheeler ML, Norton JA, Fineberg NS, Vinicor F, et al. The diabetes education study: A controlled trial of the effects of diabetes patient education. *Diabetes Care* 1986;9:1-0.
8. Adepu R, Rasheed A, Nagavi BG. Effect of patient counselling on quality of life in type 2 Diabetes mellitus patients in two selected south Indian community pharmacies: A study. *Indian J Pharm Sci* 2007;69:519-24.
9. Adepu R, Betsy AB, et al. Impact of community pharmacy based patient education on quality of life in Type 2 diabetes mellitus. *IJOP* 2009;2:43-51.
10. Adepu R, Ari SM. Influence of structured patient education on therapeutic outcomes in diabetes and hypertensive patients. *Asian J Pharm Clin Res* 2010;3:174-8.
11. Ramanath KV, Santhosh YL. Impact of clinical pharmacist provided patient education on QOL outcome in type ii diabetes mellitus in rural population. *Asian J Pharm Clin Res* 2011;4:15-20.
12. Shobana R, Snehalatha C, Latha E, Vijay V, Ramachandran A. Dietary profile of urban South Indians and its relations with glycaemic status. *Diabetes Res Clin Pract* 1998;42:181-6.