

**IMPACT OF PATIENT COUNSELLING ON KNOWLEDGE, ATTITUDE, PRACTICE  
AND MEDICATION ADHERENCE IN TYPE 2 DIABETES MELLITUS PATIENTS**Ann Mary Swaroop<sup>1</sup>, Christina Varghese<sup>1</sup>, Josmine Jose<sup>1</sup>, Maheswari E.<sup>1\*</sup>, Pramila Kalra<sup>2</sup><sup>1</sup>Department of Pharmacy Practice, M.S. Ramaiah University of Applied sciences, Bangalore, Karnataka, India.<sup>2</sup>Department of Endocrinology, M.S. Ramaiah hospitals, Bangalore, Karnataka, India.**\*Correspondence for Author: Dr. Maheswari E.**

Department of Pharmacy Practice, M.S. Ramaiah University of Applied sciences, Bangalore, Karnataka, India.

Article Received on 28/01/2016

Article Revised on 19/02/2016

Article Accepted on 11/03/2016

**ABSTRACT**

**Aim & Objective:** Type 2 Diabetes mellitus (Type II DM) is one of the most prevalent chronic diseases in India and the cornerstone of its care is to educate the patients about self-management. The objective of the study is to assess the knowledge, attitude, practice (KAP) and medication adherence (MA) and to determine the impact of patient counselling by clinical pharmacist in the management of Type II DM patients. **Methods:** A randomised prospective interventional study was carried out in 60 patients of M.S. Ramaiah hospitals. The patients were divided into control and intervention groups. Baseline Fasting Blood Sugar (FBS) levels, KAP and MA scores of all the patients were collected. Extensive counselling was done by clinical pharmacist and patient information leaflets (PIL) were given to intervention group during the study. A follow up was conducted after 1 month at the time of which the above parameters were reassessed for all the patients. **Results:** The mean baseline KAP and MA scores and FBS levels were  $10.79 \pm 4.46$ ,  $8.43 \pm 2.50$ ,  $6.50 \pm 2.50$  and  $1.75 \pm 2.04$  and  $166.96 \pm 54.66$  mg/dl respectively for the intervention group and  $12.07 \pm 3.80$ ,  $8.96 \pm 2.10$ ,  $7.33 \pm 2.33$  and  $1.15 \pm 1.46$  and  $148.7 \pm 52.20$  mg/dl for the control group respectively which improved to  $15.54 \pm 2.78$ ,  $9.54 \pm 1.73$ ,  $8.21 \pm 1.44$  and  $0.93 \pm 1.08$  and  $135.39 \pm 53.09$  mg/dl for the intervention group after counselling ( $p < 0.05$ ). **Interpretation & Conclusion:** The current study revealed improvements in KAP and MA scores as well as FBS levels in the intervention group indicating that clinical pharmacist provided counselling plays a vital role in the management of Type II DM patients.

**KEYWORDS:** Attitude, Diabetes, Knowledge, Medication adherence, Practice, Patient counselling.**INTRODUCTION**

Type II DM is a metabolic disorder characterized by hyperglycaemia due to defects in insulin secretion and action or a combination of both which results in chronic complications such as microvascular, macrovascular and neuropathic disorders.<sup>[1,2]</sup> The World Health Organization (WHO) has stated that diabetes mellitus is at an epidemic level.<sup>[3]</sup> The prevalence of Diabetes Mellitus (DM) has risen dramatically in adults worldwide from 6.6% in 2010 and estimated to be 7.8% by 2030, with India contributing to the major part.<sup>[4]</sup> In 2011, it has been estimated that 61.3 million people live with diabetes in India and is expected to increase to 101.2 million by 2030.<sup>[5]</sup>

Knowledge, Attitude and Practice (KAP) studies are highly observant evaluations that measure changes in Knowledge, Attitude and Practice in response to a specific intervention, usually outreach, demonstration or education.<sup>[6]</sup> Before creating awareness in a community, it is necessary to assess the environment in which awareness should be created. Understanding the levels of KAP may lead to a more efficient process of awareness

creation and allow the program to be tailored more appropriately to the needs of the community.<sup>[7]</sup>

Medication adherence monitoring helps to assess the extent of adherence of patients with the health advice provided by the physician regarding the time, dose and frequency of intake of medications. Adherence is a crucial link between treatment and outcome in medical care.<sup>[8,9,10]</sup> The rate of MA for diabetes varies between 36 and 93 percent worldwide. MA in diabetic patients is very important as it is directly associated with a decrease in HbA1c levels.<sup>[11]</sup> Low medication adherence may result in poor therapeutic outcome.<sup>[9]</sup>

Patient counselling is a process that upgrades the patient's ability to cope with their disease and make informed decisions regarding management and medication. It also helps patients to change any harmful dietary and lifestyle habits. Pharmacists are at a unique position to play a vital role in helping patients to cope with their disease.<sup>[12]</sup> The ultimate goal of counselling is to provide information about KAP needed for disease management thereby enhancing therapeutic outcomes.<sup>[13]</sup>

Counselling could be provided with the support of counselling aids such as patient information leaflets, medication cards etc. Patient information leaflets provide information about the patient's disease, therapy and life style modifications.<sup>[14]</sup> Organising educational programmes and providing counselling are the important steps in increasing awareness and reducing economic burden of DM patients.<sup>[15]</sup> The objective of the current study was to assess the KAP and MA and impact of patient counselling in TYPE II DM patients and to find the association of sociodemographic factors with KAP and MA.

## METHODS

### Patients and study design

A prospective, interventional, randomised study was conducted among Type II DM patients of either sex aged above 18 years visiting M.S. Ramaiah hospitals, Bangalore. The study was carried out in 60 Type II DM patients for a duration of 6 months from December 2013 to May 2014. The sample size was calculated based on a similar study conducted in Type 2 DM patients. Paediatric patients, pregnant women and unwilling patients were excluded from the study. The study has been approved by the Institutional ethics committee. The enrolled patients were randomized into control group and intervention group.

Demographic details, baseline FBS levels, KAP and MA scores were obtained with the aid of questionnaires and the factors responsible for medication non-adherence were assessed. A KAP questionnaire was designed and validated by conducting a pilot study. It contains 18 knowledge, 6 attitude and 10 practice questions. Each correct answer for knowledge and practice was given a score of 1 and wrong answer was given a score of 0. For attitude, each correct answer was given a score of 2.

Knowledge scores were divided into good knowledge (15-18), moderate knowledge (9-14) and poor knowledge (0-8). Attitude scores were divided into positive attitude (8-12) and negative attitude (0-7). Practice scores were divided into good practice (7-10) and poor practice (0-6). Morisky medication adherence questionnaire, a standard questionnaire for assessing medication adherence was used. It consists of 8 questions. Scores were divided into high adherence (<1), moderate adherence (1-2) and poor adherence (>2).

The control group and intervention group were provided with the questionnaires to assess KAP and MA scores at the beginning of the study. During the study, the intervention group was provided with extensive counselling, patient information leaflets and medication chart to document time of medication administration

regularly and to find out the missed dose. Intervention group patients were followed up for a period of 1 month by home calls every week. During home calls, lifestyle modifications, medication adherence and other complications were discussed and patient counselling was provided accordingly. During the study period, the control group was not counselled. After a period of 1 month, control and intervention group were reviewed for assessment of FBS levels, KAP and MA scores. The data obtained from the control and intervention groups were compared. The control group was provided with detailed counselling after completion of the study.

The impact of patient counselling on the improvement of KAP and MA in intervention group was assessed. Also, the association between the level of KAP, MA and sociodemographic factors were assessed.

**Statistical analysis:** The statistical methods used were Mann-whitney U, Wilcoxon signed rank and Chi square tests. Data of all the 60 patients were analysed using SPSS version 15.0 software.

## RESULTS

A total of 60 patients meeting the inclusion criteria were enrolled for the study. Out of which 55 patients completed the study (27 control and 28 intervention patients); of the remaining subjects, 1 patient died during the follow up period and 4 patients withdrew from the study for unknown reasons.

Among the study population, 38 (69.1%) were males and 17 (30.9%) were females. More number of patients were in the age group of 45-64 years [38 (69%)] followed by  $\geq 65$  years [11 (20%)] and 35-44 years [6 (10.9%)]. Majority of the patients [24 (43.63%)] had secondary level (5<sup>th</sup> to 10<sup>th</sup> standard) of education. Majority of the subjects were employed [32 (58.1%)], the rest were unemployed [14 (25.4%)] or retired [9 (16.3%)]. The mean  $\pm$  SD age of the patients was  $56.08 \pm 9.64$  years with mean  $\pm$  SD BMI of the patients was  $26.83 \pm 3.19$  and the mean duration of diabetes of the patients was  $7.17 \pm 7.47$  years.

At the first visit, mean knowledge score of the study population was found to be  $11.42 \pm 4.16$ , which is under the category of 'moderate score', the mean attitude score was  $8.69 \pm 2.30$  which is under the category of 'positive attitude', the mean practice score was  $6.91 \pm 2.43$  i.e. 'good practice' and the mean MA score was found to be  $1.45 \pm 1.79$  i.e., 'moderate adherence'. The mean FBS value of the study population at the first visit was found to be  $158 \pm 53.76$  mg/dl.

**Table 1. Comparison of Fasting Blood Sugar between control and intervention groups.**

Parameter	Control		Intervention	
	Pre (mean ± sd) Mg/dl	Post (mean ± sd) Mg/dl	Pre (mean ± sd) Mg/dl	Post (mean ± SD) mg/dl
<b>Fasting blood sugar</b>	148.70 ± 52.202	138.70 ± 32.955	166.96 ± 54.66	135.39 53.09

Control: *p* value 0.542, Intervention: *p* value 0.008

**Table 2: Comparison of knowledge scores between control and intervention groups.**

Parameter	Control		Intervention	
	Pre (mean ± sd)	Post (mean ± sd)	Pre (mean ± sd)	Post (mean ± sd)
<b>Knowledge</b>	12.07 ± 3.802	13.11 ± 3.215	10.79 ± 4.467	15.54 ± 2.782

Control: *p* value 0.002, Intervention: *p* value 0.000

**Table 3: Comparison of Attitude score between control and intervention groups.**

Parameter	Control		Intervention	
	Pre (mean ±sd)	Post (mean ±sd)	Pre (mean ±sd)	Post (mean ±sd)
<b>Attitude</b>	8.96 ± 2.103	9.15 ± 2.214	8.43 ± 2.501	9.54 ± 1.732

Control: *p* value 0.157, Intervention: *p* value 0.00

**Table 4: Comparison of practice scores between control and intervention group.**

Parameter	Control		Intervention	
	Pre (mean ±sd)	Post (mean ±sd)	Pre (mean ±sd)	Post (mean ±sd)
<b>Practice</b>	7.33 ± 2.337	7.89 ± 1.908	6.50 ± 2.502	8.21 ± 1.449

Control *p* value. 0.008, Intervention: *p* value 0.001

**Table 5: Comparison of medication adherence scores between control and intervention groups.**

Parameter	Control		Intervention	
	Pre (mean ±sd)	Post (mean ±sd)	Pre (mean ±sd)	Post (mean ±sd)
<b>Medication adherence</b>	1.15 ± 1.460	1.00 ± 1.387	1.75 ± 2.048	0.93 ± 1.086

Control: *p* value 0.234, Intervention: *p* value 0.009

## DISCUSSION

Diabetes is a chronic metabolic disorder which can lead to life threatening complications due to lack of KAP and MA. Effective diabetes care mainly encompasses of individualised lifestyle modifications and good self-care skills of the patient.<sup>[16]</sup> In chronic diseases like diabetes, pharmacists play an essential role in helping patients control their disease. A study conducted in Erode district (2011) concluded that counselling provided by pharmacists improved the perception of DM patients about the disease, lifestyle modifications and diet which thereby helps improve glycaemic control.<sup>[12]</sup> The number of male patients enrolled in the study were greater than the number of female patients. Majority of the patients were in the age group of 45-64 years. In the present day scenario, there is an increasing number of new diabetic cases, due to unhealthy dietary habits, sedentary life style and obesity. 60% of the patients enrolled in our study had a diabetic history ranging from 1 month to 5 years. In the current study, it was noted that, as the duration of diabetes increased the level of knowledge also increased. Patients having a diabetic history >20years possessed good knowledge.

In the present study, 40% of patients had hypertension as comorbidity. Education is a strong predictor of knowledge about the preventability of diabetes. As the level of education increased the level of knowledge also

increased. Ideal body weight is crucial for maintaining a good glycaemic control. 54.5% were over-weight and 20% of the patients were obese. This study showed that, there is an association between obesity and development of diabetes. Hence, there is a need for educating patients regarding the caloric value of food, calorie requirements and weight control. Glycaemic control is very much important to prevent complications of diabetes. The improvement in FBS level of intervention group may be due to the pharmacist provided counselling on disease, medications, diet and lifestyle modifications (Table 1). This was similar to a randomised controlled study regarding patient education in diabetes, conducted in Sweden (2007) which concluded that counselling to patients helped to maintain their glycaemic control despite the progressive nature of the disease.<sup>[17]</sup>

Knowledge regarding a disease is an important factor in its effective management. Studies from both developed and developing countries have reported that poor knowledge prevails among diabetic patients which lead to decreased therapeutic outcomes.<sup>[18]</sup> In intervention group, there was a significant improvement in the knowledge scores after follow up compared to control group (Table 2). The current study, suggests that educational intervention has an impact in improving the knowledge scores. Many patients in the present study had poor knowledge regarding the types of diabetes,

whereas they had a better knowledge regarding the symptoms and complications of diabetes, hypoglycaemia and its management. There was a direct relationship between the level of education and good knowledge.<sup>[19]</sup> In the present study, a statistically significant improvement ( $p=0.004$ ) was observed in the attitude score of the intervention group patients compared to the control group (Table 3). Further analysis showed that, there is significant statistical association between attitude and the level of education ( $p=0.001$ ) and also with the patient's employment status ( $p=0.049$ ). Most of our study subjects believed that keeping blood sugar level close to normal can prevent diabetic complications. Most of the patients agreed that people with diabetes should learn a lot about their disease so that their attitude and practice can be changed. There was a significant association between the attitude and practice of the study subjects. Even though a patient has good knowledge and positive attitude, outcome would not be as good as expected if they have a poor practice. In our study, maximum number of the subjects had a good practice. A significant improvement between the practice scores of intervention and control group was found ( $p=0.028$ ) (Table 4). In the present study, there was a significant association between the duration of diabetes and practice, this might be due to chronic state of the disease by which the patients are more aware of the disease and its outcomes and hence will develop good practice. Most of the patients, exercised regularly and consulted the physician as per schedule but, did not monitor the body weight regularly. MA reflects the medication taking behaviour of the patient and is very much important for the treatment to be effective. Most of the patients in both control and intervention group had high medication adherence. There was a significant improvement in the mean medication adherence score in the test group after follow up ( $p=0.009$ ) (Table 5). This may be due to the educational intervention provided by the pharmacist which emphasised more on the importance of MA. The present study did not show any significant association of MA with sociodemographic factors despite the differences in sociodemographics. This indicates that, there is same perspective regarding MA in all patients, irrespective of their demographic variations. There was a significant improvement in the MA scores of intervention group compared to control group after follow up ( $p=0.013$ ).

## CONCLUSION

The results of the current study suggests that patient counselling provided by pharmacists may help improve patient's knowledge about the disease and its management, thereby influences the patient's attitude and practice towards the disease and ultimately translates into better glycemic control and prevention of further complications of the disease.

## ACKNOWLEDGEMENT

We wish to thank Dr. V. Madhavan, Principal, Faculty of Pharmacy, M.S. Ramaiah University of Applied Sciences for encouraging us to successfully carryout this work.

## REFERENCES

1. Tripilitt CS, Reasner CA, Isley WL. Diabetes Mellitus. In: DiPiro JT, Talbert RL, Yees GC, Matzke GR, Wells BG, Posey LM, editors. *Pharmacotherapy: A Pathophysiologic Approach*. 6<sup>th</sup>ed. New York, NY: McGraw-Hill; 2005; 1333-1368.
2. American Diabetic Association. *Diagnosis and Classification of Diabetes Mellitus*. *Diab Care* 2004; 27: 5-10.
3. Pray WS, Pray JJ. Counseling patients about complications of diabetes. *US pharm* 2003; 28(11): 24-29.
4. Ramachandran A, Das AK, Joshi SR, Yajnik CS, Shah S, Kumar KMP. Current status of diabetes in India and need for novel therapeutic agents. *JAPI* 2010; 58: 7-9.
5. Whiting DR, Guariguata L, Weil C, Shaw J. *IDF Diabetes Atlas: Global estimates of the prevalence of diabetes for 2011 and 2030*. *Diabetes Res ClinPr* 2011; 94(3): 311-21.
6. Shah AP, Parmar SA, Ramkishan A, Mehta AA. Knowledge, attitude and practice (KAP) survey regarding the safe use of medicines in rural area of Gujarat. *Adv Trop Med Pub Health Int* 2011; 1(2): 66-70.
7. Survey methodologies. Available from: [http://www.uniteforsight.org/global-health-university/survey-methodologies#\\_ref19](http://www.uniteforsight.org/global-health-university/survey-methodologies#_ref19): Accessed on 24 Mar 2014.
8. Ho PM, Bryson CL and Rumsfeld JL. Medication Adherence: Its importance in cardiovascular outcomes. *American Heart Association* 2009; 119: 3028-3035.
9. Mahesh PA, Parthasarathi G. Medication adherence. In: Parthasarathi G, Nyfort – Hansen K, Nahata MC, editors. *A textbook of clinical pharmacy practice: essential concepts and skills*. 1<sup>st</sup> ed. Chennai: Orient Longman pvt ltd; 2004; 54-71.
10. McDonald HP, Garg AX, Haynes RB. Interventions to enhance patient adherence to medication prescriptions: scientific review. *JAMA* 2002; 288(22): 2868-3242.
11. Wabe NT, Angamo MT, Hussein S. Medication adherence in diabetes mellitus and self-management practices among type-2 diabetics in Ethiopia. *N Am J Med Sci* 2011; 3(9): 418-423.
12. Malathy R, Narmadha MP, Ramesh S, Alvin JM, Dinesh BN. Effect of a diabetes counseling programme on KAP among diabetic patients in Erode district of South India. *J young Pharm* 2011; 3(1): 65-72.
13. Elizabeth AH, Stephen MT. Diabetes Mellitus. In: Roger Walker, Cate Whittlesea, editors. *Clinical*

- Pharmacy and Therapeutics. 4<sup>th</sup> ed. Edinburg: Churchill Livingstone Elsevier; 2007; 629-650.
14. Ramesh A. Patient counseling. In: Parthasarathi G, Nyfort – Hansen K, Nahata MC, editors. A textbook of clinical pharmacy practice: essential concepts and skills. 1<sup>st</sup> ed. Chennai: Orient Longman pvt ltd; 2004; 43-53.
  15. Upadhyay DK, Izham MIM, Alurkar VM, Pranaya M. Evaluation of the impact of a pharmaceutical care program for diabetes patients in Nepal: A preliminary study. *IJOPP* 2011; 4(4): 49-61.
  16. Pal R, Pal S, Barua A, Ghosh MK. Health education intervention on diabetes in Sikkim. *IJEM* 2010; 14(1): 3-7.
  17. Adolfsson ET, Walker-Engstro ML, SmideB, WikbladK. Patient education in type 2 diabetes-A randomized controlled 1-year follow-up study. *Diab Research andClinPract* 2007; 76(3): 341–350.
  18. Al-Maskari F, El-Sadig M, Al-Kaabi JM, Afandi B, Nagelkerke N, Yeatts KB. Knowledge, Attitude and Practices of diabetic patients in the United Arab Emirates. *PLoSOne* 2013; 8(1): e52857.
  19. Maina WK, Ndegwa ZM, Njenga EW, Muchemi EW. Knowledge, attitude and practice related to diabetes among community members in 4 provinces in Kenya: a cross-sectional study. *PAMJ* 2010; 7(2): 1-10.