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### ASSESSMENT OF THE INFLUENCE OF PATIENT COUNSELING ON KNOWLEDGE, ATTITUDE AND PRACTICE IN TYPE II DIABETES MELLITUS PATIENTS IN KOLAR DISTRICT OF SOUTH INDIA

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**Abstract:** **Aim:** To assess the impact of patient counseling on Type II Diabetes Mellitus patients by using knowledge, attitude and practice (KAP) and compliance questionnaires. **Materials and Methods:** The patients enrolled were randomized into two group—control and test group. The patient's knowledge, attitude and practice were assessed by using knowledge, attitude and practice (KAP) questionnaire at first and last visit. The capillary blood glucose levels of the patients were measured by using glucometer. The patient's compliance was also assessed by using the compliance questionnaire. The patients in the test group received patients counseling on their disease, drugs, diet and life style modification. The patient in the controlled group did not receive any pharmacist provided patient counseling till the end of the study period. **Results:** Our study showed that there is a significant reduction in the capillary blood glucose levels of the patients in the test group, whereas no significant changes were observed in the control group patients. **Conclusions:** The study revealed that patient counseling increased patient knowledge about their disease, helped to adhere to the instructions provided regarding diet and life style modification, and also enhance the patient compliance in terms of better glycemic control in Type II Diabetes Mellitus patients.

**Keywords:** Type II Diabetes Mellitus, Patient Counseling, Capillary blood glucose and Life style modifications.



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## INTRODUCTION

Diabetes Mellitus is defined by the American Diabetes Association (ADA) Expert committee in their 1977 recommendations as a “group of metabolic disease characterized by Hyperglycemia resulting from defects in insulin secretion, insulin action or both. The chronic Hyperglycemia is associated with long-term damage, dysfunction and failure of various organs, especially the eyes, kidneys, nerves, heart and blood vessels <sup>[1]</sup>.

Diabetes Mellitus is a severe medical and social problem that affects patient’s general health and well being <sup>[2]</sup>. It is an emerging epidemic health problem, which increase rate of mortality and morbidity <sup>[3]</sup>. In spite of the advances in understanding of the disease and its management, the mortality and morbidity rate are increasing day by day. Poverty, non- compliance, lack of knowledge and poor follow-ups are the major factors in poor glycemic control <sup>[4]</sup>. Many studies have proven that Diabetes Mellitus patients have poor knowledge about their disease, its long-term complication and its management. Thus diabetic patients require adequate education regarding their disease, diet and life style modifications to prevent its long term complications [5, 6, 7 and 8].

The role of pharmacists as diabetic educators is appreciated worldwide in reducing the complications and health related expenditures and improving quality of life outcomes <sup>[9]</sup>. There are virtually no epidemiological studies from Kolar District of South India assessing the level of awareness of Diabetic Mellitus in a whole population. These facts kindled out interest towards researching the disease awareness and the vibrant role of counseling which may be an effective means of managing the disease. So, our present study is designed to assess the influence of pharmacist provides patient counseling in Diabetic Mellitus patients by improving their KAP and Medication adherence.

## STUDY DESIGN

### Inclusion criteria

- Age above 30 years old
- Patients who are Type II diabetes mellitus newly diagnosed.
- Patents on treatment with oral hypoglycemic agent (OHA).
- Fasting plasma glucose lower than 300 mg/dl.
- Creatinine lower than 1.9 mg/dl.
- Patients without any associated complications.
- Patients who are ready to sign in the consent form.

### Exclusion criteria

- Pediatric patients, pregnant women, thyroid diseases, malignancy, hypertension, or taking antihypertensive medications.
- Type I Diabetes Mellitus patients.
- Patients on treatment for cerebrovascular and/or coronary heart diseases.
- Patients with severe uncontrolled diabetes and its complications.
- Patients with mental incompetence.

### STUDY PROCEDURE

Patients who were satisfying the inclusion criteria were enrolled into the study after obtaining their letter of consent. Demographic details, past and present medical and medication history were obtained in suitably designed patient profile form.

### OBTAINING PATIENT CONSENT

In order to conduct the demographic study, the patient was individually identified with the name from the patient record confirmed for his/her identity, given a brief personal introduction about the project researcher and explained the purpose of our project. Upon further interaction with the patients, after clarifying all the queries regarding mode, approach & utility of the project, a written & oral consent was obtained from each patient for his/her active participation.

### MATERIALS

1. Patient information leaflet on disease
2. Health-care Screening instrument

Glucometer- One touch BASIC *Plus* (Company – LIFESCAN, *Johnson and Johnson* –USA)

3. Questionnaires

- Knowledge, Attitude and Practice (KAP) questionnaires.
- Compliance Questionnaires

### METHODS

The patients enrolled were randomized into two groups – control and test group. The patient's knowledge, attitude and practice were assessed by using knowledge, attitude and practice (KAP) questionnaires at first and last visit. The capillary blood glucose levels of the patients were measured by using glucometer. The patient's compliance was also assessed by using the compliance questionnaires. The patients in the test group received counseling on their disease,

drugs, diet and life style modification, and also patient information leaflet, highlighting the disease, diet and life style modifications. The patient in the controlled group did not receive pharmacist provided patient counseling or patient information leaflets till the end of the study period.

Patients in each group were given two follow up dates with a spacing of two months. The patients were provided with an identity card which consist the information's such as name of the patients, enrolling number and follow up dates with corresponding capillary blood glucose levels. In addition to this, patients were reminded about their follow up – dates through telephone or by post.

### STATISTICAL ANALYSIS

Students't' test was used to analyses the significance in two groups. Values of 'P' less than or equal to 0.05 were considered statistically significant.

### RESULTS

The study of the impact of patient counseling were carried out in **Adharsh Hosiptal, KGF, Karnataka** After the scrutiny, using inclusion and exclusion criteria seventy patients were included in to the study. They were randomized in to two groups –test group (35) and control group (35).

#### Demographic profile of diabetic population

Among the total patients 48 (68.57%) were males and 22 (31.43%) were females. The demographic details of the patients are shown in the Tale 1 and 2.

**Table 1: Randomization of study population**

Group	Number of Male Patients (%)	Number of Female Patients (%)
Test	26 (74.28)	9 (25.72)
Control	22 (62.85)	13 (37.15)

**Table 2: Demographic of study population**

Age group (Years)	Male (%)	Female (%)
31 – 40	9 (18.7)	5 (22.75)
41 – 50	17 (35.4)	5 (22.75)
51 – 60	11 (23.0)	9 (40.9)
61 – 70	7 (14.6)	3 (13.6)

> 71	4 (8.3)	-
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### Diabetes disease history in study population

As shown in the Table 3, 50% of patients enrolled in to the study were diagnosed to have diabetes history of 1 month to 1 Year. 30% of patients were diagnosed to have diabetes for the past 2 to 5 years, and remaining 20% patients were with above 5 years of diabetes disease history.

**Table 3: Disease history of study population**

Duration of diabetes	History of 1 – 6 months	History of 7 – 12 months	History of 2 – 5 Years	History of >5 Years
Number	19	16	21	14
(Percentage)	(27.15)	(22.18)	(30)	(20)

### Treatment aspects and habits of study population

The different systems and agents used in the management of diabetes in the study populations are shown in the Table 4. The habits of the patients (smoking and drinking alcoholic beverages) are shown in the Table 5.

**Table 4: Treatment aspects in study population**

Group	Test Number (%)	Control Number (%)
<b>Treatment Aspects</b>		
Not on any drugs	5 (14.30)	6 (17.14)
Sulfonyl Urea alone	2 (34.3)	16 (45.71)
Metformin	0 (0)	3 (8.5)
Combination of Sulfonyl Urea and Metformin	12 (34.3)	12 (34.3)
Iusulin with sulfonyl ureas / Metformin	3 (8.5)	1 (2.8)
Thiazolidinedione	3 (8.5)	2 (5.7)
Acarbose	0 (0)	1 (2.8)
Herbal Drugs	4 (11.4)	1 (2.8)

Hemoeopathic Drugs	1 (2.8)	0 (0)
Anti Hypertensive drugs	3 (8.5)	7 (20)

**Table 5: Habits of study population**

Habits	Smoking	Drinking Alcohol
Group		
Test Number (%)	4 (14.3)	2 (5.7)
Control Number (%)	10 (28.6)	5 (14.3)

**Knowledge, Attitude and Practice of patients**

A specially developed Diabetes Mellitus KAP questionnaire was used for this study, which consist of 11 questions. These questionnaires give a brief idea about the knowledge, attitude and practice of the patient with respect to his/her disease, which enables the pharmacist to provide a better counseling with respect to the patient’s perception.

The Knowledge, Attitude and Practice of the patients with respect to their disease were assessed using KAP questionnaires while enrolling the patients. The effect of pharmacist provided patient counseling on their Knowledge, Attitude and Practice was also assessed at the final follow-up of the patient. The percentage of correctly answered patients was found to be more in the case of test group at the final follow-up. For relevant questions with the percentage of patients – correctly answered is given in the Table 6 (Test Group) and Table 8 (Control Group) separately.

**Table 6: Comparison of pre and post data from KAP Questionnaire (Test group patients)**

Sl. No.	Questions	Percentage of Correctly answered Patients Before counseling	Percentage of correctly answered Patients After Counseling.
1.	What is Diabetes Mellitus?	60	87
2.	What is the main cause of Diabetes?	20	87

3.	What is the correct method to measure sugar level?	31	74
4.	Did you know, if diabetes not treated it lead to kidney problems?	37	80
5.	Did you know, if diabetes not treated it lead to eye problems?	60	87
6.	How often a Diabetic patient should check their eyes?	3	71
7.	Will uncontrolled high Blood Pressure affect the functioning of kidneys?	11.5	71
8.	How often a Diabetic patient should check their Blood Pressure?	11	55
9.	It weight reduction is useful in the controlling of Diabetes?	28.5	68
10.	Are you aware of a condition in which the blood sugar level falls below the normal (Hypoglycemia)?	51	84
11.	Do you know how to prevent/manage the hypoglycemic condition?	40	84

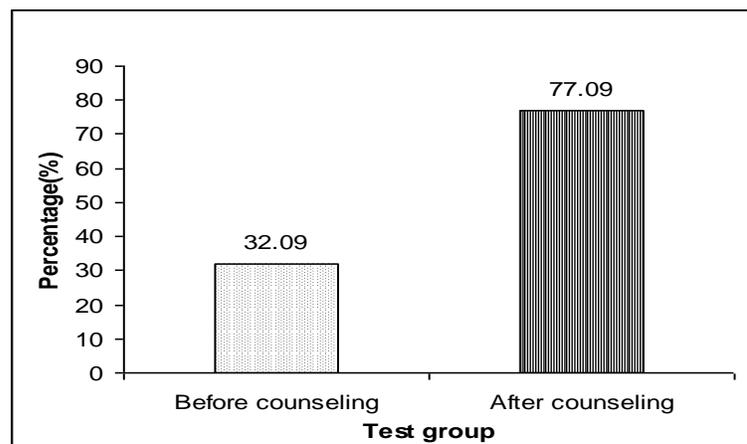


Figure 1: Percentage of correctly answered before and after counseling of Test group

**Table 7: Test group data of before and after counseling**

Test Group	Mean ± SD (SEM)	'P' Value	't' value
Before Counseling	32.090 ± 19.691 (5.937)	<0.0001	6.722
After Counseling	77.090 ± 10.261 (3.094)		

Improvement on perception in the test group of the study population who received patient counseling and patient information leaflets was found to be statistically significant (P<0.0001).

**Table 8: Comparison of pre and post data from KAP Questionnaire (Control group patients)**

Sl. No.	Questions	Percentage of Correctly answered Patients at Initial Visit	Percentage of correctly answered Patients at Final Visit
1.	What is Diabetes Mellitus?	28.6	22.6
2.	What is the main cause of Diabetes?	26	24
3.	What is the correct method to measure sugar level?	34.2	38
4.	Did you know, if diabetes not treated it lead to kidney problems?	40	40
5.	Did you know, if diabetes not treated it lead to eye problems?	68.5	60.2
6.	How often a Diabetic patient should check their eyes?	3	3
7.	Will uncontrolled high Blood Pressure affect the functioning of kidneys?	11.4	14.3
8.	How often a Diabetic patient should check their Blood Pressure?	3	3
9.	It weight reduction is useful in the controlling of Diabetes?	14.3	14.3
10.	Are you aware of a condition in which the blood sugar level falls	34	31

below the normal (Hypoglycemia)?

11. Do you know how to prevent/manage the hypoglycemic condition? 37.1 31.4

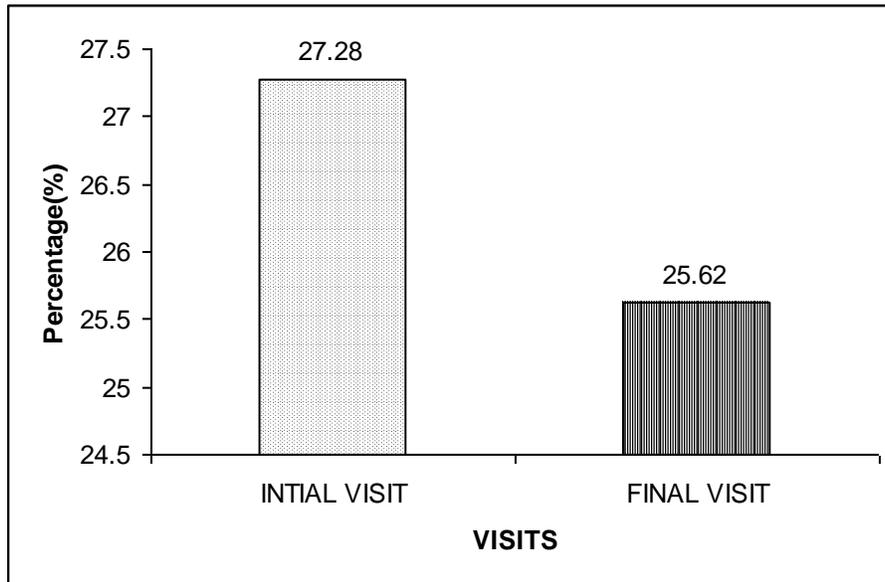


Figure 2: Percentage of correctly answered before and after counseling of control group

Table 9: Control group data of before and after counseling

Control Group	Mean ± SD (SEM)	'P' Value	't' value
Initial Visit	27.28 ± 19.11(5.763)		0.2154
Final Visit	25.62 ± 17.06(5.143)	0.8317	

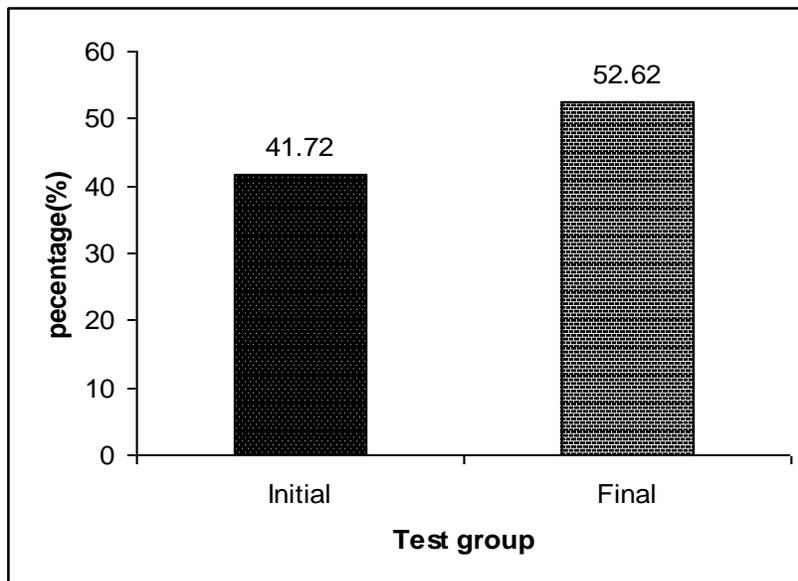
There was no change in KAP score in the control group indicating the real need of pharmacist counseling for patients.

### Compliance of the patients

The compliance of the patients towards their medication was also assessed by using a well designed questionnaire. And the impact of pharmacist provided patient counseling on compliance was assessed both in the test and control group separately. A few relevant questions and the percentage of correct answers are given in Table 10.

**Table 10: Comparison of pre and post data from compliance questionnaire**

Sl. No.	Questions	Test Group		Control Group	
		Initial %	Final %	Initial %	Final %
1.	Are you taking medications regularly?	80	93.3	82.8	86.6
2.	Are you taking medications at prescribed timing?	62.8	83	65.7	60
3.	Do you alter the Doses of medication abased on your symptoms without asking your doctor	5.8	0	25.8	22.2
4.	Do you Feel any difficulty taking your medications?	8	3.8	10	8
5.	What you do if you miss a dose?	52	83	40	40



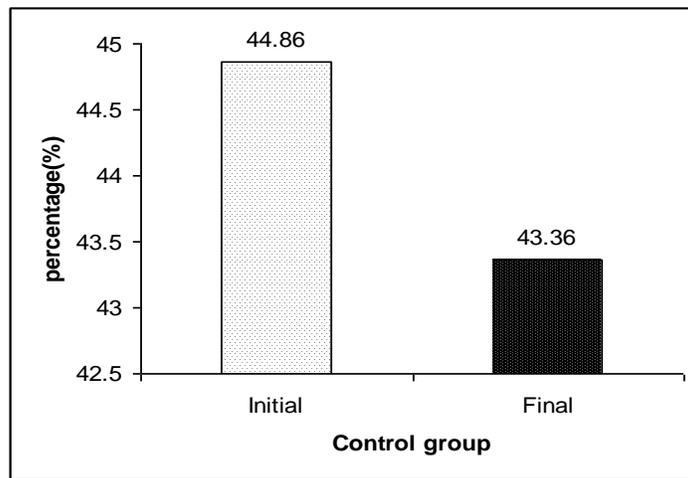
**Figure 3: Pre and post data from compliance questionnaire in the test group**

**Table 11: Test group data of compliance questionnaire**

Test Group	Mean ± SD (SEM)	'P' Value	't' value
Initial Visit	41.72 ± 33.32(14.90)		0.4260
Final Visit	56.62 ± 46.51(20.80)	0.6814	

Our study demonstrated that, compliance of the patients in the test group was greatly enhanced due to patient counseling from  $41.72 \pm 33.32$  to  $56.62 \pm 46.51$ .

**Figure 4: Pre and post data from compliance questionnaire in the control group**



**Table 12: Control group data of compliance questionnaire**

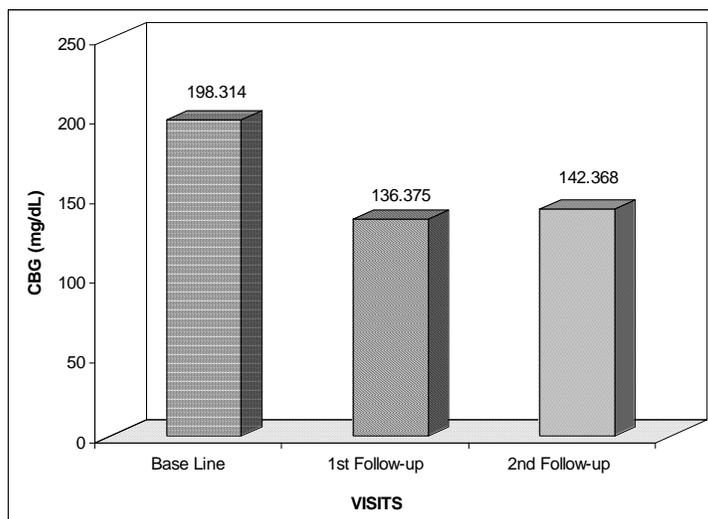
Control Group	Mean ± SD (SEM)	'P' Value	't' value
Initial Visit	44.86 ± 29.47(13.18)	0.9395	0.0783
Final Visit	43.36 ± 31.04(13.88)		

Our study demonstrated that, there are no significant changes in the control group indicating the real need of pharmacist counseling for patients.

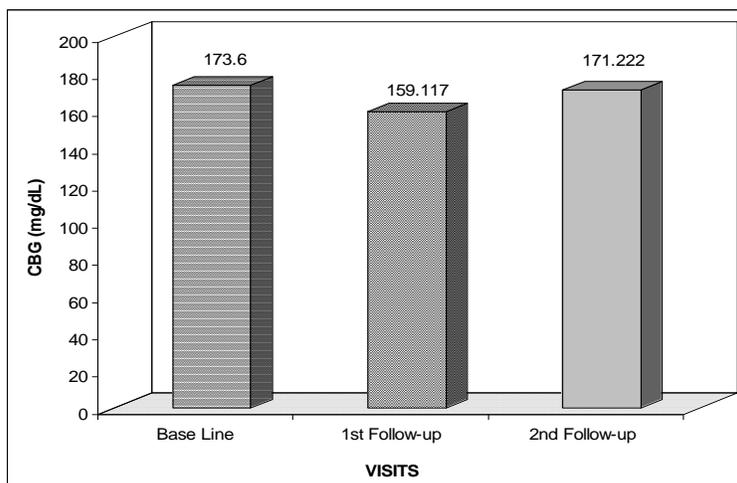
**Capillary blood glucose levels**

As an objective measure of patient compliance and practices the capillary blood sugar levels of each patient were measured during each visit of patients with sixty days interval. Because, if the patient is compliant to his/her medication and if they practice a well planned diet and

exercise, there are very good chances to decrease their blood sugar levels from the first reading. It also depends on the foods that they had, and time of food taken.



**Figure 5: Comparison of capillary blood glucose levels between each visit in test group patients**



**Figure 6: Comparison of capillary blood glucose levels between each visit in control group patients.**

Our study showed that there is a significant reduction in the capillary blood glucose levels of the patients was observed in that test group ( $P < 0.1$ ) in the first follow up and ( $P < 0.001$ ) in the final visit. No significant changes were observed in the control group patients.

## DISCUSSION

### Impact of patient counseling

Diabetes mellitus has been referred as an emerging epidemic health problem. Poorly controlled diabetes mellitus affects the end organs such as kidneys, heart and eyes. These complications have a tremendous impact on quality of life and health care costs of the individual and at large that of the society. The compliance and knowledge of the patients regarding their disease and medication can be improved by patient counseling.

### Analysis of knowledge, attitude and practices

Knowledge, Attitude and Practice (KAP) questionnaire was developed to assess the perception of the patients about their disease (Symptoms, cause, prognosis and complication) and to assess the changes in the perception after the pharmacist provided patient counseling. A significant improvement has been observed on perception in the test group of the study population, who received patients counseling and patient information leaflets, whereas no improvement was observed in the control group.

Most of the patients (31%) knew that blood glucose testing is a clear cut method to assess their improvement. But due to financial constraints, many patients go for urine testing because it is cheap and self testing is possible. Patient counseling also motivated the patients to quit smoking and to practice healthy life style.

Even though 71% of patient knew regular exercise will help in better glycemic control only 17% of patients were practicing a regular exercise. Similarly 60% of patient knew the balanced diet is one of the major components to control their diabetes, only 14% were actually practicing it. After patients counseling, there was a significant change in test group. Study results showed that 51% of the study populations were aware of hypoglycemic episode, but only 40% among them knew the symptoms of hypoglycemia, and only 20% of such patients carried sugar or candy with them while traveling in order to face the hypoglycemic complications.

### Compliance analysis

Compliance of the patients in the test group greatly enhanced due to patient counseling. This reflected in the capillary blood glucose values of the test group patients.

### Capillary blood glucose level

A significant reduction in the capillary blood glucose levels of the patients was observed in the test group [(P<0.1) in the first follow -up and (P<0.001)] in the final visit, whereas no significant changes were observed in the control group patients.

## CONCLUSION

The study revealed that patient counseling increased patient knowledge about their disease, and helped to adhere to the instructions provided regarding diet and life style modification. It also enhanced the patient compliance in terms of better glycemic control in type II diabetes mellitus patients. The study observed that, hospital pharmacists can play a key role in management of Diabetes Mellitus and patient care. We conclusively state that pharmacist provided patient counseling may be a useful tool for decision making in planning and monitoring disease interventions to improve health outcomes and evaluation costs in diabetic patients.

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