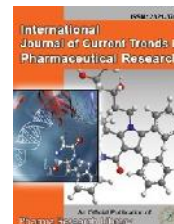




# International Journal of Current Trends in Pharmaceutical Research

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Research Article

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## Impact of Clinical Pharmacy Based Patient Education on type 2 Diabetes Mellitus

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### ABSTRACT

Diabetes mellitus (DM) is a severe medical and social problem that affects patient's general well being. Despite of the advances in understanding the disease and its management, the morbidity and mortality rate are in rise. Poverty, non-compliance, lack of knowledge and poor follow ups are the factors observed in poor glycaemic control Health related quality of life includes an individual's physical health, psychological health, social and role functions and state of general well being. Good glycaemic control can reduce the complication and thereby improve the quality of life. Health related quality of life includes an individual's physical health, psychological health, social and role functions and state of general well being. Good glycaemic control can reduce the complication and thereby improve the quality of life. The Knowledge, assessment, practice (KAP) questionnaire is used to assess the patient's knowledge regarding the disease. The improvement in the KAP is achieved at the end of the study by giving counseling to patients by the pharmacists. Scientific studies have suggested that, the counseling has shown positive impact on health and decrease the mortality and morbidity. The present nine month study also demonstrated the positive influence of patient counseling on knowledge, attitude and practices, various domains of quality of life and clinical and physiological parameters of diabetes mellitus. The study concluded that chronic diseases like diabetes affect the quality of life of patients and the education has a major role in improving the health care outcomes like glycaemic control and quality of life. The study also concluded that the Telugu version of F & P QLI instrument is reliable and valid to assess the quality of life in diabetes, which is similar to that of the original version in construct.

**Keywords:** Diabetes mellitus, Good glycaemic control, clinical and physiological parameters

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**Article History:** Received 09 February 2017, Accepted 25 March 2017, Available Online 15 May 2017

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Manuscript ID: IJCTPR3377



PAPER-QR CODE

**Citation:** B. Sampath Naik, et al. Impact of Clinical Pharmacy Based Patient Education on type 2 Diabetes Mellitus. *Int. J. Currnt. Tren. Pharm. Res.*, 2017, 5(3): 113-120.

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## 1. Introduction

Diabetes mellitus (DM) is a severe medical and social problem that affects patient's general well being<sup>9</sup>. Despite of the advances in understanding the disease and its management, the morbidity and mortality rate are in rise<sup>10</sup>. Poverty, non-compliance, lack of knowledge and poor follow ups are the factors observed in poor glycemic control<sup>11</sup>. Individuals with poor management of diabetes are at a greater risk of developing long term micro and macro vascular complications that lead to the damage of end organs such as kidney, heart, brain and eyes, affects the direct and indirect health care costs and overall quality of life<sup>12</sup>.

Because of the rapid expansion of available therapeutic agents to treat diabetes, the pharmacist's role in caring for diabetic patients has expanded. The pharmacist can educate the patients about the proper use of medication, screening for drug interactions, explain monitoring devices, and make recommendations for ancillary products and services.

The pharmacist, although not the health care professional to diagnose diabetes, is important in helping the patient maintain control of their disease. The pharmacist can monitor the patient's blood glucose levels and keep a track of it. During their contact, the patients can ask the pharmacist any questions they did not ask the physicians and can get further information regarding diabetes. The pharmacist can also counsel the patients regarding insulin administration regularly so that the onset of complications can be postponed by having tight glycemic control. Another important role of pharmacist is always being available to answer the questions of the patients. Overall, it is the pharmacist's role to help a diabetic patient in the best possible way to cope with their disease<sup>13</sup>.

In order to get effective cope up with the disease proper knowledge should be there regarding the disease. The Knowledge, assessment, practice (KAP) questionnaire is used to assess the patient's knowledge regarding the disease. The improvement in the KAP is achieved at the end of the study by giving counseling to patients by the pharmacists. In this the patients are educated by giving them the basic knowledge regarding the disease, symptoms, risk factors, medications, insulin therapy, self assessment of glycemic control and also the management of disease. The complications of diabetes can be reduced by proper control of blood glucose<sup>14</sup>. Optimal glucose control can be achieved through strict adherence to medications, diet and life style modifications that in turn minimizes long-term complications<sup>15,16</sup>.

The Diabetes Control and Complication Trial (DCCT)<sup>17</sup> demonstrated that good glycemic control can delay the onset and slow progression of diabetic complications and thereby help in avoiding health related expenditures<sup>18</sup>. Self-management is a crucial component in optimal diabetic care. Diabetic care includes knowledge in symptom recognition, diet and lifestyle modifications like routine exercise, adherence to medications, which includes dosage

adjustment and timing and detection and management of signs & symptoms of hyperglycemia and hypoglycemia<sup>19,20</sup>. Collaborative approach between pharmacist and patient may improve patient medication adherence behavior and therapeutic outcomes and quality of life outcomes. The primary goal of diabetes management is to reduce the risk of microvascular and macro vascular, disease complication to ameliorate symptoms, to reduce mortality and improve quality of life<sup>21</sup>. Hence the patient's quality of life plays a very major role in control and management of disease. Quality of life is a multidimensional concept referring to a person's total well being, including his or her psychological, social, and physical health status<sup>22</sup>. Role of pharmacist as diabetic educator is appreciated worldwide in reducing the complications and health related expenditures and improving quality of life outcomes<sup>23</sup>. Health related quality of life includes an individual's physical health, psychological health, social and role functions and state of general well being. Good glycemic control can reduce the complication and thereby improve the quality of life<sup>24</sup>.

## 2. Materials and Methods

### Study Site:

This study was conducted at Government hospital, Ananthapuramu.

### Study Design:

The prospective intervention study was carried out to determine the quality of life based on fasting blood glucose levels, blood pressure and management of complications in diabetes affected patients

### Study Period:

The study was conducted from June 2010 to February 2011

### Study Criteria:

#### Inclusion Criteria-

- Patients of either sex aged above 45 years
- Presence of signs and symptoms which are suspected to have diabetes
- Patients who give consent to participate in this study

#### Exclusion Criteria-

- Patients who are taking other system of medications  
(Ayurveda, homeopathic medications)
- Patients who are not willing to or unable to give consent to participate in study
- Patients who are pregnant

### Study Procedure:

#### Research Subjects-

Subjects with type 2 diabetes mellitus have been diagnosed, established through chart review and consultation with treating physicians was recruited. All study subjects gave written and oral informed consents.

#### Patient Enrollment:

Those patients who met the inclusion criteria were enrolled into the study after their informed consent was obtained. These patients were randomized into three groups or as follows

- a. Patient of type 2 DM and on double medication

b. Patient of type 2 DM and on triple medication

c. Patient of type 2 and on insulin

At baseline patients were interviewed to obtain their medical and medication history and their details were noted in a data collection form. All baseline parameters were also recorded.

### Study Procedure

All patients were counseled regarding disease, medication, nutrition, exercise, insulin, foot care, eye care, personal hygiene, self monitoring of glucose and self care. The patients were counseled in the presence of concerned physician hospital. At the time of counseling they were also provided with information leaflet covering all essential points and given diabetic identity cards. The patients were asked to come back for follow up every 3 months for a period of 9 months. During each follow up the pharmacists educated patients regarding their disease, medication and life style modification. To assess the KAP of the patients towards the disease management, a suitably designed, content and translation validated Telugu version of KAP questionnaire will be administered on all enrolled patients at baseline and at final follow up.

### 3. Results and Discussions

Scientific studies have suggested that, the counseling has shown positive impact on health and decrease the mortality and morbidity. The present nine month study also demonstrated the positive influence of patient counseling on knowledge, attitude and practices, various domains of quality of life and clinical and physiological parameters of diabetes mellitus.

The demographic details of patients enrolled into the study shows that the majority are females and are housewives and are dependent on their family members or relatives for refilling the prescriptions and information. Almost all the enrolled patients were literates and majority were having primary school education and in the age group of 45 to 60 years with average disease duration of 12-23 months. Majority of diabetic patients were in the normal range of body mass index (BMI).

Therapeutic management of patients enrolled in the study reveal that the patients were either on monotherapy (either Sulfonyl ureas or Metformin) on dual therapy (combination of Sulfonyl ureas or Metformin). Patients who were only on diet and lifestyle modification for managing their diabetes showed greater improvement in blood glucose control and improved quality of life with education. Micro as well as macro vascular complications are commonly produced in patients with poor control of diabetes due to lack of medication adherence, lack of awareness, and inadequate self-management skills. This ultimately affects the quality of life and showed an influence on family life, professional life and economy of the society on long run.

### Knowledge Attitude and Practice

The KAP questionnaire that consisted of questions regarding diabetes, its causes, symptoms and complications and lifestyle changes has given a lot of information on how the patients live with the disease and how well interventions

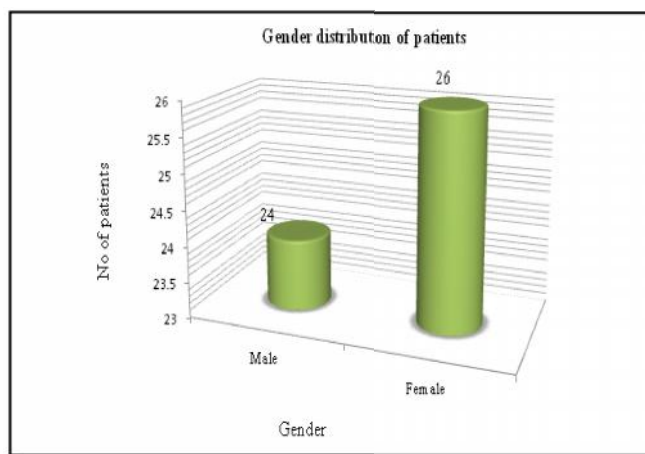
can be done to achieve better therapeutic outcome. The patient-pharmacist interaction can also be improved based on this evaluation. In this study, there was improvement in knowledge of the patients regarding basic concepts of the disease like accurate method for monitoring glucose control and the necessity of checking blood sugar at least once in a month, effect on different organs by untreated diabetes, importance of foot care in diabetes patients, management of hypoglycemic episodes etc after providing patient education.

### Fasting Blood Glucose Level

The fasting blood glucose of the patients is non significant (P value > 0.05) at the baseline. At the end of the visits the test group showed significant (p>0.05) reduction in FBS from baseline to the final follow up. This significant change is due to the influence of patient education and counseling aids that helped the patients to understand more about the long term complications of poorly managed diabetes that in turn improved their compliance, diet maintenance and life style modifications.

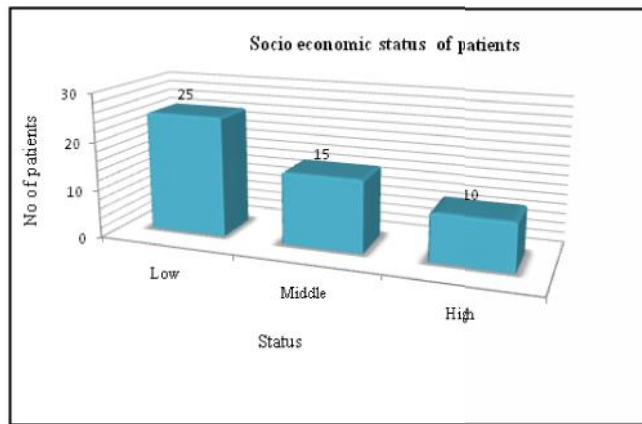
### Quality of Life

F & P diabetic specific questionnaire was used to assess the QOL of the enrolled diabetic patients. All domains of the QOL instrument were affected in diabetes patients included in the study groups. Significant improvement (p<0.05) in the overall QOL and subscales like health and functional, social and economic, physiological or spiritual and family was observed in the test group compared to the baseline. The overall QOL of both test and control groups were similar (p value>0.05) at the baseline. However a non significant improvement in the overall QOL was observed in the first follow up and a significant improvement in the overall QOL was observed in the second and final follow up. In the 2<sup>nd</sup> and 3<sup>rd</sup> follow up there was significant improvement in the QOL (p value <0.05) when compared with the baseline. This was due to the fact that patient education influenced in proper glycemetic control, which has reduced the diabetic symptoms that improved the patient's enjoyment in day-to-day activities.

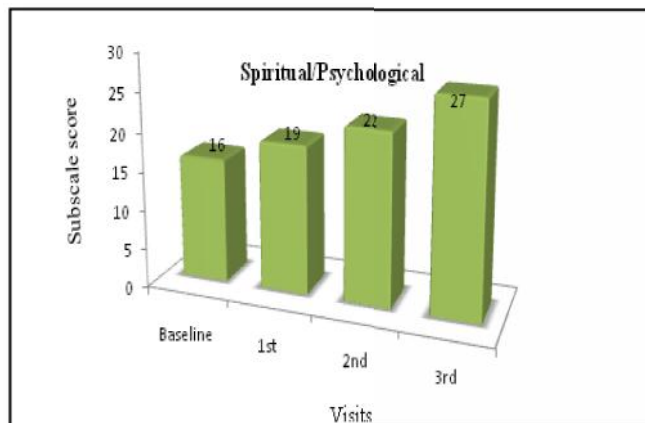


**Figure 1:** shows that the distribution of Diabetic cases according to the sex. Out of 50 cases 24 cases were male (48%) and 26 cases were female (52%). In all age groups the incidence of Diabetic was more in Females compared to males. Ratio of male to female was (1.5:1).

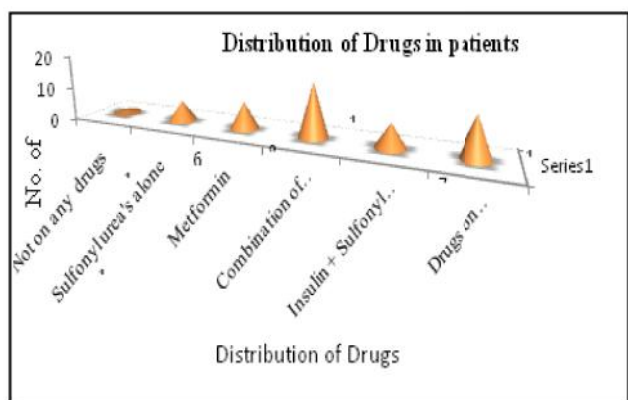
Sulfonyl urea's/Metformin and 12 cases are on drugs on HTN.



**Figure 2:** Graph shows the socio economic status of the patients enrolled in the study. Out of 50 cases 25 cases were lower socio economic, 15 cases were middle socio economic and 10 cases were high socio economic.



**Figure 4:** The above graph shows that the spiritual and psychological status of the type2 diabetes patients. Initially at the base line visits the spiritual and psychological status of the patients was found to be 16, at first visit 19, at second visit 22 and third visit 27 average.



**Figure 3:** not any drugs, 6 cases are on Sulfonyl urea's alone and three cases are on Metformin and 8 cases are on Metformin and 16 cases are on combination of Sulfonyl urea's and Metformin and 7 cases are on insulin and

#### 4. Conclusion

The study concluded that chronic diseases like diabetes affect the quality of life of patients and the education has a major role in improving the health care outcomes like glycemic control and quality of life. It also improved the medication adherence behavior. Maintenance of diet and exercise improved the patient's enjoyment in day-to-day life activities and that has reduced the morbidity and mortality rates. The study also concluded that the Telugu version of F&P QLI instrument is reliable and valid to assess the quality of life in diabetes, which is similar to that of the original version in construct.

**Table 1:** Demographic details of the study patients

Patient characteristics	Total
	(n=50)
Gender	
Male	24(48%)
Female	26(52%)
Age (mean+SD)	
Body Mass Index(kg/m <sup>2</sup> )	
Under weight	5(10%)
Acceptable weight	15(30%)
Over weight	26(52%)
Obese	4(8%)
Educational status	

No formal education	13(26%)
Primary school	17(34%)
Highs school	16(32%)
University level education	4(8%)
Disease duration	
1-11 months	7(14%)
12-23 months	15(30%)
24-59 months	19(38%)
>60 months	9(18%)
Therapy	
Not on any drugs	1(2%)
Sulphonyl ureas alone	6 (12%)
Metformin	8(16%)
Combination of sulfonyl ureas& metformin	16(32%)
Insulin + sulfonyl urea/metformin	7(14%)
Thiazolidinediones	0
Drugs on hypertention	12(24%)

**Table 2:** Age distribution of patients

S no	Age (years)	No of patients
1	45	5
2	50	20
3	55	10
4	60	15

Table. 3 shows that the distribution of Diabetic cases according to age. The prevalence of Diabetic cases was found to more in the age of 45 followed by 55 followed by 60 and followed by 40. According to this study, the diabetic prevalence was found to be high in patients of above 45 years age group.

**Table 4:** Educational status of patients

S no	Educational status	No of patients
1	No formal education	13
2	Primary school	17
3	High school	16
4	University level education	4

Table.4 shows the educational status of the patients enrolled in the study. Out of 50 cases 13 cases are with no formal education followed by 17 cases with primary school education followed by 16 patients with high school education followed by 4 Cases with university level education.

**Table 6:** Disease duration of patients

S NO	Disease duration (in months)	No of patients	% of patients
1	01-11	7	14

2	12-23	75	44
3	24-59	19	30
4	>60	9	12

Table.6 shows the disease duration of the patients. Out of 50 cases 7 cases were having disease duration of 01-11 months, 22 cases were having disease duration of 12-23 months, 15 cases were having disease duration of 24-59 months and 6 patients were having disease duration of greater than 60 months.

**Table 8: Health and functional**

Baseline	1st Visit	2nd Visit	3rd Visit
15	17	20	22

Table.8 shows that the health and functional status of the type2 diabetes patients. Initially at the base line visits the health and functional status of the patients was found to be 15, at first visit 17, at second visit 20 and third visit 22.

**Table 9: Social and economic**

Base line	1 <sup>st</sup> visit	2 <sup>nd</sup> visit	3 <sup>rd</sup> visit
15	19	21	24

Table.9 shows that the socio and economical status of the type2 diabetes patients. Initially at the base line visits the health and functional status of the patients was found to be 15, at first visit 19, at second visit 21 and at third visit 24.

**Table 10: Family**

Base line	1 <sup>st</sup> visit	2 <sup>nd</sup> visit	3 <sup>rd</sup> visit
17	20	23	29

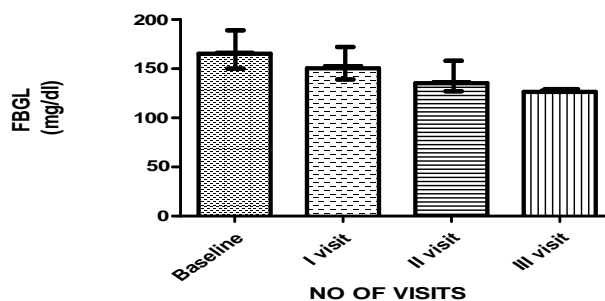
The above table shows that the Family status of the type2 diabetes patients. Initially at the base line visits the Family status of the patients was found to be 17, at first visit 20, at second visit 23 and third visit 29. The increase in the family status of the patient can be noticed from the above table which was achieved through patient counseling.

**Table 12: Fasting Blood Glucose Levels-Counseling Outcome**

VISITS	Fasting Blood Glucose
Base line	165.4
1 <sup>st</sup> Visit	150
2 <sup>nd</sup> Visit	135
3 <sup>rd</sup> Visit	126

The above graph shows the fasting blood glucose levels of the patients. Initially at the baseline visit the average FBG levels of the patients was found to be 165.4mg/dl, at the 1<sup>st</sup> visit average FBG was 150mg/dl, at the 3<sup>rd</sup> visit the average FBG was found to be 135mg/dl and at the 3<sup>rd</sup> visit the average FBG was found to be 126mg/dl.

**EFFECT OF COUNSELLING ON FBGL**



Data represents Mean ± SEM  
 One way ANOVA: P < 0.0001  
 Dunnett's Multiple Compararision test, \*\*\*P<0.05  
 As compared with baseline

**Figure 5**

**Table 13: Showing the KAP Scores-Counseling Outcome**

VISITS	KAP SCORE
Base line	11
1 <sup>st</sup> Visit	13
2 <sup>nd</sup> Visit	15
3 <sup>rd</sup> Visit	16

The above graph indicates the KAP scores of patients. Initially at the base line the average KAP scores of patients was 11, at the 1<sup>st</sup> visit the KAP score was 13, at the 2<sup>nd</sup> visit the KAP score was 15 and at the 3<sup>rd</sup> visit the KAP score was 16. The above graph indicates the increase in the KAP score from the base line to the 3<sup>rd</sup> visit.

EFFECT OF COUNSELLING ON KAP

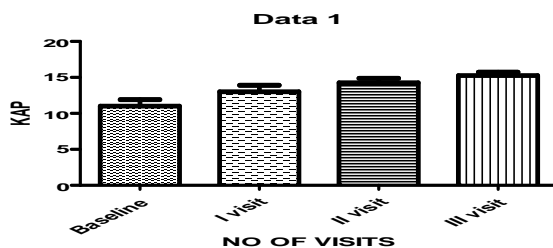


Figure 6

**Table 14: Showing the Overall Quality Of Life Index**

VISITS	QLI SCORE
Base line	16.25
1 <sup>st</sup> Visit	18.75
2 <sup>nd</sup> Visit	21.5
3 <sup>rd</sup> Visit	25.5

The above graph shows the overall quality of life index of patients. From the table initially at the base line the QLI score was 16.25, at the 1<sup>st</sup> visit the QLI was 18.75, at the 2<sup>nd</sup> visit the QLI score was 21.5 and at the 3<sup>rd</sup> visit the QLI was 25.5. There is an increase in the QOL from the baseline to the 3<sup>rd</sup> visit.

EFFECT OF COUNSELING ON QOL

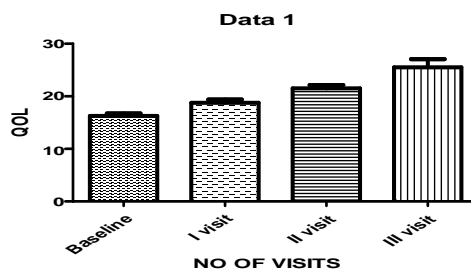


Figure 7

Variables	Frequency	Percentage
DM	37	37%
CKD	28	28%
Congestive cardiac failure	31	31%
Stroke	40	40%
Dyslipidemia	23	23%
Others	15	15%

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