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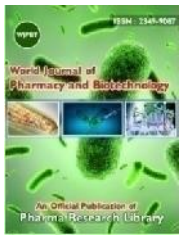

Research Article Open Access

Impact of Pharmacist Mediated Intervention on Knowledge, Attitude and Practice for Better Health Outcomes Amongtype-II DM.

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A B S T R A C T

Introduction and Background: Diabetes mellitus is chronic metabolic disorder characterized by hyperglycemia mainly due to inefficient and insufficient supply of insulin hormone. Diabetes is associated with complications such as hypertension, nephropathy, cardio vascular diseases, and retinopathy, neuropathy, which lead to chronic morbidity and mortality. Pharmacist mediated diabetic care services improves health outcomes in type 2 diabetes mellitus **Objectives:** The objective of the study was to improve knowledge, attitude and practice towards diabetes mellitus through pharmacist mediated patient education and to achieve targeted blood glucose levels. **Methodology:** The study was a prospective interventional study, conducted for a period of 6- months in the sabitha diabetic clinic, Anantapuramu. Diabetic patients were enrolled based on inclusion and exclusion criteria. All data regarding demographics, treatment and other medical details was collected in a suitably planned patient data collection form, Base line FBS, PPBS by using glucometer activ, also measured BP, BMI and their disease status. After consenting the patients answered the KAP questionnaire asked by the pharmacist. Pharmacist asked each question in KAP, in easy understandable language and the answer given by the patient was noted in the questionnaire by the pharmacist. The data obtained were entered in Microsoft excel and instat software were analysed. The score of base line was compared with second follow up using Wilcoxon matched pair test. **Results:** A total of 82 patients meeting the study criteria were compared with base line, 1st follow up and 2nd follow up based on study criteria. Assessment of blood glucose levels, BP, BMI showed that there was improvement in these parameters which attained the target levels. Assessment of KAP showed that there was significant improvement (< 0.0001) in the knowledge, attitude, and practice in the study group showed that patient education by a clinical pharmacist. **Conclusion:** The finding of this study showed that pharmacist mediated counselling to diabetic patients significantly improved knowledge and attitude of patients and percentage improvement in patients practice. This shows that pharmacist plays a vital role in the multi-disciplinary health care team

Keywords: Drug-Drug interactions, hypertension, angiotensin converting enzymes, prescriptions, captopril

A R T I C L E I N F O

CONTENTS

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1. Introduction

Diabetes has emerged as a major healthcare problem in India. According to WHO, the numbers of diabetes have risen from 1980 to 422 million in 2014. The global prevalence of diabetes among adult over 18 years of age has risen from 4.7% in 1980 to 8.5% in 2014. In 2012, an estimated 1.5 million deaths were directly caused by diabetes and another 2.2 million deaths were attributable to high blood glucose. WHO projects that diabetes will be the 7th leading cause of death in 2030. From the available information it is clear that diabetes will pose a severe burden on the already fragile and under resourced health care system in India in the near future. The pharmacist plays a vital role in helping patients to achieve therapeutic and life style goals. The principal task of the pharmacist is to give each patient knowledge, self- confidence and support.

Pharmacist patient education towards knowledge, attitude, practice (KAP) is the most effective way in reducing the consequences associated with diabetes mellitus. This will also increase the knowledge and helps in improving skills, change their attitude and improve patient health outcomes in diabetes mellitus. The need to investigate the KAP questionnaire among diabetic patients is to aid in future development and evaluating knowledge, attitude and practice towards diabetes after health care intervention.

2. Materials and Methods

Study site: The study was conducted in the Sabitha diabetic clinic, sai nagar 3rd cross, Anantapuramu.

Study design: Prospective Interventional Study (Quasi-experimental design with no control).

Study duration: The study was conducted for a period of 6 Months from October 2016 - March 2017.

Study criteria: Inclusion criteria:

Confirmed diagnosis of Type 2 diabetes mellitus by a hospital consultant, Patients aged above 18 years, Patients who are willing to participate in the study.

Exclusion criteria: Gestational Diabetes Mellitus, Children, Type-1 DM, Patients who are not willing to participate in the study.

Study materials:

The Study materials includes: Patient data collection form, Informed consent form, Knowledge, attitude, practice questionnaire, Patient information leaflet on diabetes mellitus

Study procedure:

The study was conducted in the Sabitha diabetic clinic, Anantapuramu for the period of 6 months. A total of 82 patients were enrolled in to the study based on exclusion and inclusion criteria after getting informed consent from patients/patient representative. All data regarding demographics, treatment and other medical details was collected in a suitably designed patient data collection form, Base line FBS, PPBS by using glucometer Accu-Check^{R} active, we also measured BP, BMI and their disease status. Pharmacist asked each question in KAP in easy understandable language and the answer given by the patient was noted in the questionnaire by the pharmacist. After this patients were counselled regarding various aspects of diabetic education. Patients were also advised for regular monitoring of blood glucose levels, BP, BMI, lipid profile and other complications. Follow up visits conducted by taking their address of the patients and collected the data by visiting their homes. Impact of pharmacist intervention on health outcomes was assessed by Wilcoxon Matched Paired-t test by using graph-pad In Stat (3.10 version). p-Value <0.05 was considered as statistically significant results.

3. Results and Discussion

Comparison of knowledge of patients at base line, first follow up and second follow up: All the participants of the study were initially provided questionnaires at the time of enrolment and subsequent first and second follow ups, patient's knowledge were evaluated at base line, first and second follow up. The knowledge of the patients was compared and observed that there was improvement in the knowledge of the patients in base line, first and second follow up.

Comparisons of Attitude of patients at base line, first and second follow up: All the participants of the study were initially provided questionnaires at the time of enrolment at base line, first and second follow ups. Patient's attitude were evaluated at base line, first and second follow ups and observed that there is improvement in the attitude at base line, first and second follow ups.

Comparison of practice of patients at base line, first and second follow ups: All the participants of the study were initially provided with questionnaire at the time of enrolment and subsequent first and second follow ups, patients practice were evaluated and observed that there is improvement in the practice of patients at base line, first and second follow ups.

Discussion:

Out of 82 Type-2 diabetic patients enrolled in the study, 51 (62.19%) were females and 31 (37.80%) were males.In this study 7 (8.53%) patients were between the age group 30-40, 16 (19.5%) patients were between the age group 40-50, 21 (25.6%) patients were between the age group 50-60, 24 (29.20%) patients were between the age group 60-70, 14 (17.08%) patients were between the age group > 70. According to WHO estimates of global prevalence of diabetes in the majority of patients with diabetes are in the age range of 45-64 years. Thus, our study shows similar in age wise distribution. It also shows that increasing age will

increase the risk for development of type 2 diabetes mellitus.

In this clinical study 40 (48.78%) patients were overweight &10 (12.19%) patients were obese. It is found that the major risk factor for developing DM is weight gain. Some studies have shown that reduction in weight can prevent exaggeration of the disease. Lifestyle changes are required to achieve better treatment goals. All the patients in the study were counselled regarding weight loss strategies like physical activities and diet control.

In the present study 10 (12.19%) patients were smokers and 25.60% of diabetic patients were alcoholic. The study shows that smoking and alcohol is the important strategy which is associated with the development of cardiovascular complications. Cessation of smoking and alcohol also helps to decrease of cardiovascular risk and improves health outcomes.

The study shows that 6 patients were recently diagnosed, 18 (21.98%) patients were having less than 2 year history of diabetes, 30 (36.58%) patients were having history of 2-5 years, 18 (21.98%) patients were having history of 6-10 years and 10 (12.19%) patients were having history of more than 10 years. Patients with long duration of disease are at higher risk of developing complications if they are not in glycemic control. Present study had 59 (71.95%) patients with a family history of diabetes and 23 (28.04%) patients were having no family history of diabetes. Studies show that family history is a major risk factor for type 2 diabetes. In this study 20 (24.59%) patients were doing regular physical exercises and 72 (75.60%) patients were not doing any physical activities, also 49 patients were following diabetic planned diet and 33 patients were not following any control over diet. Physical activity plays a vital role in the control and management of type-2 DM. The present study was designed to measure the impact of pharmacist mediated diabetic care program on health outcomes in type-2 DM.

The progressions in FBS & PPBS in the present study were probably due to pharmacist mediated patient education, improved medication adherence to drugs and lifestyle changes. Out of 82 patients enrolled in the study, FBS and PPBS values are compared at baseline, 1st follow up and second follow up. These mean values at baseline were 162.41 ± 62.83 and when compared to second follow up the value were improved to be 132.54 ± 32.21 with a p-value <0.0001. In the present study, decrease in mean FBS and PPBS values at 2nd follow up achieved the ADA target goals (FBS=70-130 mg/dl, PPBS= <180 mg/dl), Similar results which were observed by the Berringer et al study. This study shows significant improvement in blood pressure control (systolic and diastolic) in a second follow up compared to baseline. This outcome is probably due to better adherence to medication and lifestyle changes implemented by pharmacists. Out of 82 patients in the study, systolic and diastolic BP was measured at baseline, 1st follow up and 2nd follow up. These mean values were compared and observed that there is an improvement in both systolic and diastolic BP. The systolic BP was improved for 136.91 ± 15.10 to 126.51 ± 11.79 and diastolic BP were improved since 85.60 ± 8.13 to 82.68 ± 7.03. This study shows improvement in BP control in the second follow up that achieved target BP (systolic and diastolic) values <130/80 mm of Hg as recommended in hypertension guidelines.

Knowledge of patients was assessed by self-prepared and validated diabetic KAP questionnaire. The questionnaire had 25 questions to assess the knowledge of patients regarding diabetes mellitus. Each question answered correctly was given 1 point, maximum score would be up to 25 points. Knowledge was assessed at baseline 1st follow up and 2nd follow up. There is a significant improve in the mean knowledge score from baseline to 2nd follow up.

Mean knowledge score at baseline was 9.56±2.025, 18.049±1.73, with a p value of <<0.0001. A study by Malathi R, et al had also shown that there is tremendous improvement in KAP scores after counseling by pharmacists. Titian Siwihartayu et al had also shown that there was significant improvement in knowledge score at every follow up. Our study also shows that significant improvement in mean knowledge score from baseline to second follow up.

Assessment of attitude was done with the help of self-prepared and validated KAP questionnaire. It contains 5 questions related to attitude, patients, answering positive attitude was considered as 1 point and 5 is the maximum score for attitude. Our study shows that significant improvement in attitude from baseline to second follow up with a p-value of <0.0001. Similar results were obtained in Malathy R, et *al* study, which was conducted at the diabetic clinic at Erode, Tamil nadu.

Practice towards diabetes mellitus was assessed by using self-prepared and validated KAP questionnaire. It contains 5 questions related to practice were assessed at baseline, 1st follow up and 2nd follow up. This study shows that a significant improvement in practice towards the management of diabetes mellitus in 2nd visit compared to baseline and 1st follow up with a p-value of <0.0001. Similar results were observed in Malathy R, et *al* study, which was conducted at the diabetic clinic at Erode, Tamil nadu.

Table 1: Demographic characteristics of enrolled type 2 diabetes patients (n= 82)

S.No	patient characteristics	No. of subjects (n=82)	Percentage
1	**Gender**		
	Male	31	37.80%
	Female	51	62.19%

2	**Age**		
	30-40	07	8.53%
	40-50	16	19.51%
	50-60	21	25.60%
	60-70	24	29.26%
	70+	14	17.08%
3	**BMI(Kg/m2)**		
	Underweight(<18.5)	2	2.4%
	Normal Weight(18.5-24.5)	30	36.58%
	Overweight(25-29.9)	40	48.78%
	Obese(>30)	10	12.19%
4	**Smoking Status**		
	Smoker	10	12.19%
	Non Smoker	61	74.39%
	Past smoker	08	9.75%
	Chain smoker	02	2.43%
5	**Alcohol Status**	No Of Subjects	Percentage
	No	61	74.39%
	Yes	21	25.60%
6	**Duration Of Diabetes**		
	Recently diagnosed	06	7.31%8.53%
	<2	18	21.95%
	2-5	30	36.58%
	6-10	18	21.95%
	10+	10	12.19%
7	**Family History**		
	Present	59	71.95%
	Absent	23	28.04%
9	**Regular Exercise Habit**		
	Yes	20	24.59%
	No	72	75.60%
10	**Follow Special Diet**		
	Yes	49	59.75%
	No	33	40.24%

Table 2: Comparison of knowledge of patients at base line, first follow up and second follow up

Q. No	Questions	Baseline (%)	1st follow up (%)	Final follow-up (%)
1.	Diabetes is a caused due to increased intake of sugar or sugar products.	76.82	90.00	100
2.	Diabetes is a condition in which blood sugar levels is higher than the normal.	90.24	97.50	100
3.	Diabetes is caused by failure of kidneys to keep sugar out of the urine	26.82	42.50	61.53
4.	Knowledge about symptoms of disease.	70.73	81.25	91.02
5.	Knowledge about complications of diabetes.	53.65	72.50	82.05
6.	Kidney produces insulin.	10.97	32.50	53.84
7.	If am diabetic, my children have a higher chance of being diabetic.	56.09	72.50	87.17
8.	Diabetes can be cured.	78.04	85.00	92.30
9.	Regular exercise will help to control my diabetes.	68.29	77.50	87.17
10	The best way to check my diabetes is by testing my blood	75.60	87.50	98.71
11	A fasting blood sugar level of 210 mg/dl is too high	29.26	56.50	74.35
12	Excess of insulin dose can cause very low blood sugar	17.07	40.00	58.97
13	Planned diet will help to control my diabetes	58.53	70.00	79.48
14	A wound in diabetes heals slowly	26.82	51.25	74.35

15	Diabetes often cause poor circulation	7.30	30.00	48.71
16	Diabetes patient should take extra care when cutting nails	4.80	22.50	53.84
17	Diabetes can damage kidneys	14.63	33.75	57.69
18	Diabetes can cause loss of sensation in hands, fingers and feet	34.14	46.25	66.66
19	Shaking and sweating are signs of low blood sugar level	29.26	53.75	79.48
20	Pancreas produces insulin	25.60	57.50	93.58
21	Do you accept that a diabetic should have regular blood glucose checking at least once in a month	31.70	65.00	91.02
22	Diabetes can cause blindness	9.75	40.00	58.97
23	Is there any lifestyle modification required for diabetic patient	34.14	43.75	69.23
24	Eating sugar can bring low blood sugar level to normal	51.21	67.50	87.17
25	Blood sugar level can be controlled by doing any excessive exercise	13.41	28.75	53.84

Table **3:** comparison of Attitude of patients at base line, first and second follow up

Q. No	Questions	Baseline (%)	1st follow up (%)	Final follow-up (%)
1.	Are you eating sweets when you are on diabetic medication	41.46	70.00	88.46
2.	Are you following a controlled and planned diet	8.53	17.50	32.05
3.	Do you exercise regularly	10.97	20.00	33.33
4.	Dou you miss taking the dose of your diabetic medication	19.51	30.00	41.02
5.	Are you aware of your blood sugar levels falling below normal when you are taking drugs	4.87	22.50	29.48

Table 4: Comparisons of frequencies of checking blood sugar in base line, first and second follow ups

	Base line	**1st visit**	**2nd visit**
Weekly	9.75	7.31	7.31
Monthly	29.26	46.34	59.75
Twice monthly	31.70	29.26	26.82
6 monthly	21.95	14.63	4.87
Yearly	1.21	0.00	0.00
Never	6.09	2.43	1.21

Table 5: Comparison of frequencies of checking blood pressure in base line, 1st follow up and 2nd follow

	Base line	**1st visit**	**2nd visit**
Weekly	0.00	0.00	0.00
Monthly	46.34	56.09	68.29
Twice monthly	43.90	35.36	29.26
6 monthly	6.09	3.65	1.21
Yearly	0.00	0.00	0.00
Never	3.65	1.21	1.21

Table 6: Comparison of frequencies of doing eye examinations in base line, 1st follow up, 2nd follow up

	Base line	**1st follow up**	**2nd follow up**
Weekly	0.00	0.00	0.00
Monthly	8.53	10.97	9.75
Twice monthly	14.63	18.29	21.95
6 monthly	18.29	26.82	31.70
Yearly	23.17	30.48	32.92
Never	35.36	13.41	3.65

Table 7: Comparison of frequencies of doing urine examination in base line, 1st follow up and 2nd follow up

	Base line	1st follow up	2nd follow up
Weekly	0.00	0.00	0.00
Monthly	19.51	23.17	32.93
Twice monthly	10.97	13.41	14.63
6 monthly	14.63	17.07	15.85
Yearly	8.53	4.87	7.31
Never	46.34	41.46	29.26

Table 8: Comparison of frequencies managing hypoglycemic events in base line, 1st follow up and second follow up

	Base line	1st follow up	2nd follow up
By taking sugar	52.43	63.41	78.04
By taking medicine	25.60	28.04	19.51
By taking insulin	0.00	0.00	0.00
Not doing anything	21.95	8.53	2.43

Table 9: Comparison of FBS at base line and 2nd follow up

Mean base line score ± standard deviation (SD)	Mean 2nd follow up score ± standard deviation (SD)	P – value
162.41 ± 62.83	132.54 ± 32.21	< 0.0001

Table 10: Comparison of PPBS at base line and 2nd follow up

Mean base line score ± standard deviation (SD)	Mean 2nd follow up score ± standard deviation (SD)	P – value
222.36 ± 73.21	168.34 ± 37.98	<0.05

Table 11: Comparison of systolic BP at base line and 2nd follow up

Mean base line score ± standard deviation (SD)	Mean 2nd follow up score ± standard deviation (SD)	P – value
136.91 ± 15.101	126.51 ± 11.79	< 0.0001

Table 12: Comparison of diastolic BP at base line and 2nd follow up

Mean base line score ± standard deviation (SD)	Mean 2nd follow up score ± standard deviation (SD)	P – value
85.60 ± 8.13	82.68 ± 7.03	< 0.0001

Table 13: Comparison of BMI at base line and 2nd follow up

Mean base line score ± standard deviation (SD)	Mean 2nd follow up score ± standard deviation (SD)	P – value
26.10 ± 4.19	24.79 ± 2.58	< 0.0001

4. Conclusion

The study concludes that pharmacist plays an important role in achievement of better health outcomes in type 2 diabetes mellitus. Diabetic patients who are well known about their disease medication usage, regular exercise, diet control plan, life style modifications, self-monitoring of blood glucose (SMBG), regular eye, foot, cholesterol, echo examinations will better manage the complications of diabetes. This study shows that pharmacist mediated patient counselling had improvement in the KAP levels in Type-2 Diabetes Mellitus.

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