

Impact of Clinical Pharmacist Education in Gestational Diabetes Mellitus in Tertiary Care Hospital

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Abstract

Objectives: To assess the impact of clinical pharmacist education on gestational diabetes mellitus in a tertiary care hospital.

Material and methods: A prospective and observational study was conducted in a tertiary care hospital over a period of 6 months from January 2018 to June 2018 after getting approval from hospital ethical committee. The study includes 103 pregnant women with GDM who visited gynecology department.

Results: Majority of age patients with GDM were found to be within the age group of 30-34 years (38.83%). Before intervention the mean \pm SD for knowledge, attitude and practice was found to be 7.184 ± 3.3331 . At the follow up visit the mean \pm SD for knowledge, attitude and practice was found to be 11.6 ± 2.767 . Before intervention the mean \pm SD for medication adherence was found to be 4.16 ± 1.67 and at the follow up visit the mean \pm SD was 3.12 ± 1.28 . At the initial visit mean \pm SD for FBS, RBS and PPBS was found to be 124.5 ± 11.32 , 147.4 ± 5.338 and 148.6 ± 6.024 respectively. At the final visit, mean \pm SD for FBS, RBS and PPBS were found to be 95.62 ± 6.906 , 126.3 ± 4.911 , 125 ± 8.495 respectively.

Conclusion: The patient education provided by the clinical pharmacist was effective in better management of GDM, improving patient's knowledge towards the disease management and the pharmacists were capable to perform it to minimize the risk and complications of GDM patients.

Keywords: Gestational diabetes mellitus; Knowledge; Clinical management; Disease; Education

varies from 3.8%-21% in GDM patients [1]. During pregnancy approximately 84% of hyperglycemia cases are due to GDM and other 26% of cases are due to pre-existing T1 or T2DM. Prevalence of GDM in urban areas were found to be more, when compared to rural areas around 2%-5% of all pregnancies occurs with GDM and which is known to be associated with poor maternal and fetal outcomes [2]. Women diagnosed with GDM are at a higher risk of developing future type 2 diabetes mellitus (T2DM).

There are three general causes that can cause GDM: 1) autoimmune β -cell dysfunction, 2) highly penetrant genetic abnormalities that lead to impaired insulin secretion, and 3) β -cell dysfunction that is associated with chronic insulin resistance (Metzger and Counstan, 1998). Risk assessment for GDM should be ascertained at the first prenatal visit. GDM is closely related with risk of pre-eclampsia for pregnant women and may leads to the development of macrosomia, hypoglycemia, hyperbilirubinemia, respiratory distress syndrome, polycythemia, hypocalcemia in infants [3]. A major part of GDM management involves educating patients about diet, exercise, self-monitoring and insulin treatment. It should be initiated in early pregnancy, which to be continued throughout the pregnancy. Educational programmes and counselling may helpful to improve the awareness and knowledge. With this view, the present study was designed to assess the impact of clinical pharmacist education in GDM.

Materials and Methods

A prospective and observational study was conducted in a tertiary care hospital over a period of 6 months from January 2018 to June 2018 after getting approval from hospital ethical committee. The study includes 103 pregnant women with GDM who visited gynaecology department. The sample size was calculated using the RASOFT online software. The patients below 18 years and who diagnosed diabetes prior to the pregnancy are excluded from the study.

The participants were informed about the study and their consent was received in the prescribed format. The baseline data were collected by a designed and validated patient data

Introduction

Gestational diabetes mellitus (GDM) can be defined as a condition in which women without diabetes develops hyperglycemia during pregnancy. It is a subtype of diabetes and its prevalence increases constantly. In India, prevalence rate

collection form. A specially designed proforma was used to collect the information such as patient demographics, family history, obstetric history, menstrual history, laboratory parameters and medication chart review. The knowledge, attitude and practice of patients were assessed in the beginning and end of the educational session with help of KAP questionnaire. The questionnaire was circulated among patients and a score of 1 is given to each correct answer and each woman is scored out of 15. A score of 0-5 was considered as poor, 6-10 as average and 11-15 as good. The patient medication adherence was evaluated by using Modified Morisky Medication Adherence Scale. It consists of 8 items with a scoring scheme of 'Yes=1' and 'No=0'. The items are summed to give a range of scores from 0 to 8.

Education was done on disease condition, blood sugar management, medication adherence, life style modifications and their importance using patient information leaflets (PIL). PILs were designed based on ADA guidelines in both English and regional language. The GDM patients were followed for 6 months regularly and their response rate was reassessed before and after education. The data collected from GDM patients was statistically analysed using GraphPad Prism 7. $p < 0.05$ were considered as statistically significant.

Results and Discussion

Out of 123 gestational diabetes mellitus women were screened during the study period, in that 103 patients were recruited. Among 103 patients 40 (38.83%) patients belong to 30-34 age group, 38 (36.89%) patients aged between 25-29 years, 15 (14.56%) patients belong to 35-39, 8 (7.76%) patients between 20-24 age group, and 2 (1.94%) under 40-44 age group as shown in **Table 1**. The study by Getahun et al. [4] reported that the prevalence of gestational diabetes mellitus largely driven by the increase in 25-35 years' age group.

Table 1: Age wise distribution (n=103).

Age (in years)	Number of patients	Percentage (%)	CI (95%)
20-24(in years)	888	7.76 Percentage	3.4-14.7 CI
25-29 years)	38	36.89(%)	27.6-47(95%)
30-34	40	38.83	29.4-48.9
35-39	15	14.56	8.4-22.9
40-44	2	1.94	2-6.8
mean \pm SD	(30.73 \pm 4.31)		

Out of 103 patients 7 (6.79%) were in the group of normal weight, 48 (46.60%) were in the group of overweight, 30 (29.12%) were in the group of class I obesity, 13 (12.62%) were in the group class II obesity, 5 (4.85%) were in the group of class III obesity as shown in **Table 2**. Hedderon et al. [5] also supported our study by providing evidence for association

between gestational weight gain and the risk of GDM which was more pronounced among overweight.

Table 2: Descriptive analysis of BMI Category (n=103).

Category	Normal values	No. of patients	Percentage	CI-95%
Underweight	<18.5	-	-	-
Normal weight	18.5–24.9	7	6.79	2.8-13.5
Overweight	25.0–29.9	48	46.6	36.7-56.7
Class I obesity	30.0–34.9	30	29.12	20.6-38.9
Class II obesity	35.0–39.9	13	12.62	6.9-20.6
Class III obesity	\geq 40.0	5	4.85	1.6-11

Our study 33(32.03%) had family history of DM, 10 (9.70%) had a family history of HTN, 11(10.67%) had family history of hypothyroidism, 11(10.67%) had a family history of both DM and HTN while 41(39.80%) did not have a family history of diseases as shown in **Table 3**. Our results were consistent with other studies, showed that the family history of diabetes reflects genetic and behavioral factors whereby women might have predisposed to an increased risk of GDM. Jawad et al. [6] and Hadaegh et al. [7] determined the evidence that parental history of DM have significant risk of GDM.

Table 3: Descriptive analysis of Family History (n=103).

Category	Number of patients	Percentage (%)	CI (95%)
DM	33	32.04	23.2-42
HTN	10	9.71	4.8-17.1
Hypothyroidism	11	10.68	5.5-18.3
Combination (DM+HTN)	8	7.77	3.4-14.7
No family history	41	39.8	30.3-49.9

Among the GDM patients, 62 (60.19%) patients were prescribed with OHA, 27 (26.21%) patients were prescribed with insulin analog, 14 (13.51%) were prescribed with a combination of insulin analog and OHA as shown in **Table 4**. The study done by Rowan et al. [8] reported that OHA alone or with supplemental insulin, was an effective and safe treatment option for women with GDM and OHA were more acceptable to GDM women than insulin. Clinical parameters such as FBS, RBS and PPBS were measured at the initial visit and at the final visit. Before intervention, the mean \pm SD for FBS, RBS and PPBS was found to be 124.5 \pm 11.32, 147.4 \pm 5.338 and 148.6 \pm 6.024 respectively. After intervention it was reduced to 95.62 \pm 6.906, 126.3 \pm 4.911, 125 \pm 8.495 respectively as shown in **Table 5**. Tanir et al. [9] revealed that blood glucose levels and consequent diabetic state were associated with maternal and perinatal morbidity and mortality and early screening and dietary control

of GDM could promote the curtailment of maternal and perinatal morbidities. Jain et al. [10] also suggested that early proper diagnosis coupled with postpartum testing and follow-up in women with GDM can improve perinatal outcome.

Table 4: Descriptive analysis of anti-diabetic drugs (n=103).

Category	Number of patients	Percentage (%)	CI (95%)
Insulin analogues	27	26.21	18-35.8
OHA	62	60.19	50.1-69.7
Combinations	14	13.51	7.6-21.8

Table 5: Descriptive analysis intervention in blood sugar levels (n=103).

Clinical parameters		Mean	SD	CI (95%)	Mean Difference	SD difference	P value
FBS(mg/dl)	Base	124.5	11.32	122.3-126.8	28.92	11.57	<0.0001
	Review	95.62	6.906	94.27-96.27			
RBS(mg/dl)	Base	147.4	5.338	125.3-148.3	21.13	5.118	<0.0001
	Review	126.3	4.911	127.2-148.4			
PPBS(mg/dl)	Base	148.6	6.024	147.4-149.7	23.59	11.56	<0.0001
	Review	125	8.495	123.3-126.6			

Medication adherence was assessed twice during the study period and found that 47 (45.63%) patients were under medium adherence, 41 (38.80%) were under low adherence and 15 (14.56%) were under high adherence before intervention. At the final visit, 60 (58.25%) were medium adherence, 32 (31.06%) were high adherence and 11 (10.76%) patients were low adherence as shown in **Table 6**. On comparing scores of questionnaire, it was found that there was a 24% improvement in medication adherence in the gestational diabetes mellitus patients after the pharmacist education. Before intervention, 103 GDM patients has KAP level of 39 (37.86%) was found to be poor, 38 (36.89%) was found to be average and 26 (25.24%) was found to be good. After the intervention, it has reduced to 5 (4.85%), 32 (31.06%) and 66 (64.07%) respectively as shown in **Table 7**. At the follow up visit the mean \pm SD for knowledge, attitude and practice was found to be 11.6 ± 2.767 . On comparing the scores of KAP questionnaire, it was found that knowledge, attitude and practice of the patients improved by 61%. The similar study done by Sargees et al. [11] also provided that there was a significant improvement in knowledge regarding GDM and suggests that educational intervention to the patients was beneficial in increasing the GDM knowledge.

Table 6: Descriptive analysis of medication adherence levels (n=103).

Adherence Level	Low	Medium	High	Mean \pm SD	P value
Before Intervention	41	47	15	4.16 \pm 1.67	<0.0001
	39.80%	45.63%	14.56%		
	30.3-49.9	35.8-55.7	8.4-22.9		

After Intervention	11	60	32	3.12 \pm 1.28
	10.67%	58.25%	31.06%	
	5.5-18.3	48.1-67.9	22.3-40.9	

Table 7: Descriptive analysis of KAP levels before and after intervention (n=103).

KAP Level	Poor	Average	Good	Mean \pm SD	P value
Before Intervention	39	38	26	7.18 \pm 3.33	< 0.0001
	37.86%	36.89%	25.24%		
	25.5-48	27.6-47	17.2-34.8		
After Intervention	5	32	66	11.6 \pm 2.76	
	4.85%	31.06%	64.07%		
	1.6-11	22.3-40.9	54-73.3		

Among the 103 GDM patients, before intervention 49 (47.57%) patients do exercise rarely, 21 (20.38%) had never did, 20 (19.41%) do at least 3 times a week and 13 (12.62%) do almost daily. The study participants after intervention 46 (44.66%) found to do exercise daily, 25 (24.27%) do at least 3 times a week, 23 (22.33%) rarely did exercise and 9 (8.73%) had never did due to other health issues as shown in **Table 8**. Harrison et al. [12] reported that the physical exercise, as an

adjunct to standard GDM care, was beneficial in controlling blood glucose level in women diagnosed with GDM.

Table 8: Descriptive analysis of physical exercise (n=103).

Exercise	Before Intervention			After Intervention		
	Number of patients	Percentage (%)	CI(95%)	Number of patients	Percentage (%)	CI (95%)
Almost daily	13	12.62	6.9-20.6	46	44.66	34.9-54.8
At least 3 times a week	20	19.41	12.3-28.4	25	24.27	16.4-33.7

Conclusion

Gestational diabetes mellitus was an intricate disorder that presented a unique treatment challenges for health care professionals. Our study concluded that patient education provided by the clinical pharmacist was effective in better management of GDM, improving patient's knowledge towards the disease management and the pharmacists were capable to perform it to minimize the risk and complications of GDM patients. Regular monitoring of blood glucose, diet, physical exercise and strict control of weight bring about a successful outcome of pregnancy in women with diabetes.

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