Assessment of knowledge and risk factors about gestational diabetes mellitus among pregnant women in a tertiary care hospital

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ABSTRACT

Proper Gestational diabetes mellitus(GDM) management is important for better health outcomes. Knowledge and education are key components for better treatment and diabetes control. In patients with GDM, poor health literacy may be there which is associated with poor diabetic control and require educational program to improve health outcomes. A risk factor is any characteristic of an individual that can increase the likelihood of developing a disease. Risk factor assessment is usually recommended in many populations in early pregnancy. The prospective study was conducted for 6 months to assess knowledge and risk factors associated with gestational diabetes in 58 pregnant women using KAP questionnaire from WINGS project.The study found that knowledge among non GDM patients was poor when compared to GDM patients. Family history and obesity were found to be the major risk factors for development of gestational diabetes. So the future direction should focus on early prediction and effective preventive measures before GDM develops .Therefore a need for patient counseling is essential to reduce the GDM patients in future.

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INTRODUCTION

As per World Health Organization (WHO), Gestational Diabetes Mellitus (GDM) is defined as any degree of glucose intolerance with onset or first during pregnancy .So as the definition says there are chances of either returning or not returning to normal blood glucose levels after delivery [1].

Gestational diabetes, similar to type 2 diabetes, develops when the body is no longer able to respond effectively to insulin a condition called insulin resistance. Insulin resistance in pregnant women is mainly due to hormonal changes. More specifically, insulin resistance happens due to an imbalance between levels of certain insulin- or glucose affecting hormones in the body during pregnancy. The hormones that raise blood glucose or break down insulin produced more than those that lower blood glucose, resulting in elevated blood glucose levels [2] .

For people with chronic disease like diabetes require self-management as an important part of treatment strategies .People should have proper knowledge and skills for effective self-management of disease. Proper GDM management is important for better health outcomes.Knowledge and education are key components for better treatment and diabetes control [3]. By providing proper knowledge and education about healthy eating habits, weight control, physical activity, regular checkup, screening, risk factor and complications of GDM, helps in achieving better control of diabetes and

Table 1: Agewise distribution of the study participants

Age (in years)	GDM n=32	Non GDM n=58	Total n=90	p-value
18-23	3(9.375%)	17(29.31%)	20(22.22%)	.013*
24-29	19(59.375%)	35(60.34%)	54(60%)	
30-35	10(31.25%)	6(10.35%)	16(17.78%)	
Total	32(100%)	58(100%)	90(100%)	
Mean± SD	28.44 ±3.99	25.64 ± 3.4	26.63 ± 3.84	

Chi square test; significant if p<0.05

Table 2: Various demographic variable distributions in study population

Characteristics	GDM n=32	Non GDM n= 58	Total n=90	p-Value
1.BMI(KG/M2)	12(37.5%)	43(74.1%)	55(61.1%)	0.003b*
Normal	15(46.8%)	12(20.6%)	27 (30%)	
Overweight	5(15.6%)	3(5.17%)	8 (8.9%)	
Obese	25.64 ± 2.92	24.8±1.67	25.1 ± 2.22	
Mean ± SD				
2.Period of Gestation (Weeks)	20(62.5%)	24(41.3%)	44(48.9%)	0.055a
Less than 24 Weeks	12 (37.5%)	34 (58.6%)	46(51.1%)	
More than 24 Weeks				
3.Number of Pregnancies	14(43.75%)	17(29.3%)	31 (34.4%)	0.167a
Primigravida	18(56.25%)	41(70.6%)	59(65.5%)	
Multigravida				

Chi square test /Fisher exact test^b; significant if p<0.05

thus, allowing mother to have a good life with their babies [4]. A risk factor is any characteristic of an individual that can increase the likelihood of developing a disease. The risk factors can be modifiable or nonmodifiable. The modifiable risk factors can be smoking, physical inactivity, being overweight etc and can be controlled and their effect can be reduced by making changes to the lifestyle, while the non modifiable risk factors like age, gender, family history etc cannot be modified. Risk factor assessment is usually recommended in many populations in early pregnancy. The presence [5]of a risk factor helps in early assessment of hyperglycemia $. Identification of potentially alterable factors which put pregnant women at risk for the development of GDM like obesity is imp [6]rtant for developing clinical strategies for its prevention $.

MATERIALS AND METHODS

Study area and Population: The study participants include inpatient and outpatient pregnant women attending The Oxford Medical College Hospital and Research Center located in Attibele, Bangalore, which is a 750 bedded multispecialty teaching hospital, who were diagnosed with GDM during period of December 2018 to May 2019. In this study total of 32 GDM women and 58 NON GDM women were prospectively followed and data were collected in previously prepared forms. Socio- demographic and clinical history obtained from self-prepared data entry form and by interviewing patient or patient attendants.

Eligibility criteria

Inclusion criteria

Pregnant women above 18 years of age with gestational diabetes mellitus

Pregnant women who are willing to enroll in the study (with consent)

Exclusion criteria

Pregnant women with severe complications of diabetes and with other comorbidities

Table 3: Personal and family history of study participants

Characteristics	GDM n=32	Non GDM n= 58	Total n=90	P-Value
1.Family history of diabetes Yes No	17 (53.12%) 15 (46.87%)	8 (13.79%) 50 (86.20%)	25(27.8%) 65(72.2%)	0.000067a*
2.History of GDM Yes No	1(3.1%) 31(96.9%)	2(3.45%) 56(96.55%)	3(3.3%) 87(96.7%)	0.713b
3.History of HTN Yes No	2(6.3%) 30(93.7%)	4(6.9%) 54(93.1%)	6(6.7%) 84(93.3%)	0.639b
4.History of Preeclampsia Yes No	0(0%) 32(100%)	3(5.2%) 55(94.8%)	3(3.3%) 87(96.7%)	0.550b
5.History of Still birth or miscarriage Yes No	5 (15.62%) 27 (84.37%)	12(20.6%) 46(79.3%)	17 (18.8%) 73 (81.2%)	0.577a
6.History of PCOS Yes No	5 (15.62) 27 (84.37)	10 (17.24) 48 (82.75)	15(16.7%) 75(83.3%)	0.844a

Chi-squaretest^A, Fisher exact test^b ; significant if p<0.05.

Table 4: Basic Knowledge about GDM among pregnant women

Study Groups	Participants Who Answered		
	Yes	No	Don't Know
GDM(n=32)	21 (65.62)	9 (28.13)	2 (6.25)
Non GDM (n=58)	39 (67.24)	11 (18.96)	8 (13.79)

Pregnant women with infectious diseases

Pregnant women who are not willing to participate

Sampling techniques

At First random pregnant women were selected who are attending OBG department. And informed consent form was obtained from them as per the ethical procedure. KAP questionnaire was filled by each patient. Only the above mentioned patients were included. And each questionnaire form was analyzed. And GDM patients were selected for Risk factor assessment by collecting all the demographic details, family history, Pregnancy status, laboratory investigations etc. And all this was conducted in both GDM and Non GDM patients.

Questionnaires and Survey

2 forms Questionnaire and PIL were used in this study for assessing risk factors and providing knowledge regarding GDM.

Knowledge, attitude and practice (KAP) questionnaire was obtained with approval from WINGS (Women in India with GDM Strategy)project.[7] The KAP questionnaire consisted of 15 questions with choices. The patients' knowledge towards the disease and risk factors, importance of screening and

follow up, complications is known through the questionnaire. The KAP scoring was as follows:

Composite Score: 0 indicates no knowledge

1-24 indicates poor knowledge

25-49 indicates average knowledge

50- 74 indicates good knowledge

75- 99 indicates very good knowledge

100 indicates excellent knowledge

By providing proper knowledge and education about healthy eating habits, weight control, physical activity, regular checkup, screening, risk factor and complications of GDM, helps in achieving better control of diabetes and thus allowing mother to have a good life with their babies. Hence for self-care and self-management of GDM, all pregnant women need education and knowledge regarding Patient Information Leaflet (PIL) usually made in simple language about patient's disease and treatment including lifestyle changes needed, which was prepared by us. It will cover the topics of prevalence of GDM in India, etiology, risk factors, diagnosis, complications of GDM along with extra care to be taken by GDM women in pregnancy in terms of diet, exercise, monitoring of glucose levels and advice on postpartum care to be taken by GDM women.

Data management and Analysis

Details of the patient were collected in self-developed data entry form. KAP was analyzed by using composite scores according to WINGS project [7].

KAP questions were categorized as basic knowledge about GDM in pregnant women, knowledge about screening in pregnant women, knowledge about monitoring in pregnant women, knowledge about post-partum conversion to type 2 diabetes mellitus, knowledge about post-partum follow up, knowledge about risk factors, knowledge about consequences. Those 15 questions were analyzed in both GDM and Non GDM pregnant women. Finally composite score was taken as poor, average, good, very good, excellent..Risk factor assessment was done based on demographic details of the patient.

The Statistical software namely SPSS 20.0 was used for the analysis of the data.Student t test (paired test), Chi square test, Fisher exact test, mean and standard deviation were used in our study.

RESULTS

As from Table 1 the maximum number of study participants (for both GDM and NonGDM) belongs to the age group of 24-29 years.Maternal age (p=0.13 i.e. p<0.05) is having statistically significant association with GDM.

From theTable 2 , women with GDM more likely reported higher pregnancy body mass index (62.4%) while non GDM have comparatively higher number of times of pregnancies (70.6%). Body mass index (p=0.003) was found to have significant relation with GDM.

From theTables 3 and 4 , family history of diabetes (53.12%) was more found among GDM participant than in Non GDM participants. Family history of diabetes (p=0.0000067) was found to have statistically significant association with GDM.

KAP Measurement

Represents basic knowledge about GDM was high in majority of the pregnant women i.e. 65.2% in GDM and 67.24% in non GDM.

Figure 1 demonstrates the screening of GDM is considered essential by majority of pregnant women in both GDM and non GDM patient's i.e. 60.94% and 59.48 % respectively.

TheFigure 2 represents the knowledge of essentiality of monitoring for GDM is slightly more in GDM patients (71.87%) than non GDM patients (63.79%)

The Table 5 shows among GDM women 62.5% believed that GDM will lead to type 2 DM compared to 55.17% among non GDM women.

The Figure 3 indicates that the knowledge about postpartum follow up is more positively answered by Non-GDM (67.6%) than GDM (54.7%).

Figure 4 indicates, both GDM and non GDM study group believes family history and obesity as the major risk factor for GDM while high maternal age and others are considered as least important by both groups. 28.12% of GDM and 32.7% of non GDM study participants answered that they were UN aware of any of the risk factors.

From Figure 5 , childhood obesity is found to be commonly reported long term consequence by women in both GDM and non GD), followed by type 2 DM and glucose intolerance in children.

The Table 6 shows both GDM 17(53.12%) and non GDM 30(51.72%) have mostly equal knowledge in composite score, whereas GDM patients have slightly higher when compared to non GDM patients.

DISCUSSION

Mean age of the study participants in our study was found to be 26.63 years in which GDM participants were having higher maternal age than non GDM group .
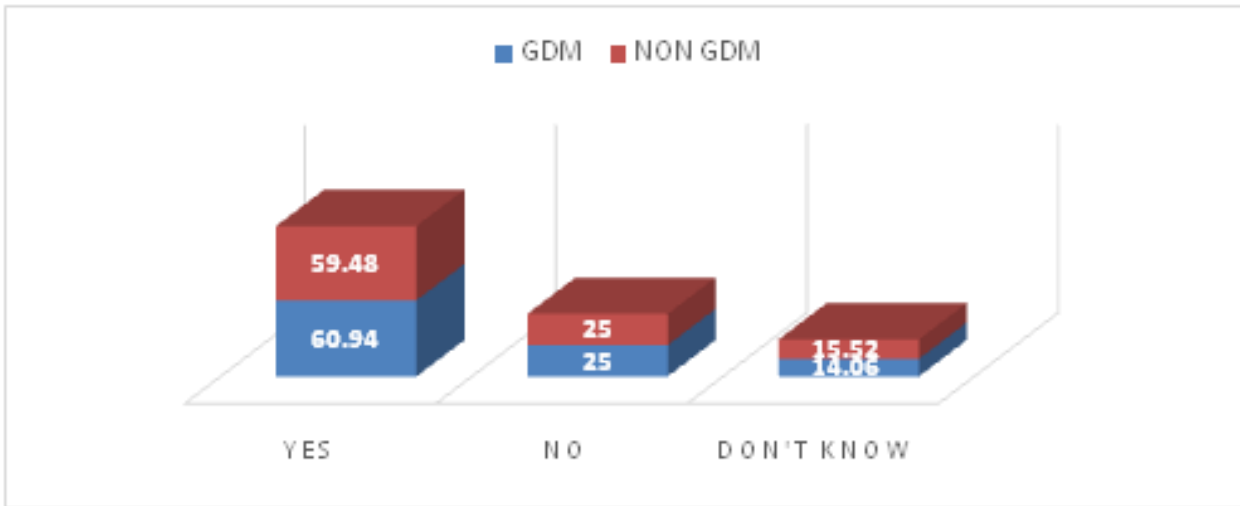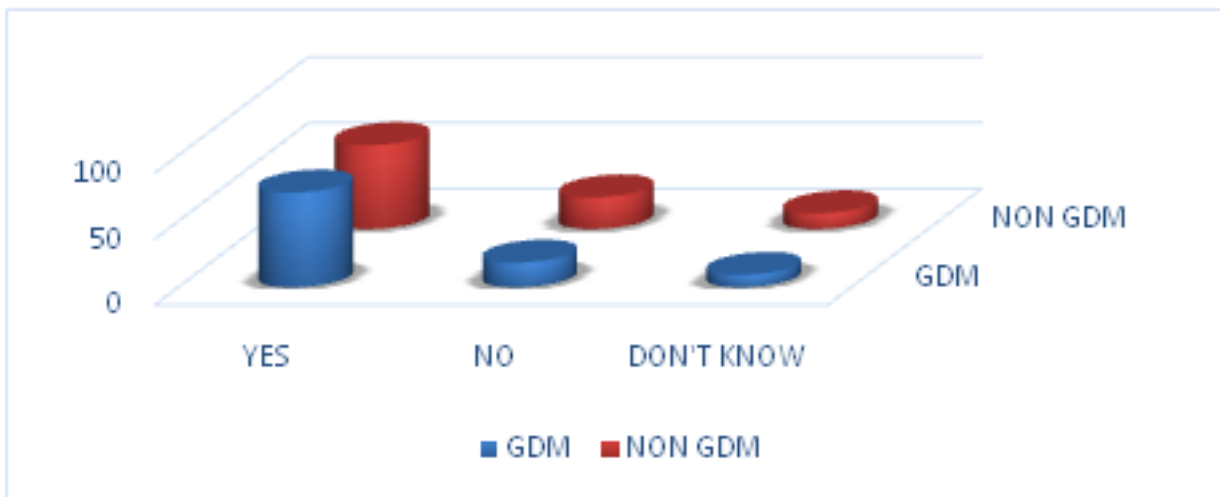
Figure 1: Knowledge aboutscreening in pregnant women

Figure 2: Knowledge about monitoring on pregnant women

Table 5: Knowledge about postpartum conversion to type 2DM

Study Groups	Participants Who Answered		
	Yes	No	Don't Know
GDM (n,%)	20 (62.5%)	9 (28.12%)	3 (9.37%)
Non GDM (n,%)	32 (55.17%)	18 (31.03%)	8 (13.79%)

Also„ compared to women without GDM ,women with GDM more likely reported higher pregnancy BMI and family history of diabetes(53.12%).The result is in line with study of Sheshiah et al., [8] in which BMI was significantly higher in GDM cases than in controls(37.9% vs. 14.3%) and also proportion of those with family history of diabetes amongst first degree relatives and especially in mothers were more among cases as compared to control. This was in line with results of the study by Savitri et al., [9] in which women having BMI >25 kg/m2 had more

incidence of GDM (9.2%) compared to women with BMI <18.5 kg/m2 (7.2%).

A previous study by Mona [10] had shown that overweight and obese women were likely to develop GDM. Our study results shown significant association with GDM and age(p=0.125), which is in agreement with previous study of Renata et al, [11] according to which overweight or obesity, family history of diabetes and advanced age(38027%) and low levels of physical activity have significant association with
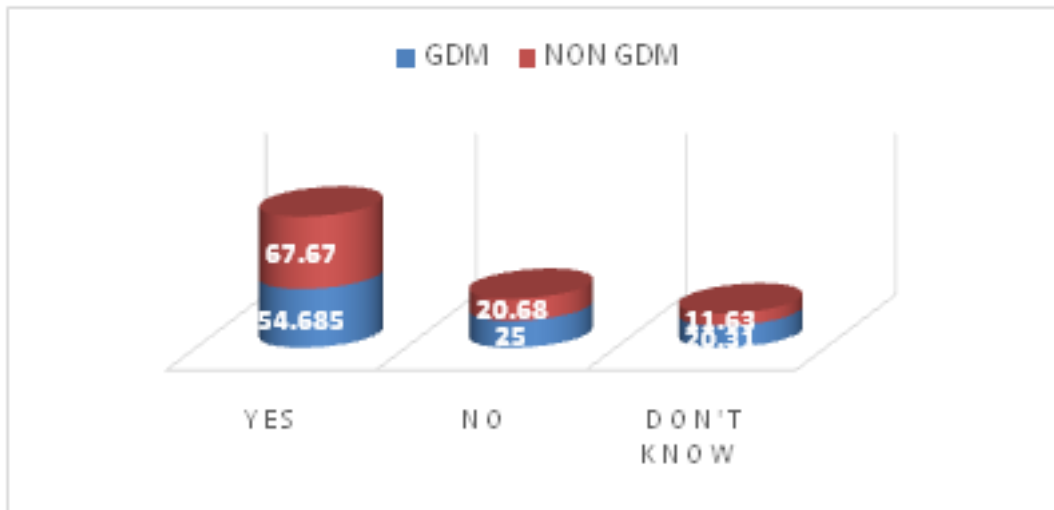
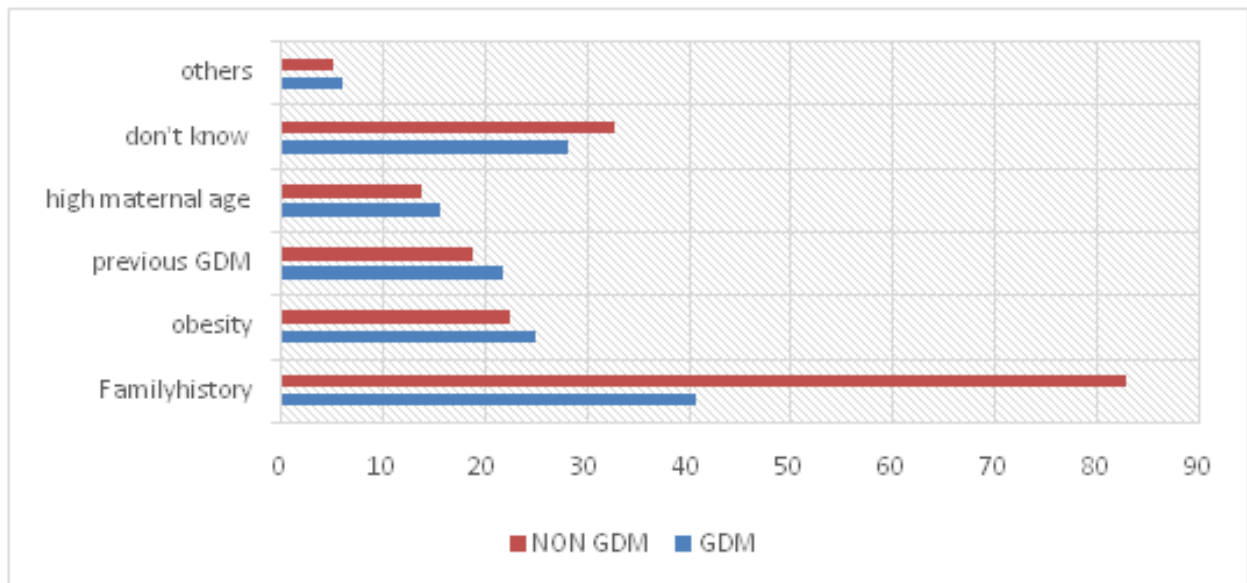**Figure 3: Knowledge about postpartum follow up**

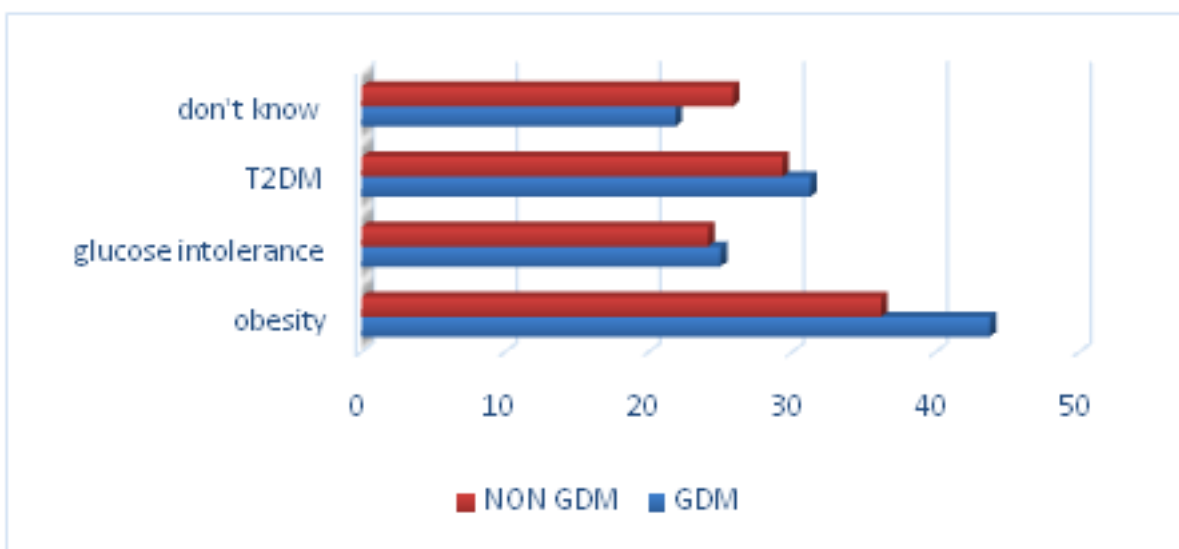**Figure 4: Knowledge about risk factor of GDMs in pregnantwomen**

Figure 5: Knowledge about consequences of GDM in pregnantwomen

Table 6: Composite knowledge score of GDM

Composite Score	GDM, n(%)	Non GDM, n(%)
0 no	0(0)	0(0)
1-24poor	0(0)	0(0)
25-49 average	15(46.87)	28 (48.27)
50-74 good	17(53.12)	30(51.72)
75-99 very good	0(0)	0(0)
100 excellent	0(0)	0(0)

GDM. The study results are also in line with study of Belvi et al., [12] in which majority of women were in 25-29 age groups.

Knowledge about GDM along with proper diagnosis and treatment of GDM will help to prevent it and its complication. Our study results show basic knowledge about GDM was high in majority of pregnant population (GDM-65.2% and Non-GDM 67.24%). This result is in line study of Amr et al., [13]according to which a greater proportion of pregnant women (73.5%0 in Sharjah were aware about GDM. These results are also in agreement with previous study of Vanishree et.al., [14] in which a greater proportion of women were aware of conditions of diabetes mellitus and GDM.

According to our study, majority of pregnant women had good knowledge on screening of GDM (GDM-60.94% and Non GDM 59.48%). This correlates well with previous study reports that revealed majority of women believed that they should undergo screening for GDM during pregnancy.

From previous study of Kaptein et al., [15] showed the majority of pregnant women reported a high perception of diabetes risk in future which is in agreement with our study results in which 62.5% of GDM women and 55.17% of non GDM women reported that GDM would lead to type 2 diabetes mellitus in future.

Lakshmi et al., in their study highlighted that most of the pregnant women had adequate and moderately adequate knowledge about risk factors of GDM. Only 32.5% had inadequate knowledge about risk factors of GDM. Also in previous study by Balaji et.al. Majority of urban pregnant women (55.9%) reported family history of type 2 diabetes mellitus as an important risk factor.

In our study, the childhood obesity is found to be commonly reported long term consequences in both GDM (43.75%) and Non GDM (36.72%) followed by type 2 diabetes mellitus and glucose intolerance in children.

CONCLUSION

For women's to take proper precautions and self-care it is important that they should have a good knowledge about the risk factors and consequences that they may face if they have untreated GDM. The results of the present study shows that the improvement in their knowledge about their disease, complications, proper diet and also their QOL. The future direction should focus on early prediction and effective preventive measures before GDM develops.Therefore a need for patient counseling is essential to reduce the GDM patients in future.

Family history and obesity were found to be major risk factors and it can be prevented by implementing a healthy life style in terms of proper physical activity, changes in nutrition and giving other extra care to high risk pregnant women. The pregnant women (both, GDM- 53.12% and Non GDM -51.72%) had good knowledge about GDM. Family history of diabetes and obesity were considered as the major risk factor by both GDM and Non GDM group. Childhood obesity is found to be commonly reported long term consequence by women in both GDM and Non GDM.

The limitations were 1) Study was conducted for shorter duration. 2) Data with higher amount of authenticity can be obtained if other hospitals are also included in the study. 3) Larger studies on treatment pattern involving a larger population to validate the findings of the present study 4) Most of the details collected were on the basis of self report. So chances of recall bias are more

Our findings may be used to develop and implement programmers aimed at supporting high risk mothers in antenatal care.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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