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A Prospective Observational Study on Incidence, Prevalence Rate and associated Risk Factors of Gestational Diabetes Mellitus in Obstetrics and Gynecology Department

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Abstract: ***Introduction: The gestational diabetes is increasing globally and shows serious consequences on both mother and neonates. Objective: To determine prevalence and incident rate and associated common risk factors of gestational diabetes in women attending government general hospital, Ongole through prospective observational study. Methods: A study was conducted in government hospital by taking samples after a glucose tolerance test performed in 385 women who are in their 1st, 2nd and 3rd trimester of pregnancy and by using a well-designed Performa. Results: Out of 385 pregnant women 80 were having gestational diabetes where the prevalence rate is 20.77% and the incident rate is 17.35%. The risk factors we observed were Age (55%), BMI (50%), Family history of diabetes (22%), History of pre-eclampsia (26%), PCOS (19%), Multiparity (13%), GDM in previous pregnancy (16%), macrosomia in previous pregnancy (2%). Conclusion: By this study we observed that GDM usually caused by different risk factors like, Age BMI, Multiparity, PCOS, Macrosomia in previous pregnancy, Family history of DM, previous history of GDM, H/O of preeclampsia but Age and BMI are prone to cause GDM than others.***

Keywords: GDM, gestational diabetes mellitus, DM, diabetes mellitus, BMI, body mass index, PCOS, polycystic ovarian syndrome

1. Introduction

GDM is any degree of glucose tolerance with onset or first recognition during pregnancy [1, 2]. The increase in high blood sugar can happen at any stage of pregnancy, but it is more common in the second or third trimester. The risk factors of GDM include gestational hypertension, pre-eclampsia, cesarean section, developing subsequent type 2 diabetes mellitus and cardiovascular diseases [3, 4, 5,]. Complications in new born babies include macrosomia, may suffer congenital abnormalities or may develop neonatal hypoglycemia or type 2 diabetes in later life [6, 7]. Based on different diagnostic criteria used in different countries prevalence of GDM worldwide is 7.0%.compared with selective screening, universal screening detects more cases and improves maternal and neonatal prognosis. The prevalence is expected to increase more over years especially in Asia due to increase in maternal age and obesity [8, 9]. The vast disparity in prevalence rates may be due to differences in ethnicity, screening strategies and population characteristics [10, 11]. The progressive change in maternal metabolism due to body's effort to provide adequate nutrition for the growing fetus causes increase in level of hormones like cortisol and estrogen where they peak in 26th to 33rd week of gestation. Both Beta cell impairment and tissue insulin resistance are critical components of GDM which also leads to type 2 diabetes post pregnancy. To achieve adequate glucose levels the standard treatment is insulin therapy and optimal glycemic control by medications [12]. Treatment for GDM can encompass three different therapies: Dietary changes, exercise and pharmacotherapy.

2. Methodology

A prospective observational study was carried out in obstetrics and gynecology department in Tertiary care Hospital. The pregnant women who are having GDM are associated with risk factors of Age, BMI, Multiparity, PCOS, Family history of DM, macrosomia in previous pregnancy, previous history of GDM, H/O of preeclampsia. The exclusion criteria for this study includes pregnant women who are below 18 years of age, women who are not willing to participate in the study and women tested negative for GDM, whereas the inclusion criteria include women who are in their 1st, 2nd and 3rd trimesters of pregnancy and who have been tested for gestational diabetes mellitus through glucose tolerance test. A well designed Performa was used to obtain their information and their consent was obtained from all pregnant women before conducting test.

Variables

Variables evaluated for the study includes sociodemographic details of like their locality (rural and urban), age (18-24, 25-30, 30-36), educational status (primary, secondary, graduation), occupational status (House wife, Employee, Student, Worker), sleep cycles (normal or disturbed), food habits (normal or anorexia) of all patients are taken through the questionnaire forms to know about their awareness about Gestational Diabetes Mellitus and risk factors associated include Age, BMI (Underweight, normal, overweight and obesity), Multiparity (primipara, multipara), PCOS, Family history of DM, previous history of GDM, H/O of preeclampsia, Macrosomia in previous pregnancy.

Table1: Sociodemographic details of pregnant women, Government General Hospital, Ongole.

Variable	Frequency	Percentage
	Locality	
Rural	30	37.2
Urban	50	62.8
	Age	
18-24	11	13.8
25-30	25	37.5
30-36	45	55
	Educational Status	
Primary	20	25.3
Secondary	39	49.4
Graduation	21	25.3
	Occupational Status	
House wife	57	71.25
Employee	18	22.5
Student	0	0
Worker	5	6.25
	Sleep	
Normal	72	90
Disturbed	8	10
	Appetite	
Normal	70	87.5
Anorexia	10	12.5

3. Results

Participant characteristics:
In total of 385 pregnant women 80 were tested positive for GDM and remaining 105 were excluded as they tested negative for GDM. The prevalence rate is 20.77% and Incident rate is 17.35%.

Age
According to data analysis among 80 cases/patients, the women (n=11) of 18-24 years age, (n=29) of 25-30 years and (n=40) above 30 years of age.

Table 2: Age data analysis and frequency

Age	Frequency (n)	Percentage (%)
18-24	11	14%
25-30	29	36%
Above 30	40	50%

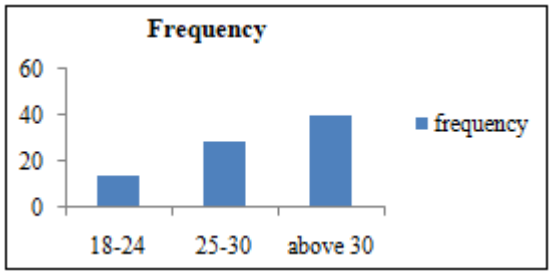


Figure 1: Age data analysis of pregnant women

BMI
According to data analysis among 80 patients/cases, the (n=10) of underweight women, (n=30) of normal weight women, (n=20) of overweight women and (n=20) for obese women.

Table 3: BMI data analysis and frequency

Variable	Frequency	Percentage
Underweight	10	12%
Normal	30	38%
Overweight	20	25%
Obesity	20	25%

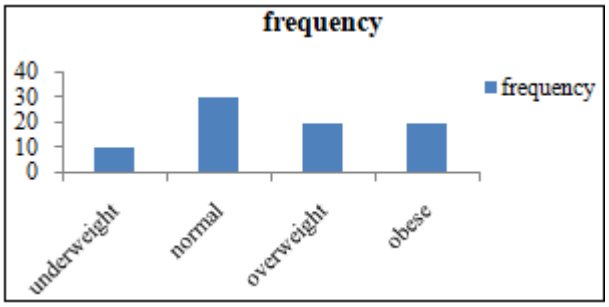
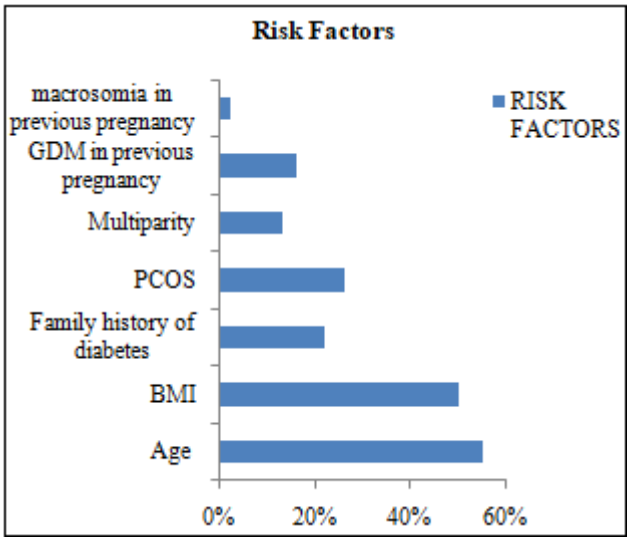


Figure 2: BMI data analysis in pregnant women

Risk Factors:
Risk factors are analyzed and their frequency, percentage and significant values are shown in the Table. The percentage of risk factors are shown in figure.

Risk factors	Frequency (n)	Total (%)
Age (18-24) (25-30) (30-36)	11 29 40	55%
BMI (underweight) (Normal) (overweight) (obesity)	10 30 20 20	50%
Parity (primipara) (multipara)	70 10	13%
H/O of GDM in previous pregnancy	13	16%
Family history of DM	13	22%
History of preeclampsia	21	26%
PCOS	15	19%
Macrosomia in previous pregnancy	2	2%



4. Discussion

Gestational Diabetes Mellitus (GDM) is a global health consequence for both mothers and neonates. The prevalence of GDM has risen in several population in past 20 years and

it varies due to differences in the ethnicity, diagnostic criteria, screening strategies and population characteristics.
This study is mainly focused on the incidence, prevalence and risk factors of GDM among 80 pregnant women who tested positive for Gestational Diabetes mellitus. In our study we observed that Age (55%), BMI (50%), multiparity (13%), H/O of GDM in previous pregnancy (16%), family history of DM (22%), history preeclampsia (26%), PCOS (19%), macrosomia in previous pregnancy (2%) are the risk factors of GDM.

The progressive change in maternal metabolism is the cause of GDM where the hormones level of cortisol and estrogen increases as the pregnancy progresses and leads to insulin resistance. The hormones peak is seen in 26th to 33rd week of pregnancy. Due to both beta cell impairment and tissue insulin resistance are main critical components of GDM, where these impairments exist prior to pregnancy which represents increased risk to type 2 diabetes post pregnancy [(13)]. The exact mechanisms can be varied and complex [(14, 15)].
The main risk factors include age and BMI.A study by Ahia Garshaibi et al. prevalence and risk factors for GDM shows that prevalence of GDM steadily increases with age where the risk is high from age 30-36 years compared to other groups [(16)].In our study we observed that out of 80 women (14%) are 18-24 years, (36%) are 20-30 years whereas age above 30 includes (50%). Another study conducted by Ryes Lopez et al. shows that BMI reflecting with overweight and obesity are closely associated with the occurrence of GDM where 30.26% of pregnant women are overweight and obese [(17)]. In our study we observed that out of 80 women (12%) are underweight, (38%) are normal, (25%) are overweight and (25%) are obese.

5. Conclusion

From this study we concluded that for every 100 pregnant women 20 pregnant women were affected with GDM. Gestational Diabetes Mellitus is caused by many risk factors but in this study, we observed that Age and BMI are main risk factors.

From this study we also observed that there is no relation between Number of risk factors per subject and GDM. By providing awareness to the pregnant women about GDM and the precautions needed to be taken we may be able to reduce the serious complications and mortality rate.

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Conflict of Interest

The authors show no conflict of interest

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