Journal Homepage: -www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/14067
DOI URL: http://dx.doi.org/10.21474/IJAR01/14067

ISSN NO. 2320-5407

RESEARCH ARTICLE

EARLY VS ROUTINE GDM SCREENING IN OBESE PREGNANT WOMEN

Dr. Tarini Singh, Dr. Anuradha and Dr. Simrat Kaur

Manuscript Info

Manuscript History
Received: 15 November 2021
Final Accepted: 18 December 2021
Published: January 2022

Abstract

A prospective observational study was designed to assess the high risk of obesity in antenatal patients. The study took place over a period of 6 months (July 2019- Dec 2019) in a tertiary care hospital , GMC Jammu. Patients were subjected to early (before 14 weeks) and later (24-28 weeks) screening of GDM randomly according to the first antenatal visit done at the hospital. Multivariable logistic regression was used to examine the correlations of GDM and its outcomes. All data were analyzed and t score and p value were calculated. $P<0.05$ was considered statistically significant.As per the results obtained the adverse effects of macrosomia, primary caesarean section, shoulder dystocia, polyhydramnios and neonatal hypoglycemia were higher in routine group although the difference were not statistically significant.

Introduction:-

Overweight and **obesity** are defined as abnormal or excessive fat accumulation that may impair health. Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults.

More than 1.9 billion adults who were 18 years and older were reported to be overweight in 2016. Out of these, over 650 million adults were found to be struggling with obesity.

In 2016, 39% of adults aged 18 years and over (39% of men and 40% of women) were overweight.

Overall, about 13% of the world's adult population (11% of men and 15% of women) were obese in 2016.

The worldwide prevalence of obesity increased three times between 1975 and 2016.(1)

In the years 1975 to 2016, the percentage of women (aged ≥20 years) suffering from obesity almost doubled and surged from 6% to 15% worldwide. (2)

Evidence from various observational studies done across the world concluded that obesity pre-existing and during pregnancy has adverse outcomes for both mothers and babies(3), Obesity during pregnancy is closely related with an increased risk of gestational diabetes mellitus (GDM), hypertensive disorders of pregnancy, abortions, venous thromboembolism, infection, and haemorrhage in the mother.(4) Furthermore, in India obese women may be exposed to low nutrient but high caloriediets,especially during pregnancy which contributes to the ill effects. Exposure to hyperglycaemia in-utero and hypertension may have negative effects on foetal development and lead to

Corresponding Author:- Dr. Tarini Singh

macrosomia, stillbirth, preterm birth, congenital abnormalities,and neonatal death. (5) Globally, maternal overweight/obesity has been reported to contribute to a 0.6 million increase in deaths from 1990 to 2010.

Gestational diabetes when treated leads to improved pregnancy outcomes but obese women with gestational diabetes continue to have worse outcomes. (6)

NICE guidelines recommends that we assess the risk of gestational diabetes using risk factors in a healthy population. At the booking appointment, check for the following risk factors:
*BMI above 30 kg/m2
* previous macrosomic baby weighing 4.5 kg or more
*previous gestational diabetes
*family history of diabetes (first-degree relative with diabetes)
*an ethinicty with a high prevalence of diabetes.

It uses the75-g 2-hour OGTT to test for gestational diabetes in women with risk factors. For women who have had gestational diabetes in a previous pregnancy, offer:
early self-monitoring of blood glucose or
a 75-g 2-hour OGTT as soon as possible after booking (whether in the first or second trimester), and a further 75-g 2-hour OGTT at 24 to 28 weeks if the results of the first OGTT are normal.

South Asian population being a high risk population especially the Indian females with a 11 fold higher risk of developing glucose intolerance during pregnancy, compounded with the delayed starting of antenatal check-ups in the rural and semi urban population which in turn leads to late GDM screening, we planned a study in a tertiary care hospital catering to patients of all socio-economic strata to study if there was any significance difference in the materno-fetal outcomes if GDM was diagnosed and treated early on rather than at 24-28 weeks in obese patients.

Material And Methods:-

A prospective observational study was designed to assess the high risk of obesity in antenatal patients. The study took place over a period of 6 months (July 2019- Dec 2019) in a tertiary care hospital , GMC Jammu. Patients were subjected to early (before 14 weeks) and later (24-28 weeks) screening of GDM randomly according to the first antenatal visit done at the hospital. Patients with BMI>= 30 were eligible for the study.
Exclusion criteria:
Previous LSCS
existing diabetes mellitus
chronic steroid use
h/o bariatric surgery
major medical illness(cardiac disease)

An OGTT was done on all patients and diagnosis of GDM was made according to the NICE guidelines as below:

If the woman has either: a fasting plasma glucose level of 5.6 mmol/litre (100.8 mg/dl) or above or a 2-hour plasma glucose level of 7.8 mmol/litre (140.4 mg/dl) or above.

Upon diagnosis the GDM was managed according to the institute guidelines, followed up with regular ANC and institutional deliveries.

Primary outcome was defined by the presence of adverse outcomes in terms of macrosomia(birth weight > 4 kg), primary caesarean delivery, shoulder dystocia, neonatal hypoglycemia(<35 mg/dl) , stillbirth, hypertensive disorders of pregnancy(bp> 140/90), need for diabetic medication and polyhydramnios.

Statistical Analysis
Multivariable logistic regression was used to examine the correlations of GDM and its outcomes. All data were analyzedand t score and p value were calculated. P<0.05 was considered statistically significant.

Results:-

In our study out of the total patients who came for antenatal visits over a span of 6 months in the hospital1072 patients were obese and out of these 278 were diagnosed with gestational diabetes.

They were randomised into early and routine screening according to the gestational age at first visit. After excluding the patientswho lost to follow up and non-compliance 254 patients were followed upto term and analysed for primary outcomes.

Primary outcome	Early (n=132)	Routine(n=122)	P value	RR(95% CI)
Macrosomia	5(3.7%)	7(5.7%)	0.447	1.5148 (0.4938 to 4.6469)
HDP	3(2.3%)	7(5.7%)	0.149	2.5246 (0.6677 to 9.5450)
Primary caesarean	16(12.1%)	18(14.7%)	0.541	1.2172 (0.6503 to 2.2782)
Shoulder dystocia	1(0.75%)	3(2.45%)	0.267	3.2459 (0.3422 to 30.7897)
Polyhydramnios	3(2.3%)	4(3.3%)	0.603	1.4426 (0.3295 to 6.3158)
Stillbirth	1(0.75%)	1(0.81%)	0.928	1.0820 (0.0684 to 17.1104)
Neonatal hypoglycemia	11(9.01%)	15(12.3%)	0.298	1.4754 (0.7053 to 3.0864)
Need for medication	23(17.4%)	17(13.9%)	0.445	0.7997 (0.4493 to 1.4234)

The patients were divided into early group who were tested before 14 weeks of pregnancy and routine group who were screened at 28 weeks, the latter also included the patient who were initially screened negative in early group.

As per the results obtained the adverse effects of macrosomia, primary caesarean section, shoulder dystocia, polyhydramnios and neonatal hypoglycemia were higher in routine group although the difference were not statistically significant.

The number of stillbirths in both groups were the same.

The need for medication was observed to be higher in the early group17.4 % as compared to the routine group 13.9%, although it was not statistically significant.

Discussion:-

Pregnancy is accompanied by insulin resistance, caused mainly by the diabetogenic hormones secreted by the placenta. GDM is unmasked in patients whose pancreatic function in unable to overcome the same. The main adverse effects of GDM are increased risks of HDP, LGA newborns and caesarean births. These short term effects can be reduced by treatment of GDM so it is all the more important to timely screen, diagnose and intervene especially in a high risk population with obesity.

According to the study by sudhasinghe in 2018 hyperglycaemia in Pregnancy diagnosed and followed up in a sub-urban community setting in South Asia, had significantly worse pregnancy outcomes with a high risk of maternal pre-diabetes/diabetes in first post-partum year.(12)In amultivariate analysis by Filardi, Asian ethnicity, age $\geq$ 35 years and pre-pregnancy BMI $\geq$ 25 kg/m^2 were independent predictors of use of insulin therapy. Prevalence of prior gestational diabetes was seen to be higher in overweight/obese women (p = 0.002)(13)The Hyperglycemia and Adverse Pregnancy Outcome (HAPO) study also showed a positive correlation between rising maternal glycemic concentrations and macrosomia which was defined by a birth weight above the 90th percentile. In the study by Ijas et al, the babies of GDM mothers had twice the risk of hypoglycemia compared to the babies in the reference group. The rate of preterm delivery was also higher in overweight and obese women with GDM and the rate of low

5min Apgar score was increased in obese women with GDM, both of which may lead to increased need for treatment at neonatal ward.(9) It was also found that while overweight/obesity alone are associated with macrosomia, caesarean delivery, treatment at neonatal ward (obesity only), delivery induction and low Apgar score, GDM amplifies these risks.(9)

Keeping in mind the benefits of awell timed intervention we designed a prospective study to further probe the notion if early diagnosis of GDM could significantly lower the aforementioned maternal and fetal risks. No significant results were found after analysis of the primary outcomes in our study.

In a randomized controlled trial as well, it was found that screening obese women for gestational diabetes between 14 and 20 weeks' gestation was not associated with a decrease in a composite adverse perinatal outcome of macrosomia,primary caesarean delivery,HDP, shoulder dystocia, hyperbilirubinemia, or neonatal hypoglycemia. (14)

In yet another study Hong et al stated that pregnant women who were screened early required oral antidiabetic agents or insulin more frequently than those without an early screen, but had similar rates of cesarean delivery, preeclampsia, and macrosomia.(15)

Similarly, Roeder et al randomized women with a hemoglobin A1c in the pre-diabetes range (5.76.4%) or fasting plasma glucose 92 mg/dL prior to 15 weeks. Women were randomly assigned to early pregnancy treatment compared to third-trimester treatment. No difference was seen in the primary and secondary outcomes of cord blood C-peptide >90th percentile, fat mass, weight for length percentile at birth, macrosomia, or maternal gestational weight gain.

Similarly in a study by Shub et al it was found that the early diagnosis of GDM does not substantially increase rates of adverse outcomes compared to GDM diagnosed in later pregnancy or no GDM in women with risk factors for GDM.However infants of women with early GDM, but not late GDM, were more likely to have the neonatal composite outcome than infants of women without GDM, mainly due to an increase in neonatal hypoglycaemia.(10)

In the article published by bashir et al more patients in the routine-GDM group were managed on diet alone compared with Early-GDM (53.6% vs 27.5%, $p<0.001$) . Our study also had similar clinical results although not statistically significant. Maternal outcomes observed were also similar between the two groups apart from a higher incidence of preterm labour (11)

Further studies are required in the population as GDM is a important and increasing problem in the pregnant demographic.Alsoamong pregnant women, the prevalence of obesity was over 40% in 31 districts in the country, with the highest prevalence of 72% in Shupiyan district of our state(Jammu and Kashmir) (16). Hence screening and targeting GDM is the need of the hour.

References:-

1. Obesity and overweight [Internet]. Who.int. 2021 [cited 25 December 2021]. Available from: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight
2. NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: A pooled analysis of 2416 population-based measurement studies in 128.9 million children, adolescents, and adults. Lancet. 2017;390:2627–2642.
3. Marchi J, Berg M, Dencker A, Olander EK, Begley C. Risks associated with obesity in pregnancy, for the mother and baby: A systematic review of reviews. Obes Rev J Int Assoc Study Obes. 2015;16:621–638.
4. Doherty DA, Magann EF, Francis J, Morrison JC, Newnham JP. Pre- pregnancy body mass index and pregnancy outcomes. Int J GynecolObstet. 2006;95:242–247
5. Abenhaim HA, Kinch RA, Morin L, Benjamin A, Usher R. Effect of pre- pregnancy body mass index categories on obstetrical and neonatal outcomes. Arch GynecolObstet. 2007;275:39–43
6. 6. Roman AS, Rebarber A, Fox NS, et al. The effect of maternal obesity on pregnancy outcomes in women with gestational diabetes. J Matern Fetal Neonatal Med 2011;24:723–7.
7. Overview | Diabetes in pregnancy: management from preconception to the postnatal period | Guidance | NICE [Internet]. Nice.org.uk. 2021 [cited 25 December 2021]. Available from: https://www.nice.org.uk/guidance/ng3

8. **.**Wahabi HA, Fayed AA, Alzeidan RA, Mandil AA 2014 The independent effects of maternal obesity and gestational diabetes on the pregnancy outcomes. BMC EndocrDisord 14:47. pmid:24923207
9. Ijäs H, Koivunen S, Raudaskoski T, Kajantie E, Gissler M, Vääräsmäki M (2019) Independent and concomitant associations of gestational diabetes and maternal obesity to perinatal outcome: A register-based study. PLoS ONE 14(8): e0221549. https://doi.org/10.1371/journal.pone.0221549
10. Shub, A., Chee, T., Templeton, A., Boyce, D., McNamara, C., Houlihan, C., Churilov, L. and McCarthy, E.A. (2019), Timing of diagnosis of gestational diabetes and pregnancy outcomes: A retrospective cohort. Aust N Z J ObstetGynaecol, 59: 96-101. https://doi.org/10.1111/ajo.12814
11. Bashir M, Baagar K, Naem E, et al. Pregnancy outcomes of early detected gestational diabetes: a retrospective comparison cohort study, Qatar. BMJ Open 2019;9:e023612. doi:10.1136/ bmjopen-2018-023612
12. Sudasinghe B, Wijeyaratne C, Ginige P. Long and short-term outcomes of Gestational Diabetes Mellitus (GDM) among South Asian women – A community-based study. Diabetes Research and Clinical Practice. 2018;145:93-101.
13. Filardi, T., Tavaglione, F., Di Stasio, M. et al. Impact of risk factors for gestational diabetes (GDM) on pregnancy outcomes in women with GDM. J Endocrinol Invest **41,** 671–676 (2018)
14. Harper LM, Jauk V, Longo S, et al. Early gestational diabetes screening in obese women: a randomized controlled trial. Am J ObstetGynecol 2020;222:495.e1-8
15. Hong WY, Biggio JR, Tita A, Harper LM. Impact of early screening for gestational diabetes on perinatal outcomes in high-risk women. Am J Perinatol 2016;33:758–64.
16. The Demographic and Health Surveys Program. India National Family Health Survey NFHS-4 2015–16 [The DHS Program website]. 2016. https://www.dhsprogram.com/what-we-do/survey/survey-displ ay-355.cfm.