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RESEARCH ARTICLE

IMPACT OF GESTATIONAL DIABETES MELLITUS ON PREGNANCY OUTCOME

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ABSTRACT

According to World Health Organization (WHO) prevalence of diabetes will be increase 35% between 1995 and 2025, worldwide. Various studies documented that Asian countries too have the highest prevalence of gestational diabetes mellitus, which have its effect on Maternal-fetal outcomes. This study is a review of studies, concerning with outcome of pregnancies of mothers with and without exposure of diabetes.

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INTRODUCTION

Impact of gestational diabetes mellitus (GDM) occurs in 2 to 9 percent of all pregnancies (Hoffman *et al*., 1998; Clinical Management Guidelines for Obstetrician, 2001) and it has its association with substantial rates of maternal and perinatal complications (Crowther *et al*., 2005). Different studies suggest that GDM increases the risk for later obesity in the offspring (Whitaker *et al*., 1998; Vohr *et al*., 1980; Pettitt *et al*., 1983; Silverman *et al*., 1991; Silverman *et al*., 1995) Some studies documented the relationship between the onset of GDM and complications in pregnancy and increased perinatal morbidity and mortality (Casey *et al*., 1997; Gabbe *et al*., 1977). In the considered studies, we came across a prospective analytic cohort study of non-diabetic women aged ≥24 years, receiving prenatal care in three Toronto teaching hospitals. To these women glucose challenges test (GCT) and an oral glucose tolerance test (OGTT) were found administered at 26 and 28 weeks' gestation, respectively. In this study 4274 patients were observed screened and 3836 (90%) continued to the diagnostic OGTT. The study cohort was found formed by the 3637 (95%) patients without gestational diabetes, carrying singleton fetuses. Study revealed that increasing carbohydrate intolerance in women without overt gestational diabetes was associated with a significantly increased incidence of cesarean sections, preeclampsia, macrosomia, phototherapy, and an increased length of maternal and neonatal hospital stay (Sermer *et al*., 1995). In another study,524, 8 to 10 years old children whose mothers had been screened for GDM were taken at a health maintenance organization in Seattle, WA, study considered their life-time height and weight. Study also obtained maternal plasma glucose and triglyceride levels in mid-gestation 1 hour after ingestion of 50 g of glucose. Women with glucose screening levels >7.77 mmol/L (140 mg/dL) were observed underwent a 3-hour, 100-g, oral glucose tolerance test to determine GDM status. Whitaker *et al*. resulted that prevalence of obesity was 19% and 24% in the 58 offspring of mothers with diet-treated GDM and in the 257 offspring of mothers with negative glucose screen values respectively. Study put its conclusion that diet-treated GDM does not increase the risk of childhood obesity (Whitaker *et al*., 1998).

A study reported that 332 women with GDM and 177 women with preexisting insulin-dependent diabetes mellitus (IDDM) delivered 530 infants. Of these 530, 36% newborns were found large for gestational age, 62% were appropriate for gestational age, and only 2% were found small for gestational age. It was disclosed that 76(14%) of all infants were born before 34 weeks' gestation, 115 (22%) between 34 and 37 weeks of gestation, and 339 (64%) at term. Around 50%of 233 infants (47%) were caught admitted to the neonatal intensive care unit due to respiratory distress syndrome (RDS), prematurity, hypoglycemia, or congenital malformation.

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In the same study hypoglycemia was found documented most common in 137 (27%) of all newborns with 182 (34%) infants having RDS of varying severity (Cordero *et al*., 1998). We came across another study from 1993 to 2003, considering enrollment of 1000 women having gestational diabetes (DB). This study assigned 490 women to the intervention group and 510 to the routine-care group. Results of the study revealed that the rate of serious perinatal complications was significantly lower among the infants of the 490 women in the intervention group than among the infants of the 510 women in the routine-care group (1 % vs. 4%; relative risk adjusted for maternal age, race or ethnic group, and parity, 0.33; 95 percent confidence interval, 0.14 to 0.75; P=0.01).

Study also reported that more infants of women in the intervention group were admitted to the neonatal nursery (71 % vs. 61 %; adjusted relative risk, 1.13; 95 percent confidence interval, 1.03 to 1.23; P=0.01). Women in the intervention group were found having a higher rate of induction of labor than the women in the routine-care group (39 % vs. 29 %; adjusted relative risk, 1.36; 95 percent confidence interval, 1.15 to 1.62; P<0.001), whereas rates of cesarean delivery were observed similar in both the groups (31 %and 32 %, respectively; adjusted relative risk, 0.97; 95 percent confidence interval, 0.81 to 1.16; P=0.73). Data from 573 women (from the intervention group), at three months postpartum, also revealed lower rates of depression and improved health status (Crowther *et al*., 2005). One of the studies considered data of deliveries delivered between 1995 and 2001. This study compared 394 births with 100 non-diabetic women having same gestational age (38 weeks) at delivery. In the considered study women with gestational diabetes were found with lesser parity, older, and less likely to be Caucasian than the general obstetric population. Higher risk of Caesarean section, gestational hypertension, and large for gestational age deliveries were observed in women with GDM. Higher incidence of large for gestational deliveries was found in women having treatment with insulin. The incidence of RDS was also reported similar in babies whose mothers had GDM and in those whose mothers did not (Johns *et al*., 2006).

In one of the descriptive observational studies, conducted in the Bahawal Victoria Hospital, Bahawalpur, Pakistan, in the year 2003.In this duration 1429 pregnant women were considered, in the study and glucose tolerance tests (GTT) was applied. Blood glucose levels were found controlled by diet per se or with insulin. In this study ultrasound, kick count and cardiotocography were accounted for feotal well- being assessment. Study resulted that 50(3.5%) were diagnosed as GDM, 44 (88%) patients were above 25 years of age and 38(76%) were assigned multiparous. polyhydramnios 9(18%) and macrosomia 18(36%) were observed as most frequent maternal and feotal complications. Study reported Caesarean section in 29(58%) patients (Farooq *et al*., 2007). Edward *et al*. reported in one of their studies, about the risk to the infant of a diabetic mother (IDM) to have macrosomia, hypoglycemia, hypocalcemia, RDS, polycythemia, hyperbilirubinemia, and cardiomyopathy. An increase in incidence of congenital anomalies, poor neurobehavioral development, obesity and metabolic abnormalities in later life to the IDM was also reported (Ogata, 2010). In a study of 115 newborns born to mothers with diabetes at the New York Medical College Metropolitan Hospital Center, New York, data was collected for the period 2005 to 2006. The study was observed including all women with singleton pregnancies. Out of 25 neonates born to women with pre-gestational diabetes (PGDM), the mean serum calcium level was found 8.2 mg/dl ± 1.2. In this study 8 of these 25 neonates (32 %) were found having hypocalcemia at 24 hour postnatal age. In the same study out of 90neonates born to mothers with gestational diabetes (GDM), reported mean calcium level was 8.6 mg/dl ± 1.0. 6 of these90 neonates (6.6%), were found having hypocalcemia at 24 hour postnatal age. Study concluded that the incidence of clinical hypocalcemia is higher in infants born to women with PGDM compared to the neonates born to women with GDM (Das *et al.,* 2012).

One of the prospective observational cohort study, conducted in the Christian Medical College, Vellore, a tertiary-care perinatal center in southern India, considered the data of 10,394women for the period 2008 to 2009, from all the babies born to mothers diagnosed with GDM, and requiring treatment with oral hypoglycemic agents (OHAs) or insulin. This study used National Diabetes Data Group (NDDG) criteria for diagnosis of gestational diabetes. After modification of diet, blood glucoses were observed repeated 3 to 7 in a woman having diagnosed with GDM. In this study a woman was treated with OHA, if the fasting value was >5 mmol/L (90 mg/ dL) or 1hour postprandial value >6.6 mmol/L (120 mg/dL) and if these values were >7.2 mmol/L (130 mg/dL) or >13.9 mmol/L (250 mg/dL), they were observed having treatment with insulin. Study reported 574 (5.5%) women with gestational diabetes, 137 having treatment with insulin and 141 with OHAs. Study also revealed a figure of 44 (15.8%) babies, born preterm with 97 (35%) and 13 (4.7%) babies large for gestational age and small for gestationalage respectively. 9 (3.2%) were pinpointed macrosomic. In26 (9.3%) babies, hypoglycemia was observed diagnosed. congenital anomalies and birth injuries reported were 15 (5.4%) and 7 (2.5%) respectively. In the study no significant difference was found in the two groups (P=0.04) (Thomas *et al*., 2013).

In another prospective study conducted at G. B. Pant Children hospital Srinagar between 2014- 2015.Collection of data is reported on delivery mode, gestational age(GA), birth weight, investigation results, treatment, duration of hospital stay and outcome. In this study the mean GA of IDMs reported, was 37.84±1.88 weeks. In this study, the commonest morbidities highlighted, were hypoglycemia and hyperbilirubinemia in 35 (61.4%) and 30 (52.6%) respectively. Study outcome that 59.6% of the IDMs were born to mothers with gestational diabetes, whereas 40.3% were born to mothers with pre-gestational diabetes. It was also indicated that 45 (78.8%) were born by caesarean section including 22 (38.5%)born by emergency caesarean section. Non- IDMs had vaginal deliverer according to this study (Ahmed *et al.,* 2015). We found a study investigating the effect of low glycaemic index (LGI) diet during pregnancy complicated with GDM on early post-natal outcomes. Study considered 58 women (age: 23–41 years; mean ± SD pre-pregnancy body mass index: 24.5 ± 5.6 kg m−2) who had GDM and followed either an LGI diet (n = 33) or a conventional high-fibre diet (HF; n = 25) during pregnancy.

After applying a 75-g OGTT and blood lipid tests at 3 months post-partum and anthropometric assessments for 55 mother–infant pairs, the glycaemic index of the antenatal diets were output differed (mean ± SD: 46.8 ± 5.4 vs. 52.4 ± 4.4; $P < 0.001$), but no significant differences was observed in any of the post-natal outcomes. This study concluded that an LGI diet during pregnancy complicated by GDM has outcomes similar to those of a conventional healthy diet. (Louie *et al.,* 2015)

DISCUSSION

As prevalence of diabetes is increasing rapidly with its effects on pregnancy outcomes. There is a need to educate mothers and to be mothers so that they can protect themselves and their off springs from adverse effect of gestational diabetes mellitus**.**

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