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ORIGINAL ARTICLE

Frequency of Neonatal Hyperbilirubinemia in Maternal Hyperglycemia

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ABSTRACT

Objective: To evaluate the occurrence of newborn hyperbilirubinemia among women who were diagnosed as maternal hyperglycemia.

Subject and Method: The present cross-sectional study was conducted in the OBS and Gynecology department of PNS Shifa Karachi. The study was done over the time period of six months. All pregnant women who visit antenatal clinics at PNS Shifa Hospital with a gestational age of 24 and 32 weeks undergoing a 75 gm 2 h glucose tolerance test and fulfilling criteria of IFG, IGT, or GIGT were included. After delivery, a 2 ml blood sample was drawn from each newborn and sent to the hospital diagnostic laboratory to evaluate the neonatal bilirubin level and serum bilirubin >300µmol/L after 96 hrs was considered as neonatal hyperbilirubinemia. All of the data was obtained using a study proforma. For the analysis of the data, SPSS software version 20 was utilized.

Results: A total of 157 hyperglycemic mothers were studied; their average age was 28.20±4.67years and gestational ag was 37.11±3.22 weeks. Out of all, most of the women 100(63.7%) were multiparous. Caesarean section was done in 98(62.4%) cases. New born Neonatal hyperbilirubinemia was noted in 10.2% of the cases. The frequency of the neonatal hyperbilirubinemia was higher in the age groups of 19–30 years and >30 years, while findings were non-significant statistically according to maternal age and gestational age (p = >0.05).

Conclusion: The study's findings showed that 10.2% of women with diabetes were found to have newborns with hyperbilirubinemia. It was proven to be statistically insignificant based on maternal age and gestational age.

Keywords: Maternal, hyperglycemia, hyperbilirubinemia

INTRODUCTION

Neonatal jaundice is caused by a high level of total serum bilirubin and is an extremely frequent condition. Despite the significant financial burden that is linked to it.[1] However, the determination of the maternal characteristics that are linked with newborn jaundice is extremely significant for the detection, prevention, and treatment of neonatal jaundice.[1] Babies delivered to diabetic mothers appeared to have a larger risk of developing hyperbilirubinemia than babies born to mothers who do not have diabetes. Gestational diabetes has been related to increased rates of morbidity and mortality of both mother and foetus during the pregnancy for a very long time. The major mechanisms responsible for a wide variety of prenatal and postnatal disorders are improper regulation of the metabolism in mothers, as well as the exposure of the foetus to hyperglycemia throughout pregnancy.[2,3] Evidence that is now available indicates that maternal hyperglycemia is not advantageous for the growth of the foetus or the postnatal state of the child.[3] According to the findings, the maternal hyperglycemia had a worsening outcome of the pregnancy. Neonates born to diabetic women had a raised risk of developing neonatal hyperbilirubinemia.[4] Hyperbilirubinemia of the neonates is the leading cause of hospitalization in newborns, accounting for 17%–19% of all admissions.[5,6] Whenever the blood bilirubin level seems to be more than 5 mg/dl, a condition known as neonatal hyperbilirubinemia.[5]

It is reported that there is a weak correlation between hyperbilirubinemia and the levels of blood sugar of mothers participating on OGTT, the likelihood of severe hyper-bilirubinemia, such as the type that has been associated with hemolysis, is relatively low.[7,8] The clinical manifestation of neonatal jaundice or neonatal hyper-bilirubinemia seems to be a yellowish colouring of the skin, eyes, and mucous membranes. Measurements of the invasive bilirubin continue to be the diagnostic and therapeutic gold standard for newborns having severe neonatal hyperbilirubinemia.[9] The treatment thresholds recommended by international recommendations for the care of newborns diagnosed with unconjugated hyperbilirubinemia are calculated using the total serum bilirubin levels of the infants[9]. The measurement of bilirubin is an essential part of the treatment of newborn jaundice. [9] In light of the fact that jaundice is a prevalent issue in Asian countries, including Pakistan, Therefore, this study has been done to evaluate the frequency of neonatal hyperbilirubinemia in pregnant women who present with hyperglycemia.

MATERIAL AND METHODS

The present cross-sectional study was conducted in the OBS and Gynecology departments of PNS Shifa Karachi. The study was done over the time period of six months. All pregnant women who visit antenatal clinics at PNS Shifa Hospital with a gestational age of 24 and 32 weeks undergoing a 75 gm 2 h glucose tolerance test and fulfilling criteria of IFG, IGT, or GIGT were included. All the females, those who were presented with autoimmune disease, twin pregnancy, hypertension, thyroid disorder, renal impairment, as well as those who refused to participate in the study were excluded. All participants in the study provided verbal consent after being informed of the study's purpose. To identify the current level of fasting blood glucose levels, a 5ml blood sample was obtained from every woman. The mother's glycemic test was conducted by the researcher utilizing the glucose oxide method. Women who had been very severely ill and admitted to the ICU were also excluded. After delivery, a 2 ml blood sample was drawn from each newborn and sent to the hospital diagnostic laboratory to evaluate the neonatal bilirubin level and serum bilirubin >300µmol/L after 96 hrs was considered as neonatal hyperbilirubinemia. The above-mentioned findings were compiled following the monitoring of females up until the time that they give birth. All of the data was obtained using a study proforma that was personally prepared. For the analysis of the data, SPSS software version 26 was utilized.

RESULTS

A total of 157 hyperglycemic pregnant women were studied; their average age was 28.20±4.67 years, and their gestational age was 37.11±3.22 weeks. Out of all, majority of the females, 100(63.7%) were multiparous, followed by 46(29.3%) were primiparous, and 11(7.0%) were grand multiparous. Out of 157 deliveries, caesarean section was done in 98(62.4%) cases, and 59(37.6%) underwent normal vaginal delivery, as shown in the table. 1

In this study, new-born neonatal hyperbilirubinemia was

noted in 10.2% of the neonates of hyperglycemic mothers. Fig: 1

Average of birth weight is presented in figure 2 of both male and female babies. Fig: 2

Frequency of the neonatal hyperbilirubinemia was higher in age group of 19-30 years and >30 years while findings were non-significant statistically (p = 0.615), newborn hyperbilirubinemia was also found insignificant statistically in accordance to gestational age (p = 0.401). Table.2

Table 1. Descriptive statistics of demographic variables n=157

Variables		Statistics
Maternal age (mean)		28.20±4.67years
Gestational Age (Weeks)		37.11±3.22 weeks
1-h OGTT		7.55±1.71 mmol/L
2-h OGTT		7.24±1.90 mmol/L
Fasting Blood Glucose		4.86±0.86 mmol/L
Parity	Primiparous	46(29.3%)
	Multiparous	100(63.7%)
	Grand multiparous	11(7.0%)
Mode of delivery	Normal vaginal delivery	59(37.6%)
	C-section	98(62.4%)

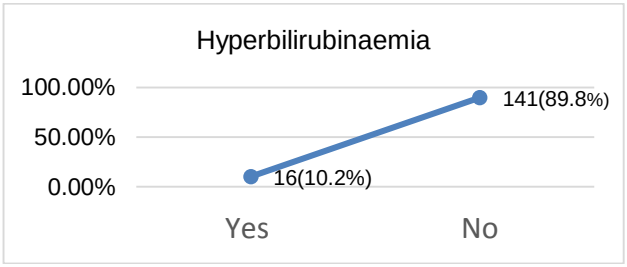

Fig:1. Frequency of hyperbilirubinemia n=157

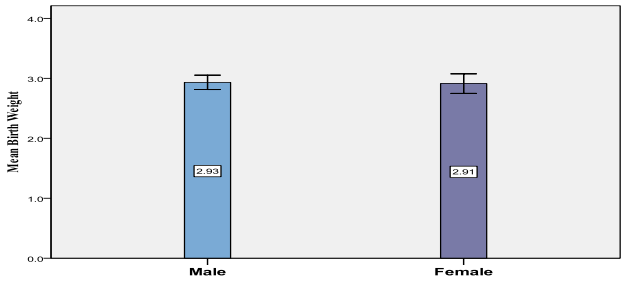

Fig:2 Mean of neonatal birth weight n=157

Table:2 Newborn hyperbilirubinemia in accordance to maternal age and gestational age n=157

Variables		Newborn hyperbilirubinemia		p-value
		Yes	No	
Maternal age	< 18 years	03	20	0.615
	19-30 years	08	59	
	>30 years	05	62	
Gestational age	<36 weeks	00	14	0.401
	37-40 weeks	09	76	
	>40 weeks	07	51	

DISCUSSION

Pregnancy-related hyperglycemia is a significant health problem for both mothers and their fetuses. Maternal hyperglycemia increases the risk of NHB in fetuses, which significantly threatens the early lives of newborns.[10] In this study, a total of 157 hyperglycemic pregnant women were studied to evaluate the frequency of neonatal hyperbilirubinemia, and it was found in 10.2% of the neonates of hyperglycemic mothers. Consistently, Chalela A et al[11] reported that the 7.5% of newborns had developed hyperbilirubinemia. On the other hand, He J et al[10] found a lower prevalence of newborn hyperbilirubinemia as 3.65%. Although Gulfareen Haider et al[12] conducted the study to assess the neonatal outcomes in diabetic women in their set-up of tertiary care and they found 21.8% hyperbilirubinemia, which is highly prevalent as compared to this study. The difference in the prevalence of newborn hyperbilirubinemia may be due to variations in study sample size and the good antenatal care of the population of developed countries.

In this study, the frequency of neonatal hyperbilirubinemia was higher in the age groups of 19–30 years and >30 years while findings were non-significant statistically (p = 0.615), newborn hyperbilirubinemia was also found insignificant statistically in accordance to gestational age (p = 0.401). Similarly, Krystyna Stencel-Gabriel et al[14] also reported that there was no correlation between the age of the mother and the prevalence of hyperbilirubinemia. The condition of hyperbilirubinemia is common in children of diabetic women. According to a less flexible cell membrane, it has been linked to a shorter erythrocyte life span.[15] The erythrocyte membrane's increased stiffness has been largely linked to changes in the structure of its lipids at the molecular level.[15,16] Increased lipid peroxidation of the cell membrane, which affects its fluidity and the mechanical stability of membrane-bound enzymes, also linked to the mechanism of hemolysis.[15,17] Hyperbilirubinemia affects newborns from poorly treated diabetes mothers more severely. On the other hand, it is stated that, a common feature of GDM is maternal hyperglycemia, which increases the amount of glucose that is transferred to the foetus. Fetal hyperinsulinemia leads to excessive and imbalanced foetal development, which increases the risk of birth trauma, shoulder dystocia, and other neonatal complications like newborn hyperbilirubinemia, or even neonatal mortality. [18] Neonates whose mothers have diabetes should have a thorough physical examination, close monitoring, and treatment as well as testing for hypoglycemia, electrolyte imbalance, including hyperbilirubinemia. Maintaining glucose levels at the very reduced level that is ideal for pregnancy is crucial to reducing negative consequences for both the mother and the foetus.[20] Consequently, excellent outcomes can be achieved with proper prenatal care and management of maternal hyperglycemia.

CONCLUSION

The study's findings showed that 10.2% of women with diabetes were found to have newborns with hyperbilirubinemia. It was proven to be statistically insignificant based on maternal age and gestational age. In accordance with the numerous limitations of our study, additional large-scale publications are advised in order to reach a firm conclusion.

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