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BIRTH WEIGHT;
TO COMPARE BIRTH WEIGHT OF INFANTS BORN TO DIABETIC AND NONDIABETIC MOTHERS

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ABSTRACT… Objectives: To evaluate the birth weight in infants born to diabetic mothers and to compare it with those born to nondiabetic mothers. **Study Design:** Descriptive cross sectional study. **Setting:** Gynae and obstetrics unit Hayatabad Medical Complex Peshawar in association with Anatomy Department Khyber Girls Medical College Peshawar. **Period:** January 2015 to June 2015. **Material and Methods:** This study was carried out on babies born to diabetic as well as non-diabetic healthy mothers. A total number of 100 diabetic mothers and 100 nondiabetic healthy mothers were selected for this study. After delivery, the weight and sex of the babies born to diabetic as well as nondiabetic mothers along with the mother's age were noted on an observation sheet. The student's t test was applied for all quantitative data. A p-value of ≤ 0.05 was taken significant. **Results:** The mean birth weight of female babies born to diabetic mothers was significantly greater than babies of nondiabetic mothers (p= 0.05). No significant difference (p=0.11) was noted when the birth weight of all babies born to diabetic mothers was compared to all babies born to nondiabetic mothers. No significant difference (p= 0.51) was noted in babies belonging to younger nondiabetic and diabetic mothers but a significant difference (p=0.01) was noted when birth weight of babies from older nondiabetic mothers was compared with birth weight of babies from older diabetic mothers. **Conclusion:** The birth weight of female babies born to diabetic mothers was significantly more as compared to babies born to nondiabetic mothers. A significant difference was also noted when birth weight of babies from older diabetic mothers was compared with the babies of older nondiabetic mothers. This larger weight of babies may be due to maternal diabetes which may affect the normal development of fetus leading to an increased morbidity and mortality in babies as well as mothers.

Key words: Macrosomia, Development of Fetus, Pregnancy in Diabetic Patient, Birth Weight, Female Infant, Male Infant, Shoulder Dystocia.

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INTRODUCTION

The normal birth weight of newborn babies in this region is about 2.91 kg.[1] There is also difference between birth weight of male and female babies. It has been noted by some investigators that the male babies are slightly heavier than female babies.[2] There are many factors which can influence the birth weight of newborns, like gestational period, birth order and sex of the baby.[3] In some of the studies associations have been found between cardiovascular problems and low birth weight and they suggested that environmental factors like maternal smoking during pregnancy may contribute to low birth weight along with associated cardiovascular problems.[4] On the other hand, maternal age can also affect the birth weight of babies.[5]

It has been reported that increased weight gain during pregnancy resulted in higher birth weight babies. Women with lower body weight are associated with lower birth weight infants. It can be presumed that maternal factors could also contribute to the intrauterine development of babies.[6] An overweight woman with high increase in fasting plasma glucose during pregnancy is at risk of having a higher birth weight baby[7] which could be associated with other congenital abnormalities.

Ehrenberg et al also observed that maternal obesity has an association with larger birth weight infants.[8] Yang et al noted that the incidences of adverse fetal and neonatal outcomes in infants' maternal diabetes is one of the major risk factor for development of congenital anomalies and they found that the adverse neonatal outcomes are greater in infants of diabetic mothers as compared to infants born to nondiabetic mothers.[9]

Weismann-Brenner et al compared maternal and neonatal outcomes of increased birth weight babies with that of normal birth weight babies. They found that babies with birth weight more than 4000 grams were associated with increased rate of cesarean section, shoulder dystocia, neonatal hypoglycemia, and longer hospitalization.[10] It is reported that diabetes is more common among female than male in certain regions. They noted that the prevalence of diabetes is 57% higher among female when compared with the male members of the same population. It may reflect the difference in lifestyle which may contribute to the higher prevalence of diabetes in female in some of the particular regions.[11]

Balaji and Seshiah have described that diabetes in pregnancy is associated with the higher risks miscarriage, pre-eclampsia, preterm labour. It is also associated with increased risk of congenital abnormalities in babies born to diabetic mothers.[12] It has been reported that infants with lower birth weights were more likely to remain lighter throughout childhood and those infants with higher birth weights were likely to remain heavier. It is suggested that birth weight is an important parameter and a strong predictor of development of obesity later in the life.[13]

As diabetes is one of the most common conditions of modern age. A major reduction in physical activities at the cost of consumption of excessive amount of unhealthy diet along with a stressful life may be some of the causative factors. As diabetes is a common condition in female which demands to study the development of fetus in diabetic mothers and compare it with those of nondiabetic mothers. The aim of this study was to evaluate the birth weight in infants born to diabetic mothers and to compare it with those born to nondiabetic mothers.

MATERIAL AND METHODS

This study was carried out on babies born to diabetic as well as nondiabetic healthy mothers at Gynae Unit HMC KGMC Peshawar from January 2015 to June 2015. A total number of 100 diabetic mother and 100 nondiabetic healthy mothers were selected for this study. The babies having associated gross congenital anomalies were excluded from this study. The mother having other chronic diseases, twin pregnancy or gross congenital abnormalities were excluded from this study. After delivery, the weight and sex of the babies born to diabetic as well as nondiabetic mothers along with the mother's age were noted on an observation sheet.

Confidentiality of the patients was ensured by keeping the observation sheet without name and by giving specific number to each patient. The data was analyzed with help SPSS version 20. The student's t test was applied for all quantitative data. A p-value of ≤ 0.05 was taken significant.

RESULTS

Weight of Babies

The mean birth weight of female babies born to nondiabetic mothers was significantly lesser than babies of diabetic mothers ($P=0.05$). As mean birth weight of female babies born to nondiabetic mothers was 2.84 ± 0.06kg and the mean weight of babies born to diabetic mothers was 3.42 ± 0.13kg. Similarly, the mean weight of male babies born to nondiabetic mothers was 3.00 ± 0.07kgwhile the mean weight was 3.70 ± 0.15kg in male babies born to diabetic mothers which was not significant. No significant difference ($p=0.11$) was noted when the weight of all babies born to nondiabetic mothers was compared to all babies born to diabetic mothers, as the mean birth weight of all babies related to nondiabetic mothers was 2.92 ± 0.04kg which were 3.54 ± 0.09kg in babies born to diabetic mothers (Table-I).

Parameter	Nondiabetic mother's babies		Diabetic mother's babies		P value
	N	Mean±SE	N	Mean±SE	
Weight of female babies (kg)	47	2.84±0.06	47	3.42±0.13	0.05*
Weight of male babies (kg)	49	3.00±0.07	49	3.70±0.15	0.43
Weight of all babies (kg)	100	2.92±0.04	100	3.54±0.09	0.11
Key: N = Number of specimens SE = Standard error of the mean * = Statistically significant					

Table-I. Comparison of birth weight of babies to nondiabetic mothers with the birth weight of babies related to diabetic mothers.

Maternal Age

No significant difference (p= 0.51) was noted in babies belonging to younger group of nondiabetic or diabetic mothers. As the mean birth weight of all babies from nondiabetic younger group of mothers was 2.85±0.06kg which was 3.55±0.14kg in babies related to younger diabetic group of mothers (Table-II). A significant difference (p=0.01) was noted when birth weight of babies from older group of nondiabetic mothers (2.99±0.07kg) was compared with birth weight of babies from older group of diabetic mothers (353±0.14kg).

Parameter	Nondiabetic mother's babies		Diabetic mother's babies		P value
	N	Mean±SE	N	Mean±SE	
Birth weight of babies from younger mothers (kg)	50	2.85± 0.06	50	3.55± 0.14	0.51
Birth weight of babies from older mothers (kg)	50	2.99±0.07	50	3.53±0.14	0.01*
KEY: N = Number of specimens SE = Standard error of the mean * = Statistically significant					

Table-II. Comparison of birth weight of babies related to younger mothers with the babies of older mothers.

DISCUSSION

Weight of Female Babies

As mean birth weight of female babies born to nondiabetic mothers was 2.84 kg. These finding are consistent with the observations of Kumar et al who found that the mean birth weight of female babies is about 2889 grams[2]. We also observed that the difference in mean birth weight is greater for male than female babies. This is also in accordance with the result of a study who observed that the differences in mean birth weights have been consistently greater in male infants.[14] The mean weight of female babies born to diabetic mothers was 3.42 kg. This mean birth weight of female babies born to nondiabetic mothers was significantly less than babies of diabetic mothers (P=0.05). These finding are consistent with observations of Persson et al who noted that fetal macrosomia is more pronounced in female offspring of diabetic mothers.[15] Other researchers study shown that maternal diabetes increases the chances of occurrence of obesity in female offspring more as compared to male offspring.[16]

Weight of Male Babies

Similarly, the mean weight of male babies born to nondiabetic mothers was 3.00kg while the mean weight was 3.70 kg in male babies born to diabetic mothers which was not significant. This increase in weight of male babies may be due to greater circulating levels of glucose during fetal life, in infants related to diabetic mothers. This increased blood glucose level predisposes these babies to increased body weight as well as obesity.[17]

Weight of All Babies

No significant difference (p=0.11) was noted when the weight of all babies born to nondiabetic mothers was compared to all babies born to diabetic mothers, as the mean birth weight of all babies related to nondiabetic mothers was 2.92 kg which were 3.54 kg in babies born to diabetic mothers. The increased body weight noted in all babies may the result of intrauterine exposure to high glucose level which affected both male and female babies. The babies with increased birth weight are at high risk of developing obesity or diabetes later in life.[18]

Lesser Maternal Age

No significant difference (p= 0.51) was noted in babies belonging to younger group of nondiabetic or diabetic mothers. As the mean birth weight of all babies from nondiabetic younger group of mothers was 2.85 kg which was 3.55 kg in babies related to younger diabetic group of mothers.

We observed that there was no significant increase in birth weight of newborn babies related to young diabetic mothers. This is also in accordance with the result of a study that there was an association of maternal age at delivery and birth order of the baby. They observed that first born child are usually normal but with increasing maternal age the incidence of type 1 diabetes increases in these babies later in life.[19]

Greater Maternal Age

A significant difference (p=0.01) was noted when birth weight of babies from older group of nondiabetic mothers (2.99 kg) was compared with birth weight of babies from older group of diabetic mothers (3.53 kg). It could be suggested that recent increase in some of the childhood diabetes may be related to increasing maternal age.[20] It has been reported that the macrosomia noted in babies born to diabetic mothers, can be a cause of certain neonatal complications like shoulder dystocia or birth trauma.[21] Some other congenital abnormalities were also observed in babies born to diabetic bothers which should be considered when planning the pregnancy in diabetic mothers.[22]

CONCLUSION

The mean birth weight of female babies born to diabetic mothers was significantly more as compared to babies born to nondiabetic mothers. A significant difference was also noted when birth weight of babies from older diabetic mothers was compared with the babies of older nondiabetic mothers. This larger weight of babies born to diabetic mothers may be due to abnormal glucose regulation and control during pregnancy which may affect the normal development of fetus. The fetus larger size is likely to give rise to an increase in morbidity as well as mortality both in infant and mother.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Shahabuddin	Main idea, methodology,tables and discussion.	
2	Aiman Moeen	Introductio, data collection, analysis.	
3	Ihsan Ullah	Conclusion and references, review and final correctionof the article,and correspondence with the journal team.	
4	Niaz Mohammad	Overall supervision and abstract.	