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A CROSS SECTIONAL AND COMPARATIVE STUDY TO DETERMINE RELATIONSHIP OF ANEMIA IN PREGNANCY WITH THE BIRTH WEIGHT OF NEW BORN

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Abstract:

Objective: The purpose of study is to determine relationship of anemia n pregnancy with the birth weight of new born. Comparison between anemic and non-anemic pregnant females was done.

Methodology: The study design is comparative, cross sectional conducted at Lady Aitchison hospital, Lahore from to January 2019 to March 2019. The permission was granted to authors from the hospital ethical committee. Total 200 patients were enrolled and were stratified into two groups, consisting of 100 patients each. Patients with single fetus at term and till gravida 5 were included in study while those suffering from other causes of low birth weight like, grand multipara, multiple pregnancies, intra-uterine growth retardation (IUGR), preterm and any other co-morbidity which can possibly lead to low birth weight were excluded. Maternal complete blood count was performed. Blood sample was collected at the time of enrollment. Data was collected on a pre-designed form after taking informed written consent. Data analysis was done by using SPSS version 10.

Results: The mean birth weight of newborns of anemic mothers was 2338 ± 266 grams while in non-anemic mothers birth weight was 3081 ± 307 grams. The p value was 0.000. The patients in anemic group were stratified into mild, moderate and severe which were 25%, 65% and 10% respectively. The moderately anemic mothers had 2184 ± 89 grams birth weight of their newborn while severely anemics had 1990 ± 73 grams, p value was 0.000.

Conclusion: The study shows that mothers with anemia i.e. hemoglobin level less than 11 g/dl had low birth weight babies while those with HB equals or more than 11g/dl had normal birth weight babies.

Key Words: Birth weight, New born, Anemia, Pregnancy

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INTRODUCTION:

Anemia in pregnancy is one of the most common problems in developing countries like Pakistan. The anemic mothers suffer many pregnancy related complications and babies born to anemic mothers suffer complications like PPH, increased perinatal mortality, low birth weight, small for gestational age babies. Although anemia in any trimester can lead to maternal and fetal complications but its major complications are noted mainly during first trimester anemia [1, 2, 3]. Badon SE, et al in his article published in 2018, studied the effect of maternal lifestyle on neonatal health and its relation with sex of child was also studied. It was concluded that healthy lifestyle in early pregnancy was associated in increased birth weight in male child while lower birth weight in female child [4]. In a year more than 20 million low birth weight babies are born worldwide. These low birth weight babies have increased risk of mortality, morbidity and fatal complications. There are several maternal and fetal risk factors which lead to low birth weight babies. A comprehensive cohort study was conducted by Ashorn P, et al in rural Malawi and several risk factors were studied and their association with neonatal size was studied. It was concluded that improving maternal nutrition and reducing maternal infection rate during pregnancy can helping improving neonatal birth weight [5]. Fetal hemoglobin concentration increases progressively with increasing gestational age and maternal iron requirement and dietry requirement also increases. Cord clamping interval after delivery of baby also alters the hemoglobin level in child. In a study conducted in India, by Chaturvedi P, et al in 2018 the association of neonatal hemoglobin level with maternal hemoglobin level was found out and it was observed that babies of anemic mothers had low hemoglobin concentration as compared to non-anemic mothers and proportion of decreased hemoglobin level was strongly related to severity of anemia [6]. Nair M, et al. concluded investigated maternal and neonatal data obtained from two hospitals in England by following retrospective cohort study design in 2018 in which it was concluded that still birth risk increases in anemic mothers but its association with low birth weight babies and neonatal mortality is more. However, more research data needs to be collected in this regard in order to find direct association of anemia in pregnancy with still birth rate [7]. Pakistan is a developing country in which 70% of population lives in rural areas. The dietary supplementation is not enough for whole population. Mostly the local population belongs to lower socioeconomic status, with only one male member of family as earning hand.

Thus females cannot keep up with the dietary requirement during pregnancy. In our culture the other factors like multi-parity, inadequate spacing is also common leading to low birth weight children. Anemia in child bearing women is far more common than in males. The understudy title aims in highlighting the major cause of low birth weight in our population, so that effective measures can be taken by maternal iron and nutritional supplementation and neonatal low birth weight can be reduced. Besides that the neonatal and maternal death rate can also be significantly reduced by overcoming the malnutrition in females of child bearing age [13].

MATERIALS AND METHODS:

The study follows comparative cross sectional design and was conducted on a sample of 200 pregnant females who were compared by dividing into two groups 100 each. Group A was anemic (hemoglobin less than 11 g/dl) while group B was non anemic (hemoglobin 11g/dl or more). The study was conducted at Govt. Lady Aitchison hospital during January 2019 to March 2019. Detailed clinical history was recorded on a predesigned questionnaire about gestational age, parity, and other disease. Detailed past history was taken from all the participants. Clinical examination and obstetric examination was performed on all patients. All other causes which can lead to low birth weight of neonate were excluded like multi parity, preterm, post term, gestational diabetes mellitus and multiple pregnancies. Clinical investigations were done from hospital laboratory. Complete blood count, blood sugar level, obstetric ultrasonography were performed to confirm anemia, gestational diabetes mellitus, oligohydramnios or polyhydramnios, IUGR, multiple pregnancies, gestational age, any congenital abnormality was confirmed on ultrasound. After collection of detailed information through history, examination and investigation stratification into two groups consisting of anemic and non-anemic was done. It was made sure that all participants must meet the inclusion criteria i.e. parity less than five, term, single pregnancy, without maternal comorbidity and with no other cause of low birth weight. The birth weight in grams of all enrolled females was recorded to study effect of anemia on birth weight. Data analysis was done using SPSS version 10. Chi square test was used to compare both groups. Quantitative variables were presented in form of mean $\pm$ SD. Null hypothesis was tested by using student t-test and p-value of less than 0.05 was considered significant.

RESULTS:

200 was sample size compared after dividing into two equal groups. 50% i.e. 100 out of 200 females were anemic. The anemic was defined as hemoglobin level less than 11 g/dl. All females were at term and had singleton pregnancy. Patients in anemic group were further divided into mild, moderate and severe anemia and were 65%, 32% and 3% respectively. Birth weight of all neonates was measured in grams and was compared. The mean birth weight of newborns of anemic mothers was 2338± 266 grams while in non-anemic mothers birth weight was 3081±307 grams. The p value was 0.000. The patients in anemic group were stratified into mild, moderate and severe which were 25%, 65% and 10% respectively. The moderately anemic mothers had 2184 ± 89 grams birth weight of their newborn while severely anemics had 1990±73 grams, p value was 0.000. 45 (70%) neonates were of normal birth weight in mild anemic mothers, while 20 (30%) had low birth weight. Only 5(16%) babies were of normal birth weight in moderately anemic mothers while 27 (84%) had low birth weight. 100 % babies born to severely anemic mothers were anemic. The p-value was 0.000. The results show a strong correlation between anemia in pregnancy and birth weight of babies born to such mothers.

Table 1: Comparison of mean neonatal birth weight between both groups.

Groups	Mean fetal birth weight in grams	p-value
Anemic group	2338□266	0.000
Non-anemic group	3081□307	0.000

DISCUSSION:

Several research studies have been conducted across the globe to study the effect of maternal anemia on neonatal health. Anemia is associated with several neonatal complications like asthma, neonatal anemia, low birth weight, still birth, affected anthropometric measures, early and late neonatal death and mental retardation. Association of maternal anemia and childhood asthma was evaluated by obtaining birth data from record of Kuopio University Hospital between 1989 and 2007. 8189 women had anemia during pregnancy which was 21% of total sample. Maternal anemia was associated with childhood asthma [8]. Gestational weight gain association with baby birth weight was estimated and it was observed that > 4kg baby birth weight was associated with euglycemic obese mothers. Increased risk of neonatal hyperinsulinemia and macrosomic babies was noted in euglycemic obese pregnant females [14]. In India a study was conducted by Behal m, et al and anthropometric derangements and their association with maternal weight was estimated. It was observed that 53.75 females were anemic in third trimester out of total pregnant female cohort. The anthropometric measures were compared between babies born to mothers with mild or no anemia and those with severe anemia, the results depicted low anthropometric measurements in babies of severely anemic mothers [9, 10]. Dietary supplementation of arginine and other amino acids showed fruitful results in mothers and offsprings in animals. The study was conducted to evaluate the role of dietary arginine supplementation during pregnancy and its effect on maternal and child health the results favored the hypothesis that high protein intake during pregnancy lead to healthy pregnancy and offspring[11, 12]. Different causes of low birth weight were studied by drawing a sub sample from a national survey in Bangladesh and it was noticed that 20% babies had low birth weight. The most common risk factor was maternal malnutrition and maternal infections. The babies born to mothers from higher socioeconomic class had less low birth weight ratio as compared to those from lower income class [14]. Pre pregnancy maternal nutritional status affects child birth weight and gestational weight gain. Healthy pre-pregnancy females suffer less pregnancy related complication. The birth weight and gestational age at time of delivery were maximum, if gestational weight gain was more than 11 kg, followed by lower gestational weight gain and strong association between maternal pre-pregnancy nutritional status and GWG was observed [15]. Pakistan is a developing country in which 70% of population lives in rural areas. The dietary supplementation is not enough for whole population. Mostly the local population belongs to lower socio-economic status, with only one male member of family as earning hand. Thus females cannot keep up with the dietary requirement during pregnancy. In our culture the other factors like multi-parity, inadequate spacing is also common leading to low birth weight children. Anemia in child bearing women is far more common than in males. The understudy title aims in highlighting the major cause of low birth weight in our population, so that effective measures can be taken by maternal iron and nutritional supplementation and neonatal low birth weight can be reduced. Besides that the neonatal and maternal death rate can also be significantly reduced by overcoming the malnutrition in females of child bearing age [13].

CONCLUSION:

The study shows that mothers with anemia i.e. hemoglobin level less than 11 g/dl had low birth weight babies while those with HB equals or more than 11g/dl had normal birth weight babies.

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