

Examine the Accuracy of Ultrasound in Estimation of Fetal Weight and Comparison with Post Delivery Birth Weight

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ABSTRACT

Aim: To determine the accuracy of ultrasonography in estimation of fetal weight and comparison with post delivery birth weight.

Methods: This cross-sectional study was conducted at Department of Gynaecology and Obstetrics Sughra Shafi Medical Complex affiliated with Sahara Medical College, Narowal, from 1st January to 30th June 2018. In this study, 265 pregnant women of ages 20 years to 40 years were randomly selected. After taking informed consent from all pregnant women, detailed evaluation of all patients was done by thorough history examination and investigations. Literacy level, socio-economic status, patient's weight, height and parity were also noted. Fetal weight at 37-42 weeks of gestation was estimated by using ultrasound and compared it to post delivery birth weight.

Results: Out of all 265 patients, 144(54.33%) patient's ages were between 20 to 30 years, 90(33.96%) patients were between 30 to 35 years and rest 31(11.70%) had ages greater than 35 years. Patient's weight was in range between 50kg to 90 kg. Minimum fetal weight was observed as 2.30kg while maximum was 4.60kg at 37-42 weeks gestation. After birth weight accuracy of ultrasound resulted 71.70%. Error estimation was noted as 71.70%, 15.09% and 13.20% as accurate, over and under estimated.

Conclusion: Estimation of fetal weight by ultrasound is a good option with high accuracy, however chances of error are prevalent upto $\pm 13\%$.

Keywords: Ultrasound, Fetal weight, Birth weight

INTRODUCTION

Macrosomia has enormous observation and may lead to increase in perinatal mortality and morbidity due to genital tract trauma and postpartum bleeding². Studies report long term health issues as a result of macrosomic births¹. Consequently it is reported that estimation of fetal weight is very helpful in controlling the intervals and time of delivery². Fetal weight can be estimated either by ultrasonic measurement of fetal parts or by clinical examination of fetal parts and calculation based on uterine height^{3,4}.

Prenatal estimation of fetal weight at term is very helpful in management of labour, delivery and prenatal care, as it helps the obstetrician to make decision for mode of delivery^{5,6}. By knowing estimated fetal weight obstetrician can make decision about whether instrumental vaginal delivery or vaginal birth after cesarean can be attempted or elective C-section is safe for those patients who have macrosomic fetus. Appropriate route of delivery for macrosomic fetuses can help in preparation of shoulder dystocia or to prevent a traumatic delivery⁷. Several researches have been established for importance of ultrasonography method for fetal weight estimation, intrauterine growth, isoimmunization and macrosomic fetuses^{8,9}.

The fetal weight estimation by using ultrasound takes in account of different measurement of fetal body parts integrated into different formulae. The most popular strategy of this is using formula based on hand abdomen femur measurement¹⁰. Comparing ultrasound prediction and palpation techniques for fetal weight measurements,

studies reports a difference in sensitivity and specificity upto 92.1% versus 99.6%.^{9,11} However another study reported that accuracy of the ultrasound in prediction of birth weight resulted 72.2%.¹² Irrespective of its simple use, ultrasonic estimation of fetal weight could have variation in measurement up to 6 to 11%.¹³

The present study was conducted to examine the accuracy ratio of estimation of fetal weight by using ultrasound method. This comparison addressed the important role of Ultrasound technique for preventing mortalities and morbidities related with macrosomia.

PATIENTS AND METHODS

This cross-sectional study was conducted at Department of Gynaecology and Obstetrics Sughra Shafi Medical Complex affiliated with Sahara Hospital, Narowal from 1st January to 30th June 2018. In this study, 265 pregnant women of ages 20 years to 40 years were randomly selected. Mothers with their pregnancy at term ranged gestational age from (37-42weeks) and admitted for normal vaginal delivery, elective C-section delivery and induction of labour were included. Patient's detailed history regarding age, literacy level, socio-economic status, gravidity, parity, gestational age and booking status was noted. Patient's weight was also noted. Fetal weight was estimated by using ultrasound and it was compared to post delivery birth weight by using weight machine. Ultrasound examination was done by the expertise. Patients with preterm labour, multiple pregnancies and malformation were excluded from this study. All statistical data was analyzed by computer software SPSS 16.0.

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RESULTS

Out of all 265 patients, 144(54.33%) patients were ages between 20 to 30 years, 90(33.96%) patients were ages between 30 to 35 years and rest 31(11.70%) had an ages greater than 35 years (Table 1). The literacy rate was 110(41.59%). 160(60.38%) had an urban residency and 105 (39.62%) patients were belonged to rural areas. Eighty (30.19%) patients had weight 50 to 59kg, 152(57.36%) had 60kg to 80kg weight and 33(12.45%) had weight >80kg (Table 2). Minimum fetal weight was observed as 2.30kg while maximum was 4.60kg. After birth weight range was 2.40-4.50kg at 37-42 weeks of gestation (Table 3). Accuracy of ultrasound resulted 190(71.70%) patients while 75 (28.30%) had an error in estimation (Table 4). Error estimation was noted as 71.70%, 15.09% and 13.20% as accurate, over and under estimated (Table 5).

Table 1: Age-wise distribution of mothers

Age (years)	No.	%
20-30	144	54.33
31-35	90	33.96
>35	31	11.71

Table 2: Demographic details of patients

Characteristics	No.	%
Literacy Level		
Literate	110	41.59
Illiterate	155	58.41
Residency		
Urban	160	60.38
Rural	105	39.62
Weight (kg)		
50-59	80	30.1
60-80	152	57.36
>80	33	12.45

Table 3: Fetal weight by ultrasound and by weight machine after birth

Characteristics	Minimum	Maximum
Fetal weight (kg)	2.30	4.60
After Birth	2.40	4.50

Table 4: Accuracy of ultrasound in estimated fetal weight

Characteristics	No.	%
True	190	71.70
False	75	28.30

Table 5: Estimation error by USG

Characteristics	No.	%
Accurate	190	71.70
Over estimated	40	15.09
Under estimated	35	13.20

DISCUSSION

Fetal weight estimation is very important in pregnancy management. It helps to predict fetal outcomes and delivery mode. Estimation of fetal weight accurately may reduce the perinatal morbidity and mortality in high risk pregnancies such as intrauterine growth retardation, premature labour and macrosomia. Estimation of fetal weight by using ultrasound is most commonly using method.¹⁰ Weight examination range of 10% of actual birth

weight is considered accurate and mostly studies showed seventy five percent of accuracy by ultrasonography^{10,11}.

In this research the accuracy rate by using ultrasound was 71.70% and these results shows similarity to some other studies in which accuracy rate was greater than 70%¹⁴. This study showed that 15.09% as over estimated rate and under estimated rate was 13.20%. The current study showed that 100-300 grams difference in prediction of fetal weight and after delivery birth weight by weight measuring machine and these results show little difference to some other studies established regarding estimation of fetal weight^{12,15}.

In this study we found low estimation error by using ultrasound however, few other studies reported high estimation error and may lead to stress, anxiety and sometimes obstetrical problems for mothers because of inaccurate prediction of fetal weight. This study showed minor error between ultrasound fetal weight and actual birth weight (100-300 grams) which is comparable with other researchers¹⁶⁻¹⁹.

In our study birth weight was measured immediately after birth but some studies determined estimated weight 14 days prior to delivery while some other studies determined estimation about weight within 7 days and corrected the estimated weight by addition of 25 gram per day during ultrasound and delivery.

In our study accuracy rate of ultrasound is much better than other studies but yet it is not a sufficient research due to small number of patients and many other conditions. More research is required for better treatment and to reduce morbidity and mortality.

CONCLUSION

Estimation of fetal weight is very important for the mother and neonatal health care. In this study, we concluded that use of ultrasound in prediction of fetal weight is more accurate than the other methods, and error estimation of fetal weight was observed that is 100-300 grams of actual birth weight. Moreover, rely only on ultrasonography for estimation of fetal weight may lead to obstetrical problems.

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