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CORRELATION OF ULTRASONOGRAPHIC ESTIMATED FETAL WEIGHT WITH ACTUAL BIRTH WEIGHT

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ABSTRACT

Background: The key predictor of the outcome of labour, as well as of perinatal illness, mortality, and maternal morbidity, is the weight of the foetus as determined by ultrasonography. The manner of delivery can be chosen by the obstetrician using an ultrasound estimate of the foetal weight at term. **Aim:** This study was conducted to correlate the ultrasonographic estimated fetal weight at term with actual birth weight in patients attending the medical college hospital. **Materials and Methods:** In collaboration with the radiology department, the study was carried out at OBG department. The time frame for this study's retrospective cross-sectional design was from February 2019 to November 2021. 300 pregnant women were selected in the study. **Results:**

The estimated foetal weight determined by ultrasonography and the actual birth weight correlated favourably. 88% of predicted weights were within ten percent of actual birth weight on average. **Conclusion:** The weight of the foetus at ultrasonography and the actual birth weight were closely correlated. Making decisions in the delivery room requires the use of this crucial tool.

Keywords: Ultrasonography, foetal birth weight

INTRODUCTION

Prior to the invention of ultrasound, the Johnsons or Dares formula was used to determine the intrauterine foetal weight. Although still employed in many healthcare settings, ultrasound-based foetal weight estimation has mainly replaced these clinical procedures. Birth weight extremes are linked to a higher risk of problems for the baby[1,2]. This provides useful information to the practising obstetrician, enabling him to decide whether to permit a vaginal

delivery or else to perform a caesarean section. Given that it is well-known that the foetus continues to gain weight at a rate of 30-35 gm/day at term, the scan delivery interval may lessen the significance of foetal weight assessment. For measuring foetal weight, sonography has a number of technical restrictions, including maternal obesity, oligohydramnios, and an anterior placenta[3,4]. In our nation, the administrative tools at the disposal of the health department regularly monitor pregnant mothers' health and have been successful in reducing maternal and perinatal morbidity and mortality[5]. We have not yet reached the stats of the industrialised countries, but we are moving steadily and gently in that direction. One aspect of prenatal treatment is the ultrasound measurement of foetal weight. On this subject, appropriate literary reviews were created, which served as the foundation for our study.

Materials and Methods

This is retrospective cross-sectional study carried out at OBG department. The time frame for this study's retrospective cross-sectional design was from February 2019 to November 2021.

Study population: All term singleton pregnancies that met the criteria for inclusion were included. There was informed consent received from all patients. 300 pregnant women were selected in the study. Women with singleton pregnancies, term pregnancies greater than 37 weeks, cases who had maternal and foetal diseases, women who had to undergo delivery within 7 days after ultrasound were included in the study. Women with complicated pregnancies like multiple pregnancy, IUGR, women who had to undergo delivery greater than 7 days after ultrasound were excluded from the study. Before proceeding with the study, institutional ethical committee clearance was obtained. To learn about the patient's age, last period, gestational age, parity, actual birth weight, and ultrasound estimate of the term foetal weight, the patient's case documents were received. In the radiology Department, a Samsung Accuvix XG device was employed. An experienced radiologist used a 3.5 MHz curvilinear transducer to perform the scans. The Hadlock method, which accounts for BPD (biparietal diameter), HC (head circumference), AC (abdominal circumference), and FL (femoral length), was used to determine the foetal weight. HC alone is not very useful because babies of identical weights can have varying head sizes. Femoral length is not usually accurate because newborns of the same weight can have various lengths. The computer software programme receives all the collected parameters. Shepard and Hadlock formulas are the most often used equations for estimating Effective foetal weight. The patient was informed of the scanning process before it started. The patient was made to lie on his or her back with the

exposed abdomen. On the abdomen, gel was administered. BPD and AC measurements were made at a level that revealed the third ventricle and the cavum septum pellucidum as well as a smooth, symmetrical head, a well-defined midline echo, and the thalami. The callipers were positioned from the parietal bone's outer boundary to its inner margin on the opposing side. A transverse picture was used to measure the AC at the level where the right and left portal veins joined together to form a "J shape," and the shortest length of the left portal vein's umbilical segment was shown. The vertebrae were at the horizontal plane and the foetal stomach served as additional landmark. FL measurement: After locating an iliac bone, the transducer was moved until the femur's entire length was visible and as horizontal as it could be. The femoral bone's diaphysis's outer margins are separated by a distance called FL. To increase the precision of FL measurement, care was made to make sure that soft tissue was visible beyond both ends of the femur and that the femoral bone did not at any time converge with the skin of the thigh. Sonographic estimated fetal weight: The ultrasound scanner automatically determined the mean after measuring the foetal parameters, and the scanner automated weight measurements of the foetus. Actual birth weight measurement: The birth weight was estimated by using a digital baby scale after cleaning the baby. Data typed into a Microsoft Excel sheet. Mean and other descriptive statistics are both. The data were interpreted using the standard deviation and inferential statistics like the paired t test and Pearson's product moment correlation (r). The cutoff point for the significance test was established at $P < 0.05$. using SPSS software, version 24 for the analysis.

RESULT

In this study, 300 pregnant women were selected. The mean maternal age was 25.87 years (17 to 38 years). The mean fetal weight estimated was 2.97 kg by ultrasound and the mean birth weight was 2.85 kg.

Table 1: Distribution based on age.

Age distribution	Frequency	Percentage
Upto 20 years	35	11.6
21-25 years	125	41.6
26-30 years	100	33.4
31-35 years	25	8.4
Greater than 36 years	15	5

Table 1 shows that 35 patients were observed to have upto 20 years, in the age group 21-25 years, 125 patients were observed, in the age group 26-30 years, 100 patients were observed,

in the age group of 31-35 years, 25 patients were observed and 15 patients were observed to have greater than 36 years.

Table 2: Distribution based on gravida

Gravida distribution	Frequency	Percentage
Primi gravida	95	31.6
Second gravida	107	35.7
Multi gravida	98	32.7

Table 2 shows that 95 patients (31.6%) were primis, 107 (35.7%) were second gravids and 98 (32.7%) were multi gravids.

Table 3: Distribution based on birth weight

Birth weight distribution	Frequency	Percentage
2000-2499 gms	50	16.7
2500-2999 gms	135	45
3000 gms & above	115	38.3

Table 3 shows that birth weight of 2000-2499 gms was observed in 50 patients (16.7%), birth weight of 2500-2999 gms was observed in 135 patients (45%) and birth weight of 3000gms and above was observed in 115 patients (38.3%).

Table 4: USG weight distribution

USG Birth weight distribution	Frequency	Percentage
2000-2499 gms	35	11.7
2500-2999 gms	144	48
3000 gms & above	121	40.3

Table 4 shows that USG birth weight of 2000-2499 gms was observed in 35 patients (11.7%), birth weight of 2500-2999 gms was observed in 144 patients (48%) and birth weight of 3000gms and above was observed in 121 patients (40.3%).

Table 5: Correlation between paired samples

Birth weight (Kg) & USG fetal weight (Kg)	Number	Correlation, r
	300	0.759

Table 5 shows that correlation between actual birth weight and USG birth weight r=0.759 and which is positive correlation and P value was significant (P=0.0001).

DISCUSSION

The scope of prenatal and postpartum care indicates how well-developed the health delivery systems are. When deciding on the mode of delivery, foetal weight prediction is of utmost

importance. Since Ian Donald's time, a great deal of progress has been made, and today ultrasound is a highly accurate tool for predicting foetal weight, alcohol consumption, and other factors. We now have machines with built-in equations for precisely determining the foetal weight after multiple upgrades to the machine's original design. This weight estimation is crucial, especially when assisted breech birth or VBAC are being considered. In present study, it was found that actual birth weight was within ±10% of USG predicted weight in 88%. Similar results were observed in study conducted by R Sujatha et al[6] study, 87.6% of estimates were within 10% of the actual birth weight. According to a study conducted at a tertiary care hospital in Bharatpur, Nepal, by Dr. Pratik Poudel[7], 65% of estimates were within 10% of the actual birth weight. Similar results were observed in studies done by Bajracharya et al[8]. ,La font et al[9]., Dimassik et al[10]., Colmand et al.[11] and observed 60%,69%,69.6% and 75% respectively. In a study conducted by Chisolum Ogechukwu Okafor et al[12], similar results as the present study was reported that is the study included 170 pregnant women in total. The average maternal age was 30.77 + 5.54 years. While the mean estimated ultrasound weight was 3.43 kg with 0.8, the mean birth weight was 3.47 kg with 0.47. The estimated weight from the ultrasound and the actual birth weight correlated favourably. The average time between an ultrasound and birth was 0.8 days (with range of 0–2 days). The study measured a mean absolute inaccuracy of 258.22 grammes and a mean estimation error of 41.17 grammes. The mean absolute estimation error was 7.56%, whereas the mean percentage error was 0.65%. In relation to the actual birth weight, 72.54% of the estimated weights were within 10%. Jan-Simon Lanowski et al[13] reported results which was The analysis comprised 204 women in all. Comparatively to all other examiners, trained ultrasound techs were the most precise when calculating foetal weight. The analysis of all four techniques revealed that ultrasound provided the best precise estimation of baby weight. There may be no set learning curve. The accuracy of the projected weight was impacted by BMI and advanced gestational age. The analysis demonstrated that for foetuses at either end of the extremes of foetal weight, i.e., with very low or very high birth weights, a higher difference between estimated weight and actual weight occurred with all four techniques. Cletus Uche Eze et al[14], reported that the average birth weights, both estimated and actual, were 3378 g and 3393 g, respectively. The two means' difference was not statistically significant. Twelve percent of foetuses were sonographically assessed to be macrosomic, but fifteen percent of them were macrosomic at birth. Eleven percent of foetuses were sonographically estimated to be microsomic. Fetal weights increased with maternal age and

parity, and caesarean sections (CS) were used to deliver the majority of macrosomic foetuses. In study conducted by Charles Njoku et al[15], 200 parturients participated in this prospective comparative study, which was carried out at the University of Calabar Teaching Hospital in Calabar. Mothers who were admitted for birth at singleton term were study participants. Both the clinical and ultrasound procedures had similar mean absolute percentage errors, and the difference between them was not statistically significant. For both clinical foetal weight estimation and ultrasound, the accuracy within 10% of actual birth weights was 69.5% and 72%, respectively, and the difference was not statistically significant. In our study, there was a strong association between the actual birth weight and the effective foetal weight determined by USG. In addition to helping with labour room dynamics, estimating term intrauterine foetal weight facilitates weight-based categorisation and helps forecast perinatal morbidity and death.

Conclusion: Because it is simple to do, there are technologically advanced versions of the USG available, and it is non-invasive, ultrasound has become the standard method for estimating foetal weight. In our study, we observed that there was an 88% correlation between the term ultrasonography weight and the actual birth weight at a + 10% interval. The weight of foetuses can be accurately predicted by sonography, it seems. However, it has been determined in certain research that ultrasound provides no additional advantage and that the time-tested clinical methods of foetal weight prediction are sufficient. For reliable estimates of the foetal weight, the radiologist's experience is a crucial factor. To ascertain the relationship between actual birth weight and the term ultrasonography foetal weight among the community of pregnant women, it was decided to conduct this study.

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