



ULTRASONOGRAPHICALLY ESTIMATED FETAL WEIGHT AND ACTUAL BIRTH WEIGHT – A CORRELATIVE STUDY IN A DISTRICT HOSPITAL

Radio-Diagnosis

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ABSTRACT

Background: Assessment of fetal weight is an essential part of antenatal care, which is useful in growth monitoring and decision regarding the mode of delivery. The ultrasound method is generally a better predictor of the actual birth weight than the clinical method. **Objective:** To determine the correlation between fetal weight estimated by ultrasonography and actual birth weight in a district hospital. **Materials And Methods:** This was a hospital-based, prospective, comparative cross-sectional study carried out in the District Hospital, Gomati, Tripura, over a 3 months period. Fifty pregnant who fulfilled the inclusion criteria, were selected for the study. **Result:** Results showed a positive correlation between the fetal weight estimation on USG and the actual birth weight of the babies, i.e. $r=0.802$ ($p<0.05$). **Conclusion:** The ultrasound fetal weight correlated well with the actual birth weight.

KEYWORDS

INTRODUCTION

Assessment of fetal weight is an essential part of antenatal care, which is useful in growth monitoring and the timely identification of high-risk pregnancies and decision making regarding the mode of delivery. Birth weight is one of the most important determinants survival of newborn. [1, 2].

The two main methods for predicting foetal birth weight in current obstetrics practice are clinical and ultrasonographic fetal weight estimation. [3] Before the advent of ultrasound, intrauterine fetal weight used to be estimated by clinical methods. However, fetal weight estimation with clinical formulae is not very accurate, especially in low birth weight babies. [4]

The ultrasound method is generally a better predictor of the actual birth weight than the clinical method, and thus it is used in estimating the actual birth weight when accessible. [5, 6]

Moreover, Ultrasonography is safe, cost-effective and easy available imaging modality.

This study was aimed to determine the correlation between fetal weight estimated by ultrasonography and actual birth weight in a district hospital.

MATERIAL & METHODS

This was a hospital-based, prospective, comparative cross-sectional study carried out in the 'Radiology unit' of 'District Hospital, Gomati', Tripura, over a 3 months period (Nov'24 to Jan'25). Fifty consecutively consenting pregnant who fulfilled the inclusion criteria, were selected for the study.

Inclusion Criteria

- Only women with singleton pregnancies.
- Term pregnancies >37 weeks
- Cases uncomplicated by maternal and fetal diseases.
- Delivery within 7 days after Ultrasound.

Exclusion Criteria

- Women with preterm pregnancy, high risk pregnancy, active phase of labour and foetal congenital anomaly.
- Women with complicated pregnancies like multiple pregnancy, IUGR.
- Delivery >7 days after USG

Relevant socio-demographic data (age, parity & gravida, literacy) were obtained.

All the examinations were performed trans-abdominally by the consultant radiologist using curvilinear transducer of ultrasound systems ('Siemens Acuson X 300' machine using 'CH 5-2' probe).

Fetal weight was being calculated using Hadlock formula (incorporated in the ultrasound machine) which takes into consideration of following fetal biometric parameters– Biparietal diameter (BPD), Head circumference (HC), Abdominal Circumference (AC) and Femoral length (FL). All these measurements were taken in proper section following standard guideline.

At delivery the actual birth weight (ABW) was determined using a standard digital birth weighing scale and recorded to the nearest 10 gram.

Data analysis were done using SPSS software, version 15. Both descriptive statistics like mean, Standard deviation and inferential statistics like paired t test were used to interpret the results. Test for significance of results was set at $p < 0.05$.

RESULT

A total of 50 pregnant women were included in this study. Majority of the women were within 15-20 years age group (44%), followed by 21-25 years age group (24%). Only one case (2%) was above 35 year. Table- 1 shows the age distribution of the patients.

Table-1: Age Distribution

Age group of patients	Frequency	Percent
upto 20 years	22	44.0
21-25 years	12	24.0
26-30 years	11	22.0
31-35 years	4	8.0
above 35 years	1	2.0
Total	50	100.0

Most of women were primigravida (58%), followed by second gravida (36%). Only 6% were third gravida. Table – 2 shows the distribution of gravida.

Table – 2: Distribution Of Gravida.

Gravida of patients	Frequency	Percent
Primi	29	58.0
Second	18	36.0
Third	3	6.0
Total	50	100.0

Estimated body weight (by USG) of most of the foetuses were in between 2.50 to 2.99 kgs (68%). 26% were 3.0 kgs & more. Least were in between 2.0 to 2.49 kgs (6%). Table-3 shows distribution of estimated body weight (by USG).

Table-3: Distribution Of Estimated Body Weight (by USG).

EFW range in Kgs	Frequency	Percent
2.0 - 2.49	3	6.0
2.50 - 2.99	34	68.0

3.0 & more	13	26.0
Total	50	100.0

Actual birth weight of most of the newborn babies were 3 kgs or more (58%). 40% of the new born were 2.5 to 2.99 kgs. Just 2 % were between 2 kg to 2.49 kgs. Table -4 shows distribution of actual birth weight of new born babies.

Table -4: Distribution Of Actual Birth Weight Of New Born Babies.

Weight range (Kg)	Frequency	Percent
2.0 - 2.49	1	2.0
2.50 - 2.99	20	40.0
3.0 & more	29	58.0
Total	50	100.0

The mean maternal age was 23 years (Range 15 to 37 years). The mean gestational age was 38.2200 weeks. The mean estimated fetal weight by ultrasound was 2.8850 Kg while the mean birth weight was 2.9710 Kg. Refer- table 5.

Descriptive Statistics

Table-5: Showing Descriptive Statistics Of Various Parameters.

Parameters	Minimum	Maximum	Mean
Maternal age	15.00	37.00	23.0000
Actual birth weight	2.20	4.15	2.9710
Estimated fetal weight by USG	2.41	3.69	2.8850
Gestational age	29.00	41.00	38.2200

Results showed a positive correlation between the fetal weight estimation on USG and the actual birth weight of the babies, i.e. $r=0.802$ ($p<0.05$), as given in table- 6.

Table-6: Paired Samples Correlations

	N	Correlation	Sig.
Pair 1 ACTUALWEIGHT & USGWEIGHT	50	.802	.000

The paired T test was applied to compare the actual birth weight and USG estimated fetal weight. The mean difference is significant at 99% confidence level at $p=0.022$.

Mean difference = 0.08600 kg, Standard error = 0.03630 kg, t value = 2.369, p value = 0.022.

Table- 7 showing the result of paired T test.

Table-7: Paired T test

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	ACTUALWEIGHT - USGWEIGHT	.08600	.25665	.03630	.01306	.15894	2.369	49	.022

DISCUSSION

In this study, the mean maternal age was 23 years, which is very close to the study by Sujatha et al, where the mean maternal age was 24.72 years [7]. Although slightly higher maternal age was recorded by similar previous studies [8, 9].

The mean fetal gestational age of the present study was 38.2200 weeks. This is similar to the study by Akinshola et al [8], where mean fetal gestational age was 38.48 weeks.

The mean estimated fetal weight by ultrasound was 2.8850 Kgs in this study, which is comparable to study by Sujatha et al, where it was 2.93601 kgs. [7]

The mean actual birth weight of this study was 2.9710 Kgs, which is almost similar to 2.9286 kgs, as recorded by Bora et al [10]

In this study, results showed a positive correlation between the fetal weight estimation on USG and the actual birth weight of the babies, i.e. $r=0.802$ ($p<0.05$). Therefore, as per this study, USG is a reliable method for estimating fetal weight during pregnancy which help in deciding the appropriate mode of delivery.

In a study at Bangladesh by Rashid et al, showed that the correlation between fetal weight estimation by ultrasonography and actual birth weight was $r=0.961$, $p<0.001$. This finding was strong enough to say that USG can be used as a reliable tool for fetal weight estimation and

identifying the cases of intrauterine growth retardation as well as macrosomia. [11]

Similar to this study, Eze et al found that fetal weight estimated by USG correlated positively with the actual birth weight among Nigerian population. [12]

In their study by Taha et al, it was concluded that ultrasound could not detect fetal weight accurately. But they found that USG estimates fetal weight with a statistically acceptable variation [13]. This is similar to our study as we also found that the variation is in an acceptable range.

A retrospective observational study was carried out by Bajracharya et al at Kathmandu of Nepal, to determine the accuracy of USG in fetal weight estimation. However, their results showed significant errors in fetal weight estimation by USG [14]. Their results contradict our study.

CONCLUSION

This study shows a strong positive correlation between the fetal weight estimated by USG and actual birth weight at delivery. We therefore conclude that estimation of foetal weight by ultrasonography at term is reliable in predicting actual birth weight.

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