



ORIGINAL ARTICLE

Comparison of Clinical Foetal Weight and Ultrasonography Detected Foetal Weight

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Abstract

Background: Comparison of foetal weight detection between clinical examination and ultrasonography is very important. **Objective:** The purpose of the present study was to compare the detection of foetal weight between clinical examination and ultrasonography. **Methodology:** This cross-sectional comparative study was carried out in the Department of Obstetrics & Gynaecology at Rajshahi Medical Hospital Hospital (RMCH), Rajshahi, Bangladesh from July 2012 to June 2014 for a period of 2(two) years. Pregnant women with known gestational age at term (38 to 40 weeks of pregnancy), singleton pregnancy with longitudinal lie were included in this study. The clinical estimation of foetal weight was done. Foetal weight was estimated by using Johnson's formula. The patient was then taken to Dept. of Radiology & Imaging, RMCH. Ultrasonographic estimation of foetal weight was done from estimation of foetal abdominal circumference (AC), biparietal diameter (BPD) and foetal femur length (FL). All the weights measured by ultrasound were recorded in the data sheet. **Result:** A total number of 245 pregnant women in term pregnancy were recruited as per inclusion and exclusion criteria. Table 1 shows age distribution of the study subjects. The mean age was 26.42 (SD \pm 4.46). Low birth weight was found 12(4.9%) cases in ultrasonographic examination and 14(5.7%) cases in clinical measurement. Overweight was found 13(5.2%) cases in ultrasonographic examination and 16(6.5%) cases in clinical measurement. The mean with SD of birth weight among the study population were 3283.27 \pm 461.05 gram and 2870.41 \pm 424.84 gram in clinical and Ultrasonographic examination respectively ($p < 0.05$). **Conclusion:** In conclusion clinical estimation of foetal weight is significant differed with the measurement of USG. [*Journal of Current and Advance Medical Research* 2019;6(2):92-96]

Keywords: Foetal weight; Clinical fetal weight; actual weight

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Introduction

Foetal weight is one of the important indicators of delivery outcome. Safety of vaginal delivery can be assessed by determining the foetal weight¹. Large baby or macrosomic baby is one of the causes of obstructed labour². Obstructed labour can cause 6% of maternal death in Bangladesh³. Not only obstructed labour, macrosomia also causes birth trauma, foetal death, PPH and increased rate of operative delivery.

Sonography is widely used for weight estimation because it is objective and reproducible⁴. There is constant search for effective methods for identifying the foetus at risk in rural based society with poor literacy status and inadequate health facilities. Identification of risk baby either low birth weight (LBW) or macrosomic should receive highest priority to provide effective minimal perinatal and maternal health care⁵.

Estimation of the foetal weight before delivery by obstetrician or midwife is very important for proper decision making in clinical management. Several parameters such as Biparietal Diameter (BPD), head circumference (HC), femur length (FL), abdominal circumference (AC) are used for estimation of foetal weight sonographically⁶.

Antenatal estimation of foetal weight in uterus is still a challenging affair to an obstetrician⁷. Estimation of foetal weight can be done clinically by a simple technical method by palpation. Ultrasound determines the foetal weight by measuring different foetal anatomical parameters such as femur length, abdominal circumference and biparietal diameter. Sonographic estimation is more objectives, reproducible and involves a well-defined measurement procedure. Clinical estimation depends on many factors and is more indirect way of measuring the foetal weight⁸. Thus sonographic estimation of foetal weight could be good tool in the hand of obstetrician to predict foetal outcome.

Quite a good number of studies have been carried out to detect the accuracy of foetal weight estimation by comparing ultrasonographic and clinical method of estimation with actual birth weight in world but no such study has been carried out in Rajshahi.

Therefore this present study was undertaken to compare the detection of foetal weight between clinical examination and ultrasonography.

Methodology

This was a cross-sectional comparative study. This study was carried out in the Department of Obstetrics & Gynaecology at Rajshahi Medical Hospital (RMCH), Rajshahi, Bangladesh from July 2012 to June 2014 for a period of 2(two) years. This study was carried on the pregnant women attending IPD and OPD in the Department of Obstetrics & Gynaecology at Rajshahi Medical Hospital, Rajshahi, Bangladesh. Pregnant women with known gestational age at term (38 to 40 weeks of pregnancy), singleton pregnancy with longitudinal lie were included in this study. Malpresentation, multiple pregnancy, dead fetus, congenital malformation of fetus, patient having gestational diabetes mellitus (GDM) or chronic hypertension, pre-eclampsia (PE) and eclampsia, patient with history of premature rupture of membrane (PROM), antepartum haemorrhage (APH) were excluded from this study. Recruitment was done daily from Department of Obstetrics & Gynaecology, Rajshahi Medical College Hospital, Rajshahi. Obtaining the inform consent, a proper history was taken from the patient and a clinical examination was done. All information was collected in a pre-designed data sheet. The clinical estimation of foetal weight was done. Foetal weight was estimated by using Johnson's formula: The women were asked to empty their bladder. They were then advised to lying down in supine position. Symphysis fundal height was measured with the use of non-stretchable tape marked in centimetres. The measurement was taken from the superior rim of the pubic bone in the midline to the top of the uterine fundus. The patient was then taken to Dept. of Radiology & Imaging, RMCH. Ultrasonographic estimation of foetal weight was done from estimation of foetal abdominal circumference (AC), biparietal diameter (BPD) and foetal femur length (FL). Actual birth weights of babies were measured soon after their birth. All the weights measured by ultrasound were recorded in the data sheet. The ultrasonic measurements of the foetal weight were made with a linear array real time B mode ultrasound equipped with a 3.5 MHZ transducer. Ultrasound velocity was 1540 m/sec. The measurements were taken with screen calibre on the freeze picture. The sonographic estimation of foetal weight was done by using the model proposed by Hadlock et al., (2005) measured by measuring different parameters such as biparietal diameter (BPD), abdominal circumference (AC) and femur length (FL). The BPD, AC and FL were measured in centimetres and foetal weight was measured in grams by applying the formula proposed by Hadlock et al⁹ The same observer performed all the

ultrasonographic measurements. The data were analyzed with the help of SPSS program. Paired “t” test and “Correlation coefficient” test performed to determine the difference among various types of measurement of foetal weight. The relationship of actual birth weight with clinical and ultrasonographic estimated weights were determined separately by using correlation coefficient test. For statistical significance *p* value was taken ≤ 0.05 . Permission was taken from the Ethical Review Committee (ERC) of the Rajshahi Medical College, Rajshahi before conducting the research. Informed written consent was taken from each study subjects before history taking and clinical examination.

Results

A total number of 245 pregnant women in term pregnancy were recruited as per inclusion and exclusion criteria. Table 1 shows age distribution of the study subjects. The mean age was 26.42 (SD \pm 4.46).

Table 1: Age distribution of the Study Subjects

Parameters	Values
Mean	26.42
Standard Deviation	4.46
Range	19 to 39

Table 2 Low birth weight was found 12(4.9%) cases in ultrasonographic examination and 14(5.7%) cases in clinical measurement. Normal birth weight was found 220(89.9%) cases in ultrasonographic examination and 215(87.8%) cases in clinical measurements. Overweight was found 13(5.2%) cases in ultrasonographic examination and 16(6.5%) cases in clinical measurement.

Table 2: Relationship between Clinical Foetal weight and Ultrasonographic foetal weight

Weight (gms)	USG FW	Clinical FW
Low Birth Weight (≤ 2499)	12(4.9%)	14(5.7%)
Normal Birth Weight (2500-3999)	220(89.9%)	215(87.8%)
Overweight (≥ 4000)	13(5.2%)	16(6.5%)
Total	245(100.0%)	245(100.0%)

The mean with SD of birth weight among the study population were 3283.27 \pm 461.05 gram and 2870.41 \pm 424.84 gram in clinical and Ultrasonographic examination respectively. The

study showed that the difference between Clinical estimation of foetal weight and estimated by USG was also significant statistically (*t*'= 19.21, *df* = 244, *p* < 0.05) (Table 3).

Table 3: Difference of Mean between Clinical Foetal Weight and Ultrasonographic Foetal Weight

Weight	Mean \pm SD	P value
Clinical foetal weight	3283.27 \pm 461.05	<0.05
Ultrasonographic foetal weight	2870.41 \pm 424.84	

Discussion

The accuracy of estimation of foetal weight was later improved by the incorporation of foetal femur length along with bi-parietal diameter and abdominal circumference⁹. Sonography is widely used for weight estimation because it is objective, reproducible and involves a well-defined measurement procedure. Clinical estimation is subjective depends on many factors, less well defined and measurements are variable¹⁰.

The present study was a cross-sectional comparative study carried out in the department of Obstetrics and Gynecology of Rajshahi Medical College Hospital from July 2012 to June 2014. The study was designed to compare the accuracy of foetal weight estimated clinically by Johson’s formula and ultrasonographically by Hadlock formula. A total of 245 women with singleton pregnancy and longitudinal lie at 38 to 40 weeks of gestation were studied.

There are few studies including present one have compared the accuracy of foetal weight estimation by clinical and ultrasonographic methods. The majority of the studies like Paterson¹¹, Raman et al¹², Chauhan et al¹³, Shamley and London¹⁴ are relatively similar and are included the women of term pregnancies. The present study also included only term pregnancies. The studies of Rahman et al¹² and Chauhan et al¹³ showed that clinical estimation was significantly more accurate than sonographic prediction.

However, in this study it has been found that sonographic estimation is more accurate than clinical estimation. In this study, error of clinical estimation was statistically higher than ultrasonography estimation and it was supported by Shamley and London¹⁴.

Shamley and London¹⁴ noted that the error of clinical estimation was statistically higher than that for ultrasonographic estimation by the Hadlock et al⁹ and Shepard¹⁵ formulas. These results were similar to other two studies performed by Sabbagha et al¹⁶ and Rose and McCallum¹⁷. Patterson et al¹⁸ also noted that clinical estimation was less accurate than ultrasonographic estimation by Compbell formula but was comparable to the Warsof et al¹⁹ formula for ultrasonographic estimation. Both formulas were more accurate than clinical estimation in the presence of oligohydramnios or engagement of the foetal head. Paired 't' test was conducted to find out the differences between the actual birth weight, estimated foetal weight by USG and clinical estimation. The study showed that the mean value of clinical estimation of foetal weight was 3283.27 grams and. In case of actual birth weight, the mean was 2936.20 grams. Foetal weight was estimated by USG and the mean value was 2870.41 grams.

Sherman et al¹⁰ showed that birth weight ranges between 2500 to 4000 grams were detected more accurately by clinical method than ultrasonography but it differs from me. In present study only 34% of clinical estimate were within 10% error of actual birth weight. Sherman et al¹⁰ showed that somewhat lower accuracy of sonographic estimation was due to foetal weight within one week prior to delivery. They also reported that both clinical and ultrasonic estimation generally underestimates the weight of the macrosomic foetus and there was a tendency toward overestimation in cases of low birth weight. A large study by Benacerraf et al²⁰ demonstrated that 74% of the ultrasonographic estimation of foetal weight was within 10% of the actual birth weight. This is a more or less correlated with present study.

Watson²¹ and Raman et al¹² also suggested that both methods have similar accuracy in large fetuses. However the study of Chauhan et al¹³ showed that the accuracy of clinical estimation of foetal weight among macrosomic fetuses were significantly better than or similar to sonographic estimation. In present study, clinical estimation of weight for large foetus was as accurate as ultrasonographic estimation. Sherman et al¹⁰ suggested that in the lower range of birth weight less than 2500 grams ultrasonic estimation was significantly accurate than clinical estimation. The present study also demonstrated ultrasonographic estimation was more accurate than clinical estimation in small size fetuses.

Clinical and ultrasonographic estimation of foetal weight are the diagnostic tools. Clinical method for detection of birth weight is not as accurate as ultrasonographic method. Clinical method has a limitation. The efficacy of the clinical method for assessment of birth weight depends on amniotic fluid volume, women with atypical physical characteristic such as obesity and height.

Conclusion

In conclusion clinical estimation of foetal weight is significant differed with the measurement of USG. In the current study estimations of foetal weight by clinical and ultrasonographic methods were obtained independently by the different observers, & finally compared with actual birth weight. Estimation of weight in both methods used separate and independent formula.

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