



## ORIGINAL RESEARCH PAPER

Obstetrics & Gynaecology

### A COMPARATIVE STUDY ON ACCURACY OF CLINICAL METHODS AND ULTRASONOGRAPHY IN ESTIMATING THE FETAL WEIGHT IN TERM PREGNANCIES

**KEY WORDS:** fetal weight, dare's , Jhonson's , Hadlock's formula

**Dr. Rita D**

PROF and HOD, Department of Obstetrics and Gynaecology Navodaya Medical College and Research Centre, Raichur.

**Dr. Aswini Reddy\***

Junior Resident 3, Department Of Obstetrics And Gynaecology, Navodaya Medical College And Research Centre, Raichur.

#### ABSTRACT

Predicting fetal weight helps in effective management of pregnancy and delivery. Johnson's and Dare formulas offer quick, cost-effective. However, ultrasound, though precise, is limited in India due to a shortage of radiologists and facilities in primary care settings. Therefore, there is need to devise a method that accurately predict fetal weight which is widely available as well as reliable in order to achieve the best outcome. The goal of this study is to evaluate the various methods of estimating fetal weight in term pregnancy and to determine their accuracy. **Methods:** One hundred pregnant women satisfying the criteria, consenting for the study were recruited. Using the USG and clinical methods Dare's and Jhonson's, fetal weight is estimated. Weight of the baby at birth was measured. All the measurements were taken and the results were compared to the actual birth weight. **Results:** The mean birth weights by the method dare's formula and actual birth weight were statistically insignificant in the present study. It was also found that, the mean birth weights by Johnson's formula and Hadlock's formula with actual birth weight are statistically significant. Even the percentage error was less in Hadlock's compare to other two clinical methods. **Conclusion:** It can be concluded that Jhonson's formula of clinical methods can be a potential option to be promoted in predicting the fetal weight in the absence of USG facilities. Training in this method is very important and can be an integral part in managing pregnancy during delivery in primary care setting. It was also concluded that sonographic examination is also accurate in estimating fetal weight.

#### INTRODUCTION:

Assessment of fetal weight in utero leads to an improved management of high risk pregnancies and considerable reduction in perinatal mortality and morbidity<sup>1</sup>.

It has become important for prevention of prematurity, evaluation of cephalopelvic disproportion, induction of labour, detection of IUGR, high-risk pregnancies, helps in planning the optimal route of delivery and management, and also counselling on the likelihood of survival<sup>1</sup>.

According to the existing literature, there is no truly accurate technique for evaluating fetal weight. Until the early 1980's, fetal weight estimation relied exclusively on clinical methods based on abdominal palpation and uterine measurements. Since the advent of ultrasound and its dissemination over the last three decades, and despite the lack of conclusive evidence, there has been a widespread belief that ultrasound is more accurate than other methods for predicting fetal weight<sup>2</sup>.

Obstetric ultrasound has revolutionized the knowledge of fetal medicine in the present day and can predict fetal weight with a great degree of precision. Estimation of birth weight by Johnson's formula, Dare Formula based on symphysiofundal height has advantages of speed, economy and general applicability<sup>3</sup>.

The development and validation of simple, effective and inexpensive tools for reproductive health are important worldwide and especially relevant in developing countries, where high-cost equipment and trained technicians are scarce<sup>3</sup>.

#### OBJECTIVE OF THE STUDY:

To evaluate the accuracy of antenatal assessment of fetal weight in term pregnancies by different methods.

- 1) 2 clinical methods – Johnson's method and Dare's method
- 2) Hadlock's formula: using ultrasonography

#### MATERIALS AND METHODS:

**Source of data** – Term Pregnant women coming to out patient department and labour room

**Study Design** : Prospective study

**Study Site:** Navodaya medical college and research centre

**Study Sample Size:** 100

**Inclusion Criteria:-** All women with singleton term pregnancies attending to out patient department and admitted in labor room, all measurements were taken within one week of delivery.

**Exclusion Criteria:** -high risk pregnancies (Multiple gestations, polyhydramnios or oligohydramnios, abnormal lie, breech presentation, Preterm labor, Fetal malformations, Antepartum hemorrhage, Eclampsia) Obese patients, Pregnancy with gynaecological conditions ( fibroid uterus, ovarian tumors).

After taking ethical clearance from the institute and consent from the patient, history and clinical evaluation is done and the following measurements are taken Symphysiofundal height (SFH in cm): patient in supine position with legs semi flexed, the distance between the highest point of fundus and the upper border of symphysis pubis is measured. Abdominal girth (AG in cm): measured at the patient's waist at the level of umbilicus.

The birth weight was estimated by using:

Johnson's formula : (SFH-n) 155 grams where  
n = 12 (head not engaged),  
n = 11 (head is engaged)

2) Dare's formula: product of SFH and AG grams

3) Hadlock's formula : ultrasonographic estimation of fetal weight by measuring HC, AC, and femur length.

The obtained values are compared with actual birth weight of the baby after delivery and accuracy of each method is calculated.

#### RESULTS:

**Patient's profile** : Most patients were in the age group of 21-30 years. Among them 28 were primigravida, 72 were multigravida and 43 had normal vaginal delivery and 72 underwent lower segment caesarean section. Most of the cases were in actual birth weight category of 2500 -3000 gms (

table 1 ).

Table 1-No. Of Cases In Actual Birth Weight Categories

| ACTUAL BIRTH WEIGHT IN GRAMS | NUMBER OF CASES | PERCENTAGE |
|------------------------------|-----------------|------------|
| <2000                        | 3               | 3          |
| 2001-2500                    | 24              | 24         |
| 2501-3000                    | 45              | 45         |
| 3001-3500                    | 25              | 25         |
| >3500                        | 3               | 3          |

Mean birth weight and standard deviation of each measurements showed statistically significant correlations between: Johnson's formula-estimated birth weights and actual birth weights (p=0.009). Hadlock's formula-estimated birth weights and actual birth weights (p=0.0082).But , there is no statistically significant correlation between Dare's formula and actual birth weights (p=0.1438) ( table 2 ).

Table 2: Mean Birth Weight And Standard Deviation In Different Methods

| METHODS   | MEANWEIGHT(gm) | SD (gm) | STANDARD ERROR | P-VALUE     |
|-----------|----------------|---------|----------------|-------------|
| JOHNSON'S | 2867           | 408     | 28             | 0.009 (S)   |
| DARE'S    | 3220           | 330     | 23             | 0.1438 (NS) |
| HADLOCK'S | 2920           | 394     | 29             | 0.0082(S)   |
| ACTUAL BW | 2806           | 420     | 30             | -           |

The Standard deviation of error incurred o calculation by Johnsons, Dares and USG with respect to actual birth Weight were 377, 415, 352 gm respectively (table 3). Therefore, the standard deviation of error was least with USG followed by Johnson's and maximum error was with Dare's formula.

Table 3 : Comparison Of Average Error, Standard Deviation Of Error.

| METHODS   | AVERAGE ERROR | SD OF ERROR |
|-----------|---------------|-------------|
| JOHNSON'S | -3.25         | 377         |
| DARE'S    | -7.68         | 415         |
| HADLOCK'S | -2.95         | 352         |

The percentage error with the Ultrasound estimated fetal weight by Hadlocks formula are within 10% error in 89% of cases. While clinical formulas are within 20 % error in 97.3 % cases (table 4).

Table 4 :Percentage error in various methods

| METHODS   | UPTO 5% | 6-10 % | 11-20% | >20% |
|-----------|---------|--------|--------|------|
| JOHNSON'S | 44      | 29     | 25     | 2    |
| DARE'S    | 30      | 31     | 34     | 5    |
| HADLOCK'S | 55      | 34     | 11     | 0    |

DISCUSSION:

The Mean age of mother's of study population was 22.37±3.6 years which was similar to the study conducted by Maria RT et al<sup>3</sup> 26.7±7.6, Japarath Prechapanich et al<sup>4</sup> 26.4±8.2, Akinola S. Shittu et al<sup>5</sup>. 30.5±4 .

In the present study , the birth weights showed 45 % of babies weighing 2500-3000 grams, with a mean birth weight of 2806 with standard deviation of 420 grams. Mean weight by Hadlock's (2920 +/-394 ) and by Johnson's (2867 +/- 330) was

comparable to actual birth weights.

The present study revealed statistically significant correlations between Johnson's formula and actual birth weights (p=0.009), Hadlock's formula and actual birth weights (p=0.0082) , which was similar to kanaka durgaprasad et.all study<sup>6</sup>.

The present study found that Hadlock's formula yielded the least average error (2.95), consistent with study Nayak et al<sup>7</sup>. This suggests that Johnson's formula can be a reliable alternative when ultrasound (USG) is not available.

In the present study's percentage error within 10% was 34% and 25 % using Hadlock's formula and Johnson's respectively which is in correspondence with Parvathini et al. study<sup>8</sup>.

CONCLUSION:

Out of all the three methods studied, Hadlock's and Johnson's has better predictable results in fetal weight estimation compared to Dare's formula. Diagnostic ultrasound is painless, non-invasive and has the potential to screen all the patients. The advantage of this technique is that it relies on linear and / or should be reproducible.

Finally, it was concluded from the study was sonographic examination (Hadlock's) is more accurate in assessing fetal growth and estimating fetal weight than clinical examination.

Even though Johnson's clinical formula has limitations like examiner bias, measurement variability and depends on patients profile ( eg -obesity), but it can be considered as a reliable and accurate method for predicting fetal weight in resource-constrained settings without ultrasound (USG) facilities. Training in this method is crucial for healthcare providers to effectively manage pregnancy and delivery.

REFERENCES:

- Williams textbook of obstetrics 26 th edition
- Arias high risk pregnancy
- Maria RT, Nelson S, Jussara LS, Ana Carolina PR, Maisa F, Paula rubia DL. Clinical formulas, mother's opinion and ultrasound in predicting birth weight: Sao Paulo Medical Journal. Vol 126:3;May 2008.
- Japarath Prechapanich, Wiboolphan Thitadilok. Comparison of the Accuracy of Fetal Weight Estimation Using Clinical and 86 Sonographic Methods: J Med Assoc Thai Vol. 87 Suppl. 3 2004.
- Akinola S. Shittu et al. Clinical versus Sonographic Estimation of Foetal Weight in Southwest Nigeria J. Health popul nutr 2007 Mar;25(1):14-23.
- Sherman DJ, Arieli S, Tovbin J, et al. A comparison of clinical and ultrasonic estimation of fetal weight. Obstet Gynaec 1998;91(2):212-217
- Nayak L, Pradhan, K, Kruthika M. Comparative study on Johnsons formula, Insiers formula and Hadlocks formula for estimating foetal weight at term. J Evid Med Health Care. 2017;4:600-5
- Comparative study of various methods of fetal weight estimation at term pregnancy in a tertiary hospital in Kanchipuram, Tamil Nadu, India Parvathavarthini K. Et.al.