

Correlation of Clinically & Sonographically estimated Fetal Birth Weight with Actual Birth Weight in Cephalic Presentation***Dr. Sugandha Patel, Dr. Akash Makwana****

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KEY WORDS : EBW (Expected Birth Weight), SFH (Symphysio Fundal Height), AG (Abdominal Girth)**ABSTRACT**

Introduction : Knowledge of the weight of the fetus in utero is important for obstetrician to decide whether to deliver or not to deliver the fetus. And also to decide the mode of delivery. Accurate estimation of fetal weight is of paramount importance in the management of labor and delivery. High rate of perinatal mortality in developing countries makes estimation of fetal weight (EFW) antenatally pivotal to obstetricians. **Objective** : EBW was estimated by clinical method using Johnson's formula, Dare's formula & by USG with Hadlock's formula. All EBW derived from these 3 methods were compared with the actual birth weight, to find out EBW by which formula has closest resemblance with actual birth weight. **Results** : In this analysis using paired t-test, the reissignificant statistical difference found between actual birth weight & Johnson's method (p-value < .00001) and between actual birth weight & Hadlock's method (p-value < .00001). There is no statistically significant difference found between actual birth weight & Dare's method (p-value 0.32725) **Conclusion** : The assessment of fetal weight using Dare's formula is more accurate for predicting birth weight at term which is easy and cost-effective, amongst all 3 methods.

INTRODUCTION

In the modern obstetrics, our main aim is to achieve the best quality of life; for both, the mother & newborn. Knowledge of the weight of the fetus in utero is important for obstetrician to decide whether to deliver or not to deliver the fetus. And also to decide the mode of delivery. Estimation of fetus weight is being done clinically, which has been criticized as less accurate because of inter-observer variations. But Sherman et al.⁽¹⁾ Baum et al.⁽²⁾ and Titapant et al.⁽³⁾ have found clinical estimation quite reliable.

A prediction formula for birth weight has been first deduced from SFH by **Johnson's and Toshach** (1954). In 1957, Johnson's simplified the equation for the same variables.

Ultrasound estimation of fetus weight using different formulas has gained much popularity after advent of obstetric USG. An accurate means of estimating fetal weight using ultrasonography was first described by Campbell and Wilkin in 1975. The most popular formulae are Shepard, Warsof's with Shepard's modification and **Hadlock's**. These formulae are included in most ultrasound equipment packages.

Various clinical formulas have come into usage for fetus weight estimation. In 1990, **Dare et al**⁽⁴⁾ used the product of symphysis fundal height (SFH) and Abdominal girth (AG) measurement (both in cm) in obtaining fairly predictable fetus weight estimation.

Basically, there are three groups of birth weights that are important to the clinicians; i.e. the low birth weight, defined as <2500gm, normal birth weight and macrosomic babies i.e. >4000gm. Categorization of fetus weight into ei the small or large for gestational age may lead to timely obstetric interventions that are significantly different from routine antenatal care.

The low birth weight especially associated with preterm deliveries. In cases of suspected preterm delivery, estimation of fetus weight is helpful for perinatal counselling on chances of survival, the intervention taken to postpone preterm delivery, optimal route of delivery, or the level of hospital where delivery should occur may be based wholly or in part on the estimation of expected birth weight. Fetal macrosomia is associated with maternal morbidity, cephalo-pelvic disproportion, prolong & obstructed labour, shoulder dystocia, birth asphyxia and birth trauma, increased operative delivery &/or lower

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genital tract injuries. Estimation of fetus birth weight can be useful in preventing these sequela.⁽⁵⁾

Estimation of fetus birth weight can also be useful while managing labour in conditions like diabetes during pregnancy, intrapartum management of fetuses presenting by the breech and vaginal birth after a previous caesarean section. Hence, from the last decade, estimated fetus weight has been incorporated into the standard routine antepartum evaluation. A simple formula can be used at periphery level to calculate EBW which may aid peripheral health worker to take proper obstetric decision.

In 1994, MRI was introduced for the estimation of fetal weight, which is done by measuring the fetal body volume. **Semi- automatic segmentation software** has recently been used for estimating fetal volume. Converting it through a formula to estimate fetal weight. Approximately 10 studies have shown that magnetic resonance imaging is more accurate than 2- dimensional ultrasound imaging in the estimation of fetal weight. Yet, the magnetic resonance imaging technique currently is not implemented clinically as its strong disadvantage is non-availability; that even where it is available, it is very expensive.⁽⁶⁾

MATERIALS AND METHODS

The study was conducted in Department of Obstetrics and Gynecology, B. J. Medical College and Hospital, Ahmedabad in year 2017-2019.

Study Population

- 200 antenatal women of third trimester.
- The patients were selected from outpatient department and labor wards who had their last fetal weight estimation done within 1 week of delivery.
- Women were asked to empty her urinary bladder before clinical examinations. Measurements were taken after centralizing uterus. The SFH is measured with a soft tape-measure from the superior edge of the symphysis pubis in the midline to the line identifying the highest point on the fund us, and recorded. AG was recorded at the level of umbilicus.
- BPD, FL & AC were measured from USG machine, which gave EBW by Hadlock's formula.

Type of Study

Prospective observational study.

Inclusion criteria

- Term Pregnancies 37-42Weeks.
- Singleton Pregnancy.
- Vertex Presentation.

Exclusion criteria:

- Pre-term, post-term
- Obesity
- Oligohy dramnios, Polyhy dramnios
- Multiple Pregnancies
- Mal presentation
- Congenital Anomalies of Fetus
- Intrauterine Fetus Death, IUGR
- Premature Rupture of Membrane(PROM)
- Pregnancy with Uterine Fibroid or Any Abdominal or Adnexal or Urinary Bladder Mass
- Placental anomalies for eg. Placenta Previa, Abruptio Placentaetc.

EBW USING CLINICAL METHODS

EBW was calculated clinically using Johnson's Formula & Dare's Formula which are as follow-

JOHNSON'S FORMULA⁽⁷⁾

EBW (in Grams) = [Symphysis Fundal Height(in Cm) – k} x 155]

Where, k is

**12 – If vertex is at or above the level of Ischial Spines
11 – If vertex is below the level of Ischial Spines**

DARE'S FORMULA⁽⁸⁾

EBW (in Grams) = [Symphysis Fundal Height(in Cm) x Abdominal Girth (in Cm)]

USG METHOD

EBW was calculated using USG machine which used Hadlock's Formula which is as follow-

HADLOCK'S FORMULA⁽⁹⁾

Log¹⁰ (EBW) =1.4787 – 0.003343 AC x FL + 0.001837 BPD² + 0.0458 AC + 0.158 FL)

Where,

BPD - Bi Parietal Diameter,

AC-Abdominal Circumference and FL - Femur Length

Standard deviation of prediction error and p-value were calculated with the help of statistician and analysis was done. A p-value <0.05 was considered significant using 95% Confidence interval. Student paired t test was used

RESULTS

MODE OF DELIVERY

Type of delivery	Normal Delivery	LSCS
Present study	85% (170)	15%(30)

MATERNAL PARITY DISTRIBUTION

	Primigravida	Multigravida
Present study	34.5% (69)	65.5%(131)

BIRTH WEIGHT IN RELATION TO GRAVIDA

GRAVIDA	Birth weight in gm					Present study
	<2000	2000-2500	2501-3000	3001-3500	>3500	
1	1	14	40	12	3	70 (35%)
2	0	16	34	14	5	69 (34.5%)
3	0	9	18	12	2	41 (20.5%)
4	0	2	6	7	1	16 (8%)
>4	0	0	2	2	0	04 (2%)
Total	1	41	100	47	11	200

MEAN FETAL BIRTH WEIGHT, STANDARD DEVIATION, STANDARD ERROR & CONFIDENCE INTERVAL

Meathods	Mean Fetal Birth Weight	Standard Deviation	Standard Error (SE=SD/ \sqrt{n})	2SE	Confidence Interval (Mean + 2SE)
Dare's Formula	2827.86	406.8706	28.77	57.54	2770.32-2885.40
Johnson's Formula	3058.875	408.9970	28.92	57.84	3001.04-3116.72
Hadlock's Formula	3211.52	364.8505	25.8	51.6	3159.92-3263.12
Actual Birth Weight	2821.22	398.5486	28.18	56.37	2764.85-2877.59

COMPARING ACTUAL BIRTH WEIGHT WITH DIFFERENT METHODS

Meathods	N	Mean + SD	p-Value	Statistical Significance
Actual Birth Weight	200	2821.22 + 398.5486		
Dare's Formula	200	2827.86 + 406.8706	0.32725	Not Significant
Johnson's Formula	200	3058.87 + 408.9970	< .00001	Statistically Significant
Hadlock's Formula	200	3211.52 + 364.8505	< .00001	Statistically Significant

for comparison of various method of birth weight estimation with actual birth weight.

In this analysis using paired t-test, there is significant statistical difference found between actual birth weight & Johnson's method (p-value < .00001) and between actual birth weight & Hadlock's method (p-value < .00001)

There is no statistically significant difference found between actual birth weight & Dare's method (p-value 0.32725)

This finding is comparable with Charles Njoku et al study,2014.⁽¹⁰⁾ & Shirish Toshniwal et al study 2017⁽¹¹⁾

DISCUSSION

This study indicates that among three methods, clinical estimation of birth weight using Dare's method shows positive correlation with actual birth weight of the fetus after delivery.

This method clearly has a role in management of labor and delivery in a term pregnancy.

This clinical method is simple, easy and cost-effective is of great value especially in a developing country like India. Recommended based on the findings from this study is that clinical fetal weight estimation should be taught to all health workers and it is suggested for use as a routine screening tool for all parturients at term and in labor.

REFERENCES

1. Sherman DJ, Arieli S, Tovbin J, Siegel G, Caspi E, Bukovskyl. : A comparison of clinical and ultra sonic estimation of foetal weight, *Obstet Gynecol.* 1998 Feb;91(2):212-7
2. Baum B J. Accurate prediction of term birth weight from prospectively measurable maternal characteristics. *J Reprod Med.* 1999 Aug;44(8):705-12.
3. Tita pant V, Chawan paiboon S, Mingmit patan akul K. A comparison of clinical and ultra sound estimation of fetal weight. *J Med Assoc Thai* 2001;84:1251-7.
4. Dare FO, Ademowore AS, Ifatureti OO, Nganwuchu A The value of symphysio-fundal height/abdominalgirth measurements in predicting fetal weight. *Int J Gynaecol Obstet.* 1990Mar; 31(3):243-8
5. Herrero RL, Fitz simmons J. Estimatedfetal weight : maternalvs. physician estimate. *J Reprod Med.* 1999 Aug. 44(8):674-8 ; *Williams Textbook of Obstetrics* 25th Ed. 2019, Page No-929
6. Magnetic resonance imaging for prenatal estimation of birth weight in pregnancy: review of available data, techniques, and future perspectives
7. Johnson, Spellacy WN. Accuracy of estimating fetal weight by abdominal palpation. *J Reprod Med* 1957;9:58-60.

8. Dare FO, Ademowore AS, Ifatureti OO, Nganwuchu A The value of symphysio-fundal height/abdominalgirth measurements in predicting fetal weight. *Int J Gynaecol Obstet.* 1990 Mar; 31(3):243-8
9. Hadlock's, Wilkin D. ultrasonic measurement of foetal parameters in the estimation of fetal weight. *Br J Obstet Gynaecol* 1975; 82:689-97.
10. Charles Njoku, Cajethan Emechebe, Patience Odusolu, et al. Determination of accuracy of fetal weight using ultrasound and clinical fetal weight estimations in calabar south, south nigeria. *International Scholarly Research Notices* 2014; 1-6
11. Dr. Shirish Toshniwal, Dr. Swarnima Saxena and Dr. Hetal Sarvaiya. 2017. "Comparative study of fetal weight estimation using hadlock's, johnson's & dare's formula and its correlation with actual birth weight", *International Journal of Current Research*, 9, (07), 54728-54730.