# Comparative Study Between Clinical And Ultrasonographic Estimation Of Fetal Weight And Its Correlation With Actual Birth Weight.

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## ABSTRACT

*Objective:To make comparative evaluation of estimation of fetal weight in term pregnancy by using a) abdominal girth * symphysiofundal height*
*b) Hadlock's formula using ultrasound c) Johnson's formula d) dawn's formula*
*Methods: fetal weight in utero is calculated by using above methods in 200 term pregnant women and the results were correlated with actual birth weight.  Comparison done by various methods.*
*Results: average error was least in AG*SFH method. Maximum error was in Dawns formula and least in AG*SFH and Hadlocks i.e.75.9% of cases came within 30% of birth weigth by both AG*SFH and Hadlocks method. Standard deviation of predicyion error was least with Hadlocks methof followed by AG*SFH.*
*Conclusion: AG*SFH is the best predictor and is used in day to day practice. Hadlocks method had more accuracy but is done in places where facilities are available.*

## Introduc6ion :

Knowledge of the weigth of the fetus in utero is important to decide whether to deliver or not to deliver and also for deciding on the mode and place of the delivery  in  order to optimize the fetomaternal outcome.Extremes of birth weigth are associated with an increased risk of newbron complications during labour and puerperium.(1)

Standard growth curves for different population groups have been devised in order to predict birth weigth at different gestational ages. Different methods of estinating fetal weigth have beem tried in different parts of the world . Broadly classified as:

Clinical method : used world wide . wide range of predictive errors

Risk factor assesment: quantiative assessment of clinical risk factors can be valuable in predicting deviations in fetal size(2)

Maternal self estimation: some studies maternal self estimation of fetal weigth in a multiparous women were as accurate as clinicla estimates in predicting fetal weigth and abnormally large fetuses at term(3)

Obstertric usg: modern method for assessing fetal weigth in utero

Estimation of fetal weigth is being done clinically, which has been criticized as kless accurate because of observer variations. But sherman et al(4), Baum et al(5) and Titapant et al(6) have found clinical estimation qquite reliable. Usg estimation of fetal weigth using different formulas like johnson's formula and dawns formula have come into usage for fetal estimation of weigth. Dare et al(7) used the product of symphysiofundal heigth and abdominal girth measuarements in cms in obtaining fairly predictable fetal weigth estimation.

The aim of this study was to assess the fetal weigth in term pregnancies by various methods- abdominal girth (cm) * sfh(cms), johnson's formula, Dawns forula and Hadlock formula and to compare with actual birth weigth of the babies

## Methods and materials

200 women at term pregnancy were studied. Fetal weigth was estimated with in a 2days prior to delivery or in active labour , if delivery doesn't occur in 2days then it was repeated. Cases of placenta previa, abruption, malpresentations, congenital babies , poly or oligo hydraminos , fibroids or adnexal mass were excluded.

Our study consisted of estimation of fetal weigth using following methods

Weigth in grams: AG*SFH. AG at the level of umblicus . SFH was taken after correcting dextrorotation and emptying bladder , from the upper border of Symphysis to heigth of fundus

Johnoson's formula:WEIGHT IN GRAMS = (SFH- X)*155

X – 13, when presneting part is unenaged

x- 12, when presnting part is at 0 station

X – 11, when presenting part is at +1station

Dawns formula: longitudinal diameter of the uterus * (transeverse diameter of uterus )2* 1.44 divided by 2

4. Hadlock's formula using usg: HC,AC, FL were measuerd in cms, the sonography machine calculated the fetal weigth

The fetal weigths measured by these 4 methods were then compared with acual weigth of the baby after birth. A comparative analysis of the four methods was done.

## Results :

Of the 200 women , 40 % were primigravidas and 60% multigravidas. 80% had normal delivery, 5.5% vaccum delivery , 15.5% has lscs. The cases were distributed as per birth weigth of the babies into 5groups in table1. Maxium distribution of cases between 2600 to 3000 grams fetal weight group

| Groups | No of cases | Percentage |
|---|---|---|
| Less than 2kg | 20 | 10 |
| 2.1 -2.5kg | 40 | 20 |
| 2.6-3kg | 115 | 57.5 |
| 3.1-3.5 | 17 | 8.5 |
| >3.5kg | 8 | 4 |

In table 2 , the average errors in different fetal weight groups are given. Average error in al weight groups except in more than >3501grams group was least with AG*SFH, follwed y Hadlocks ultrasound method. Johnsons forumla showed least error in group >3501gms. Fetal weights were under estimated by AG*SFH method and Dawns formula where as johnsons and Hadlocks formula overestimated fetal weigths

| Methods | Birth weigth(gms) | | | | | |
|---|---|---|---|---|---|---|
| | <2000 n- 20 | 2001-2500 n-40 | 2501-3000 n-115 | 3001-3500 n- 17 | >3500 n-8 | All cases |
| Average errors | | | | | | |
| AG*SFH | 300.2 | 200.2 | 210.4 | 300 | 200.4 | 250.87 |
| Dawns | 370.5 | 380 | 320.4 | 307.4 | 880.44 | 470.35 |
| Johnsons | 410.4 | 340.9 | 300.8 | 278 | 110 | 300.45 |
| Hadlocks | 362.3 | 250.2 | 220.4 | 239.7 | 450 | 299.11 |

**Table 3 : percentage error in various methods**
Maxium erre in all fetal weight was marked with Dawns formula and least with AG*SFH . in 3001-3500grams group maxium errors was seen in AG*SFH and Dawns group . in featal weight < 2000gms  the maximum errors was seen in johnsons formula group and in fetal weight 2001 to 2500grams the maxium errors was seen in Hadlocks group. Percentage error was calculated by formula – errors in grma/actual weigth *100.

| Methods | <2000 n- 20 | 2001-2500 n-40 | 2501-3000 n-115 | 3001-3500 n- 17 | >3500 n-8 | All cases |
|---|---|---|---|---|---|---|
| AG*SFH | 540 | 590 | 620 | 700 | 199 | 524.4 |
| Dawns | 560 | 900 | 1078 | 1300 | 800 | 930.1 |
| Johnsons | 1130 | 700 | 800 | 675 | 180 | 700 |
| Hadlocks | 700 | 770 | 650 | 684 | 474 | 65.6 |

**Table 4: percentage errors in the various methods.**
75.9% of cases came within 30% of birth weigth by both AG*SFH and HAdlocks method. Only 45% and 63.5% came with Dawns and Johnsons formula method.

| Percentage error | Ag*SFH | Dawns formula | Johnsons method | Hadlock s usg |
|---|---|---|---|---|
| Upto 10% | 32.1% | 20% | 20% | 26.5% |
| Upto 20% | 54% | 30% | 43% | 60% |
| Upto 30% | 75.9% | 45% | 63.5% | 75.9% |
| Upto 40% | 97% | 70% | 78.3% | 94.3% |
| Upto 50% | 95.4% | 90% | 88.4% | 95.3% |

**Table 5: standard deviation of predicition error:**
It was 256.48grams by Hadlocks method and then followed by 270.3 in AG*SFH method . higher in Dawns and Johnsons method.variance between the four methods was stastically significant.

| Method | Standard deviattion (gms) |
|---|---|
| AG*SFH | 270.3 |
| Dawns | 440.45 |
| Johnsons | 310.9 |
| Hadlock | 256.48 |

**Discussion :**
Weight of the fetus is important for an obstertician to manage labour and also helps in decrease perinatal mortality. SFH is an important parmeter for estimating fetal weigth as in  SFH*AG., johnsons formula and dawns formula. Dare et al (7) found a percentage error between the actual and the estimated weight to be 20.1% by AG*SFH. In the present study , the average error in various fetal weight groups by AG*SFH was 250.87gms which was least compared to other methods.  It was higher in the other methods.

In our study, average maximum error was the least by AG*SFH method follwed by Hadlocks method. In 75.9% of cases, percentage error was restrictes to 30% by AG*SFH and Hadlocks method. Only 45% and 63.5% came with Dawns and Johnsons formula method.

The standard deviation of prediction error was  256.48, the least of hadlocks method  and higher in other methods. Sood (9) recorded standard deviation error was 462.11gm,429.13gm, 338.75gms and 203.02gms by using clinical Dawns , johnsons and Hadlocks method. Least standard deviation was in Hadlocks method in estinating fetal weigth. AG*SFH was better predictor than the rest two .

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