

Comparison of estimated fetal weight by symphysio-fundal height and abdominal girth measurement in pregnancy with actual birth weight

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Abstract

Background: Accurate estimation of fetal weight is vital in the management of labor. Categorization of fetus into small or large for gestational age can lead to timed obstetric intervention. There are 2 common methods of estimation of fetal weight (EFW) sonographic evaluation and clinical method. In developing countries, ultrasonography most of the time unavailable or may not be affordable by patients. The accuracy of fetal weight estimation using symphysio-fundal height multiplied abdominal circumference at the umbilical level was moderate in all different BMI groups. The prediction was the highest in normal pre-pregnancy BMI.

Materials and Methods: This study was conducted at department of OBGYN, Teaching Hospital, Kodagu Institute of Medical Sciences, Madikeri, for the period from May-2019 to October-2019. Institutional Ethical committee has approved the study.

Objectives: To estimate the fetal weight in antenatal period by symphysio-fundal height and abdominal girth measurement and to compare with the actual birth weight of the baby after birth. The inclusion criteria were pregnant women of any parity of ≥ 34 weeks with singleton, cephalic presentation either not in labour or in early labour with intact membranes. The exclusion criteria were Pregnant women having obesity, multiple gestation, malpresentation, oligohydromnios & polyhydromnios, intrauterine fetal demise and diagnosed cases of uterine fibroids and abdominal masses are excluded from the study. Hospital based convenient sampling method is followed.

Results: Statistical tests (Correlation) were done between estimated fetal weight (EFW) and actual birth weight (BW). It was found that there was a positive correlation present between estimated fetal weight (EFW) and actual birth weight (BW) with a Pearson coefficient of 0.205 and with the p-value of 0.041 which is significant.

Conclusion: Symphysio-fundal height and abdominal girth derived fetal weight are useful alternative to the Ultrasonographic estimation of fetal weight. The method holds a great

promise for developing countries. Study with large sample size is recommended to accept this clinical technique as the screening method for fetal weight estimation in antenatal period.

Keywords: Symphysis-fundal height, abdominal girth, estimated fetal weight

Introduction

Accurate estimation of fetal weight is vital in the management of labor. Categorization of fetus into small or large for gestational age can lead to timed obstetric intervention [1-3]. This is especially true for developing countries like India and especially in places like Kodagu district with more of tribal population and not having access to tertiary health care facilities where ultrasonography to estimate fetal weight is most of the time unavailable. A simple method to estimate fetal weight by multiplying symphysis-fundal height (SFH) and abdominal girth in centimetres and to evaluate the efficacy of this method by the actual birth weight of the baby after birth [4].

There are 2 common methods of estimation of fetal weight (EFW) sonographic evaluation and clinical method [5]. In developing countries, ultrasonography most of the time unavailable or may not be affordable by patients. Obstetrician estimation of fetal weight (EFW) by clinical methods are as reliable as, or superior to, those made from ultrasonographic measurements of the fetus [6]. However, their accuracy depends upon on experience, which may be lacking in many obstetric care personnel in developing countries [5]. That is why measurement of symphysis-fundal height (SFH) using inexpensive and easily available measuring tapes has been recommended as a means of assessing fetal weight in low- resource countries.

Estimation of fetal weight by symphysis-fundal height (SFH) measurement has been reported by various authors including Edwards (2001), Bothner *et al.* (2000), Mongelli and Gardosi (1999), Promvijit *et al.* (2000) conducted a study to determine the measurement of fundal heights in labour as a means of estimating birth weight in singleton pregnancies. As a diagnostic tool they reported fundal height measurement as useful on an individual basis and recommended that individual biometry or sonographic measurement is more useful in assessing the growth of an at risk fetus. Probably a combination of Symphysis-fundal height and biometry is an appropriate comparison of estimation of fetal weight [7]. The accuracy of fetal weight estimation using symphysis-fundal height multiplied abdominal circumference at the umbilical level was moderate in all different BMI groups. The prediction was the highest in normal pre-pregnancy BMI [8].

Materials and Methods

This study was conducted at Department of OBGYN, Teaching Hospital, Kodagu Institute of Medical Sciences, Madikeri, for the period from May-2019 to October-2019. Institutional Ethical committee has approved the study.

The inclusion criteria were pregnant women of any parity of ≥ 34 weeks with singleton, cephalic presentation either not in labour or in early labour with intact membranes. The exclusion criteria were Pregnant women having obesity, multiple gestation, malpresentation, oligohydromnios & polyhydromnios, intrauterine fetal demise and diagnosed cases of uterine fibroids and abdominal masses are excluded from the study. Hospital based convenient sampling method is followed

The pregnant women after voiding the urine made to laid on a bed and after correction of dextrorotation of uterus, measured fundal height starting from the upper border of the symphysis pubis to upper border of the uterine fundus (SFH) using a measuring tape and marked in centimeters. The abdominal circumference (AC) was measured at the umbilical

level. The measurements were conducted while no uterine contractions were taking place. Antenatal care records were reviewed. The cases with incomplete data were excluded from the study. After delivery the birth weight of the baby were weighed in grams using a standardized digital scale within 30 minutes.

Statistical analyses done using SPSS version 25.

Results

A total of 100 pregnant women were participated in this study. The base line characteristics of the pregnant women is as follows.

Age distribution of these pregnant women is shown in Table 1 and Figure 1, Majority of the women (93%) is in the age between 19 to 30 yrs, with the mean and standard deviation is 24.77 ± 3.662 yrs.

Table 1: Distribution of age

Name of the characteristics (Age in years)	Frequency (%)
19-24	48(48%)
25-30	45(45%)
31-35	5(5%)
35-40	2(2%)
Total	100
Mean-SD	24.77±3.662

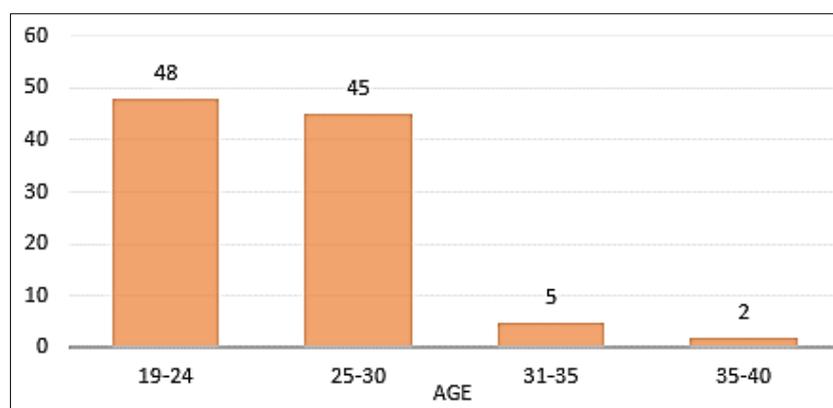


Fig 1: Distribution of Age

The gravidity of the participants in this study is 50% are primigravida and 50% are multigravida, Out of which 3% comprising of Grand multigravida and shown in Table-2 and Figure-2

Table 2: Distribution of Gravida

Name of the characteristics (Gravida)	Frequency (%)
1	50(50%)
2	33(33%)
3	14(14%)
5	2(2%)
6	1(1%)
Grand Total	100
Mean-SD	1.74-0.960

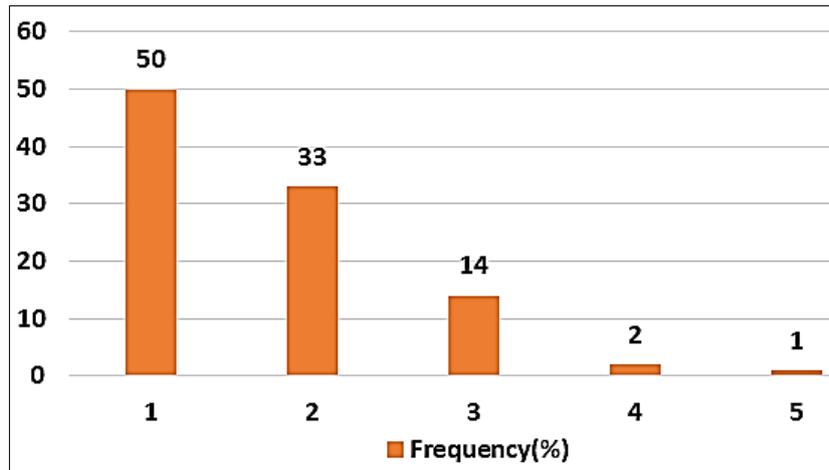


Fig 2: Distribution of Gravida

Table 3 and Figure 3 shows the distribution of gestational age (weeks) of this study subjects/pregnant women. 90% of them ranges between 37-40 weeks with the mean and standard deviation of gestational age is 39.03 ± 5.256 wks.

Table 3: Distribution of GA

Name of the characteristics (GA in weeks)	Frequency (%)
34-36	8(8%)
37-40	90(90%)
≥ 41	2(2%)
Total	100
Mean-SD	39.03 ± 5.256

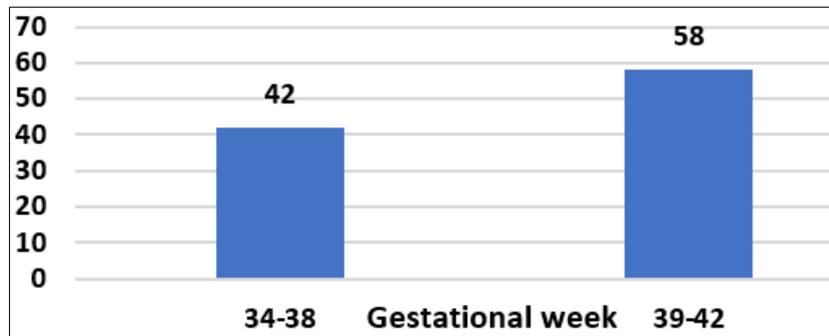


Fig 3: Distribution of GA

The distribution of Participants by Symphio-fundal height (SFH) is shown in Table 4 and figure 4.

Table 4: Distribution SFH

Name of the characteristics (SFH in cms)	Frequency (%)
≤ 30	20(20%)
31-35	44(44%)
36-40	30(30%)
≥ 41	6(6%)
Total	100
Mean-SD	33.85 ± 4.342

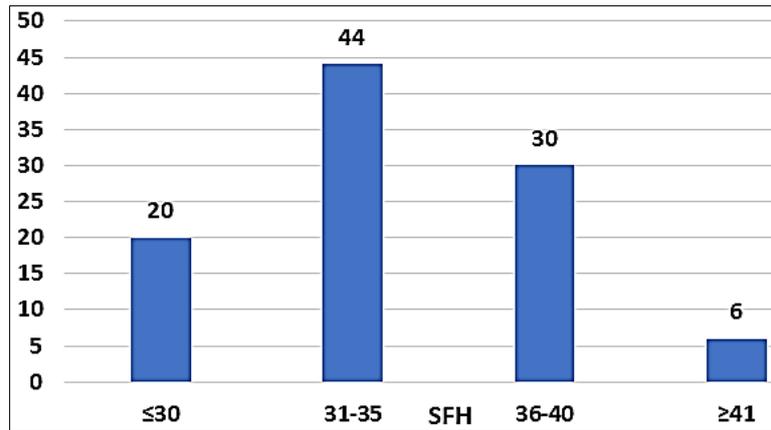


Fig 4: Distribution SFH

The distribution of Participants by Abdominal girth (AG) is shown in Table-5 and figure-5.

Table 5: Distribution of AG

Name of the characteristics (AG in cms)	Frequency (%)
75-85	11(11%)
86-95	30(30%)
96-105	47(47%)
106-115	9(9%)
116-125	3(3%)
Total	100

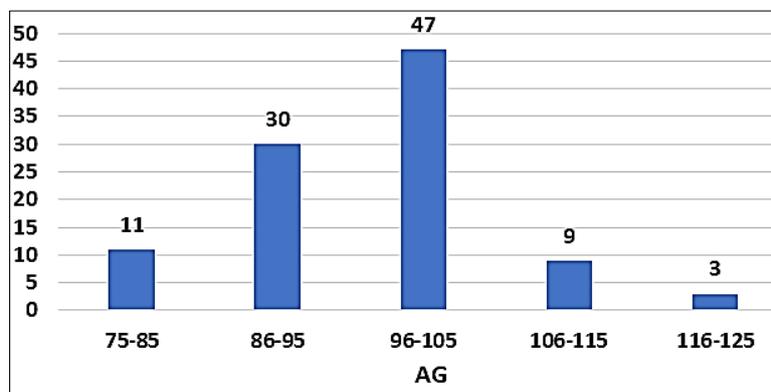


Fig 5: Distribution of AG

Table 6 shows that distribution of estimated fetal weight (EFW) of this study subject/pregnant women. 39% of EFW ranges between 3001-3500 grams. The mean and standard deviation of estimated fetal weight (EFW) is 3237.97 ± 620.674 grams.

Table 6: Distribution of EFW

Name of the characteristics (EFW-gms.)	Frequency (%)
<2500 gm.	11(11%)
2501-3000 gm.	19(19%)
3001-3500 gm.	39(39%)
3501-4000 gm.	22(22%)
≥4001 gm.	9(9%)
Total	100
Mean-SD	3237.97 ± 620.674

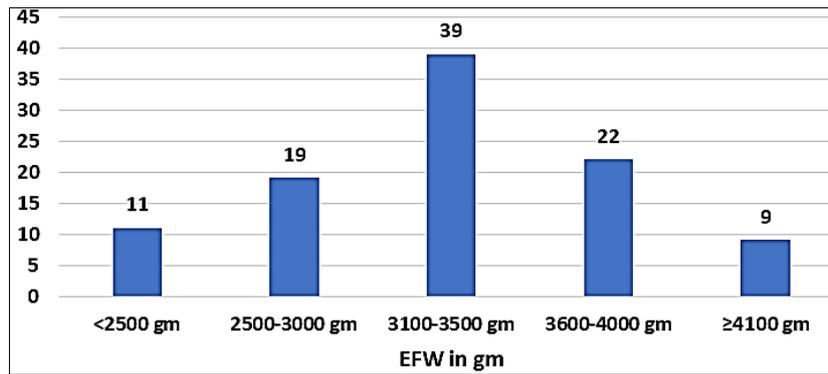


Fig 6: Distribution of EFW

Table 7 shows that distribution of Actual birth weight (BW) of this study subjects/pregnant women. 43% of the Actual birth weight (BW) ranges between 2500-3000 grams. The mean and standard deviation of the Actual birth weight is 3070.60±466.126 grams.

Table 7: Distribution of BW

Name of the characteristics (BW in grams)	Frequency (%)
<2500 gm.	10(10%)
2500-3000 gm.	43(43%)
3001-3500 gm.	33(33%)
3501-4000 gm.	12(12%)
≥4001 gm.	2(2%)
Total	100
Mean-SD	3070.60±466.126

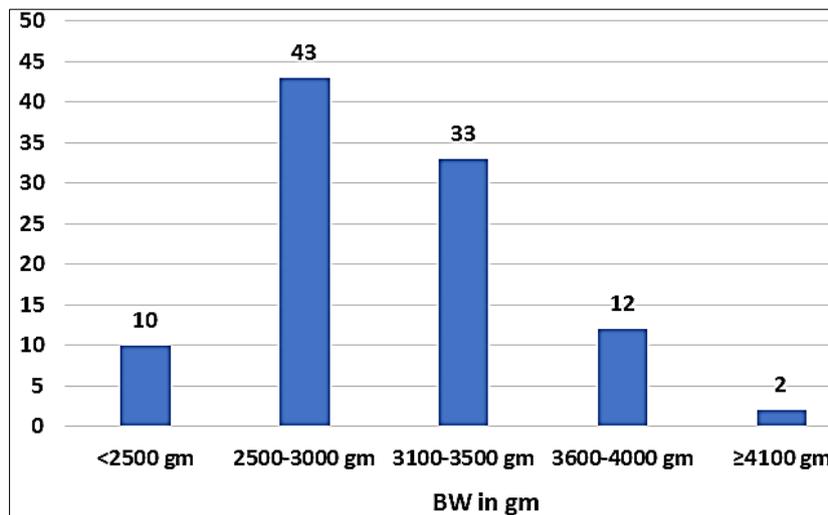


Fig 7: Distribution of BW

Correlation were done between estimated fetal weight (EFW) and actual birth weight (BW) and these are shown in the Figure 8. It was found that there was a positive correlation present between estimated fetal weight (EFW) and actual birth weight (BW) with a Pearson coefficient of 0.205 and with the p-value of 0.041 which is significant.

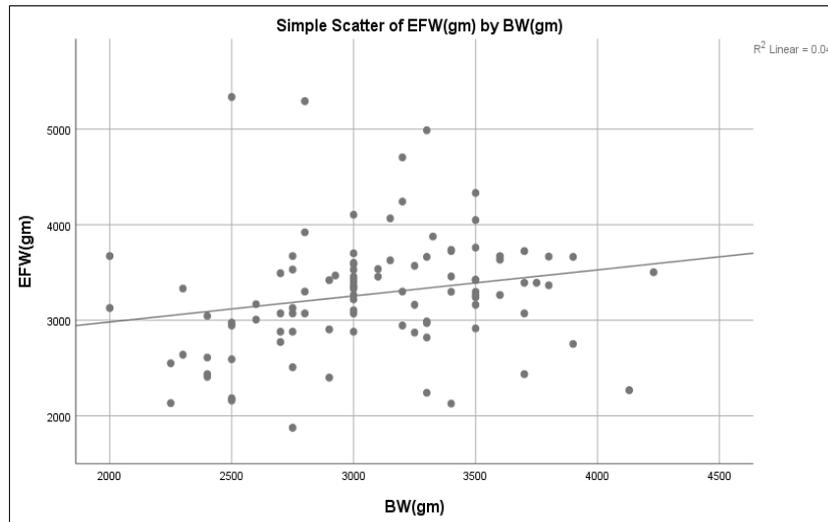


Fig 8: Statistical tests (Correlation)

Discussion

Estimation of fetal weight is very important in the obstetric management, as Fetal Growth Restriction (FGR) may lead to fetal distress during labour. Conversely, a big baby (Macrosomia i.e. birth weight of 4000 grams or more) may cause problems like Mid-pelvic arrest, shoulder dystocia or many need a Cesarean delivery.

Estimating fetal weight by clinical method (Symphysio-fundal height and abdominal girth) is a useful alternative where Ultrasonography is not available. In this study, the baseline characteristic of the participants/pregnant women's age, gravidity are similar to the study conducted by Yuwadee Itarat *et al.* 2017. Also gestational age of 37-40 week is 90% in our study, which is also comparable to Yuwadee Itarat *et al.* 2017 study in which it is 75%.

Expected fetal weight of 3-3.5 Kg is 39% in our study, which is comparable to 38% in the study conducted by Z Parvin *et al.* 2012^[9]. Similarly actual birth weight of 3-3.5 Kg is 33% in our study, which is 48% in the study conducted by Z Parvin *et al.* 2012^[9]

This study showed a positive Co-relation between Estimated fetal weight and Birth weight with P value of 0.041. Data regarding the accuracy of fetal weight prediction are inconsistent. Ultrasonography (USG) is the available accurate method, many studies^[10, 11, 12] claim better results in which patient underwent Ultrasonography. Other studies have shown there is no statistical difference in the accuracy of fetal weight prediction between USG and clinical methods^[13, 14].

So estimating the fetal weight using Symphysio-fundal height and Abdominal Girth is easy, virtually no cost, Skilled birth attendant can able to use this technique without any instrument except the measuring tape and is very helpful in developing countries like India and also in places where pregnant women are living in hilly and tribal areas like Kodagu district.

Conclusion

We conclude that Symphysio-fundal height and Abdominal girth derived fetal weight are useful alternative to the Ultrasonographic estimation of fetal weight which enable the skilled birth attendant (SBA) personnel (Mid-wife, nursing staff, Medical officer or ANM) to make a decision on the mode of delivery, anticipate problems particularly for SGA/Macrosomia and hence, to notify for availability of an Obstetrician at the time of delivery.

The method holds a great promise for developing countries. Study with large sample size is recommended to accept this clinical technique as the screening method for fetal weight estimation in antenatal period.

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