

## Intrapartum Estimation of Fetal Weight by Symphysiofundal Height Measurement

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### Abstract

**Background:** The derivation and utility of birth weight centiles based on symphysiofundal height measurements were presented in an earlier study.

**Objective:** To validate the usefulness of intrapartum symphysio-fundal height measurements in fetal weight estimation.

**Methods:** A prospective study of a consecutive series of 4154 women who delivered at the University of Nigeria Teaching Hospital, Enugu from 1st April 2000 to 31st July 2002.

**Results:** Approximately 6.7 percent (279/4154) of the birth weights were below the 10th centile for the given symphysio-fundal height; 79.1% (3286/4154) were between the 10th and 90th percentile while the remaining 14.2% (589/4154) were above the 90th percentile.

**Conclusion:** Intrapartum symphysio-fundal height measurement is a useful alternative to ultrasonography in birth weight estimation in women in Enugu, Eastern Nigeria. Whether the technique applies equally well in other populations needs to be determined and is recommended.

**Key Words:** Symphysiofundal Height, Birthweight, Nomogram [Trop J Obstet Gynaecol, 2003, 20: 127-128]

### Introduction

Antepartum estimation of fetal weight is very useful in clinical decision making in cases of breech presentation, previous caesarean section, and previous dystocia<sup>1-3</sup>. Currently available methods for fetal weight estimation include abdominal palpation<sup>4</sup>, ultrasonography<sup>5</sup> and use of symphysio-fundal height measurements<sup>6</sup>. The derivation and utility of birth weight centiles based on symphysiofundal height measurements were presented in an earlier study<sup>7</sup>. In the present paper, we report on our further experience with the method in another 4154 consecutive cases.

### Materials and Methods

The population consisted of consecutive parturients seen at the University of Nigeria Teaching Hospital, Enugu from 1<sup>st</sup> April 2000 to 31<sup>st</sup> July 2002 who satisfied the following eligibility criteria: certain or ultrasonic dates in the first or second trimester, absence of uterine fibroids, pelvic masses or polyhydramnios, and patient not included in the earlier study. When the patient meeting the above criteria was admitted for abdominal or vaginal delivery, the symphysiofundal height was determined as described previously<sup>7</sup>. In brief, a registrar who was a member of our research team measured the distance from the top of the fundus to the top of the symphysis pubis three times to the nearest centimetre using a non-elastic tape with the centimetre side facing down, the patient supine, her urinary bladder empty and the uterus relaxed. Upon

delivery, the midwife on duty also measured the birth weight of the baby to the nearest 50 grams within six hours of delivery using a weighing scale (Waymaster model) as described previously<sup>7</sup>. The baby's birth weight was then compared with the ones shown in Table 1 to determine if it fell below the 10<sup>th</sup> centile or between the 10<sup>th</sup> and 90<sup>th</sup> centile or above the 90<sup>th</sup> centile weight for the particular symphysiofundal height. The correlation between the actual and the predicted 50<sup>th</sup> percentile birth weights (residuals) for a given symphysio-fundal height was also determined.

### Results

A total of 4154 women were studied. Their mean parity was  $1.8 \pm 4.7$  (range: 0-8) and mean age  $29.2 \pm 4.9$  (range: 15 - 42) years. The mean gestational age at delivery was  $39.0 \pm 1.9$  (range: 32 - 43) weeks. Six point seven percent (279/4154) of the birth weights were below the 10th centile for the given symphysio-fundal height; 79.1% (3286/4154) were between the 10th and 90th percentile while the remaining 14.2% (589/4154) were above the 90th percentile. Pearson's moment correlation coefficient between the actual birth weights and the predicted 50th percentile birth weights for given symphysio-fundal heights was  $r = 0.78$ ,  $p = 0.000$  (Fig 1.)

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**Table 1**  
**Fitted Birth-Weight Centiles According to the Symphysio-Fundal Height**

SFH (cm)	Fitted Centiles (grams)			
	10 <sup>th</sup>	50 <sup>th</sup>	90 <sup>th</sup>	Fitted SD
25	386	1085	1785	545
26	593	1215	1837	484
27	797	1351	1905	431
28	1000	1495	1990	385
29	1217	1661	2105	345
30	1418	1820	2222	315
31	1616	1986	2356	290
32	1810	2160	2510	272
33	2023	2359	2695	262
34	2215	2548	2880	259
35	2405	2743	3081	262
36	2616	2967	3319	273
37	2803	3179	3554	292
38	2988	3397	3806	318
39	3170	3623	4075	348
40	3380	3879	4378	388
41	3560	4120	4681	436
42	3737	4368	5000	492
43	3937	4650	5363	551
44	4120	4913	5706	617
45	4292	5184	6076	694
46	4409	5462	6403	776
47	4584	5776	6808	865
48	4758	6069	7230	962
49	4930	6370	7670	1066
50	5101	6677	8125	1177
51	5270	7024	8598	1295
52	5438	7263	9088	1421

From Onah et al<sup>7</sup>

As judged by the mean residuals (actual minus predicted 50th percentile birth weight), Table 2 shows that the model is most accurate when the actual birth weight is between 2500 and 3999 grams.

## Discussion

Theoretically, the expectation is that 10 percent of the birth weights would be below the 10<sup>th</sup> percentile for the given symphysio-fundal height; that 80

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percent would be between the 10<sup>th</sup> and the 90<sup>th</sup> percentiles while the remaining 10 percent would be above the 90<sup>th</sup> percentile. The corresponding practical figures of 6.7%, 79.1% and 14.2% obtained in the present study approximate closely to the theoretical values.

**Table 2**  
**Accuracy of the Predicted Model Across Birthweight Distribution**

Birth-Weight Range	Number of Observations	Mean of Residuals	SD
< 2500 g	155	- 417.2 g	341g
2500 – 3999 g	3534	34.2 g	335 g
≥ 4000 g	465	384.0 g	492 g

As noted previously, the model is most accurate when the actual birth weight lies between 2500 grams and 3999 grams. The implication of this is that intrapartum symphysio-fundal height measurement is a useful alternative to ultrasonography in birth weight estimation, especially when the fetus is neither low-birthweight nor macrosomic. However for low-birthweight babies, ultrasonography is more accurate than SFH while for macrosomic babies, both methods show wide standard deviations for a given measurement. However, unlike ultrasonic birthweight estimation where several parameters (the fetal biparietal diameter, femur length and abdominal circumference) have to be measured before the estimation is done, only a single parameter is required when using SFH, although this single parameter may be measured several times and the mean value taken for greater accuracy.

This study validates the usefulness of intrapartum fundal height measurements in fetal weight estimation in the population where the initial study was carried out. Whether the technique applies equally well in other populations needs to be determined and this is recommended.