

Foetal Weight Estimation: Correlation Between Clinical Method & Birth Weight at Delivery

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Abstract

The estimation of foetal weight is crucial to the management of labor and delivery. The presence of large foetuses may cause difficult labour, perinatal asphyxia, neurological damage, and birth injury. In contrast, low birth weight is associated with increased perinatal mortality. Therefore, foetal weight should be determined as accurately as possible. US growth scans are commonly used for this purpose. Nevertheless, rural people in low-resource countries like Bangladesh may not have access to ultrasounds to estimate the foetal weight. It is therefore important to find a way to determine the estimated foetal weight that is accurate. This study investigated the relationship between the foetal weight estimation by Dare's formula and the actual birth weight after delivery.

Design: This prospective observational study was carried out in the Department of Obstetrics and Gynaecology, Sylhet MAG Osmani Medical College Hospital, Sylhet, Bangladesh for 2 years.

Methods: One hundred singleton, term pregnant women with longitudinal lie were included. Data were collected by using structured questionnaire designed for the study by researchers herself. Unpaired t test was done to see the difference and Pearson's correlation to see the correlation between quantitative data. $P < 0.05$ was considered statistically significant.

Result: A strong positive linear correlation was observed between foetal weight estimation by clinical method (Dare's formula) and actual birth weight ($r=0.796$; $p<0.001$).

Conclusion: Clinical method (Dare's Formula) of foetal weight estimation strongly correlates with actual birth weight. So, it has a great value estimating foetal weight prenatally and found it to be clinically effective.

Introduction

Birth weight is one of the most important factor that determines the neonatal health and survival. Both low birth weight and over weight at delivery are associated with an increased risk of newborn complications during labour and the puerperium (Muralisree and Mirunalini., 2015). Estimation of foetal weight is mandatory to take clinical decisions during the management of labour for safety of mother and newborn.

The two main methods for prediction birth weight in current obstetrics are (1) Clinical measurement of foetal weight and (2) Sonographic measurement of foetal weight (Njoku et al., 2014).

Expected foetal weight was calculated using two clinical formula (a) Johnson's formula and (b) Dare's formula. The Johnson's formula for estimation of foetal weight in vertex presentation requires the smphysio-fundal height and station level, where station of the presenting part was assessed by both abdominal and per vaginal examination. While Dare's formula requires the symphysio-fundal height and the measurement of abdominal girth for estimation of foetal weight (Alnakash and Mandan, 2013). In this formula, foetal weight in grams is equal to the product of smphysio-fundal height and abdominal girth at the level of umbilicus, both parameters measured in centimeters (Njoku et al., 2014). It needs no sophisticated equipment as well as per vaginal examination, only a non-elastic measuring tape is required. Therefore Dare's formula is more suitable in all centre by medical, paramedical stuff and trained birth attendants.

Ultrasound is another method for estimation for expected foetal weight and diagnosis of impaired growth. Sonographic predictions of foetal weight are based on algorithms of foetal parameters, such as abdominal circumference, femoral length and biparietal diameter i.e. Hadlock's Formula (Muralisree and Mirunalini, 2015). But, it is not easily available in low resources settings and needs trained, expertise and expensive equipment. In such circumstances clinical methods of estimating foetal weight can aid in obstetric decision making.

Therefore, development and validation of simple, inexpensive, accurate and effective clinical methods are important and relevant, where equipment and trained manpower are scarce at most places of delivery. In Bangladesh most of the populations are rural based who have no access to ultrasonography or who cannot afford the cost even when USG is available.

This study is an attempt to evaluate the correlation of estimated foetal weight by clinical method and actual birth weight at term. Finally, it may help health care provider to estimate the foetal weight confidently and referred high risk cases to well equipped hospital.

Objective of the study

- To estimate and record foetal weight by clinical based Dare's formula and actual birth weight just after delivery .
- To compare estimated foetal weight by clinical method with actual birth weight at term.
- To see the correlation between the foetal weight estimation by clinical method and actual birth weight at term.

Method and Materials

This prospective observational study was carried out in the Department of Obstetrics and Gynaecology, Sylhet MAG Osmani Medical College Hospital, Sylhet, Bangladesh from July 2017 to June 2019. One hundred singleton, term pregnant women with longitudinal lie were included. Polyhydroamnios or oligohydroamnios, intrauterine foetal death, congenital anomaly, preeclampsia or eclampsia, antepartum haemorrhage, morbid obese and uterine/ adnexal tumour were excluded. Symphysio-fundal height (SFH) and abdominal girth (AG) were measured with the patient lying flat on her back, with her legs extended in nearest centimeter. Foetal weight was estimated using Dare's formula (foetal Weight in grams = (SFH cm $\times$ AG cm). Immediately after delivery the newborn were weighed by using digital balance. Data were analyzed using SPSS version 22.0. Unpaired t test was done to see the difference and Pearson's correlation to see the correlation between quantitative data. $P < 0.05$ was considered statistically significant.

Result

The age of the mothers was 25.76 ± 4.53 years with 88% were within 30 year; 52.0% mothers were primipara. The mean actual birth weight was 2998 ± 352.5 grams while the mean estimated foetal weight by clinical method was 3004.1 ± 283.5 grams; difference was not significant ($t=-0.136$; $p=0.892$). A strong positive linear correlation was observed between foetal weight estimation by clinical method (Dare's formula) and actual birth weight ($r=0.796$; $p<0.001$).

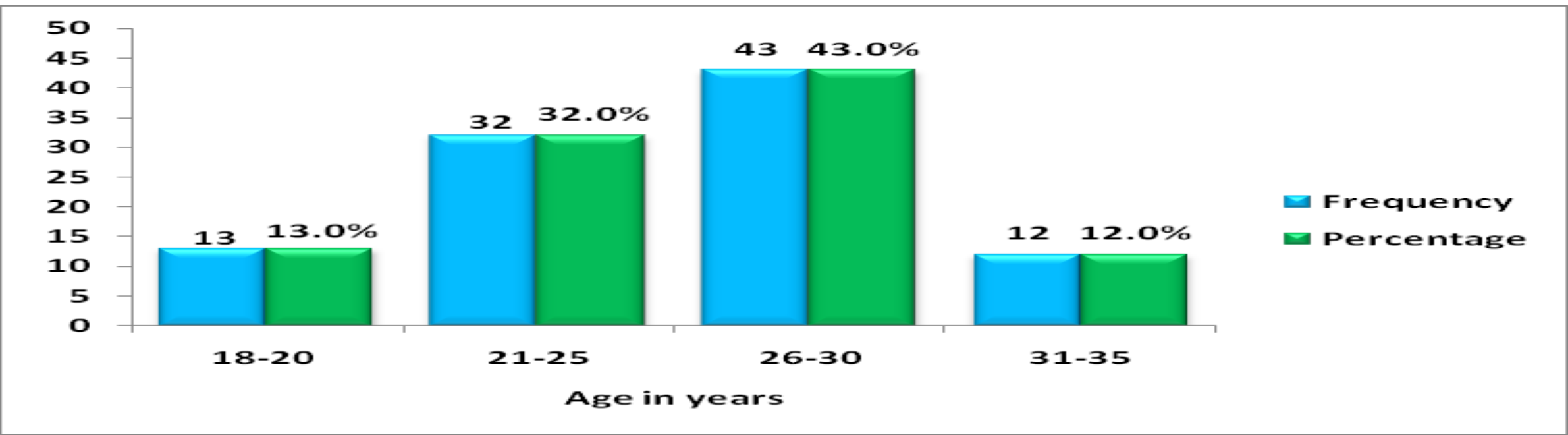
Conclusion

Clinical method (Dare's Formula) of foetal weight estimation strongly correlates with actual birth weight. Therefore routine requesting of costly ultrasound estimates of foetal weight is hardly justifiable when clinical estimation by Dare's method can be quickly carried out at no cost, easy to perform, and may be used as a screening tool for foetal weight estimation. Moreover, Clinical method can be great value in developing countries like ours where ultrasound is not available at many health care centres especially in rural area. However, in this study sample size was small, and conducted in a tertiary care hospital. Therefore, further study involving multicenter and large sample should be conducted to reach a justifiable conclusion and recommendation.

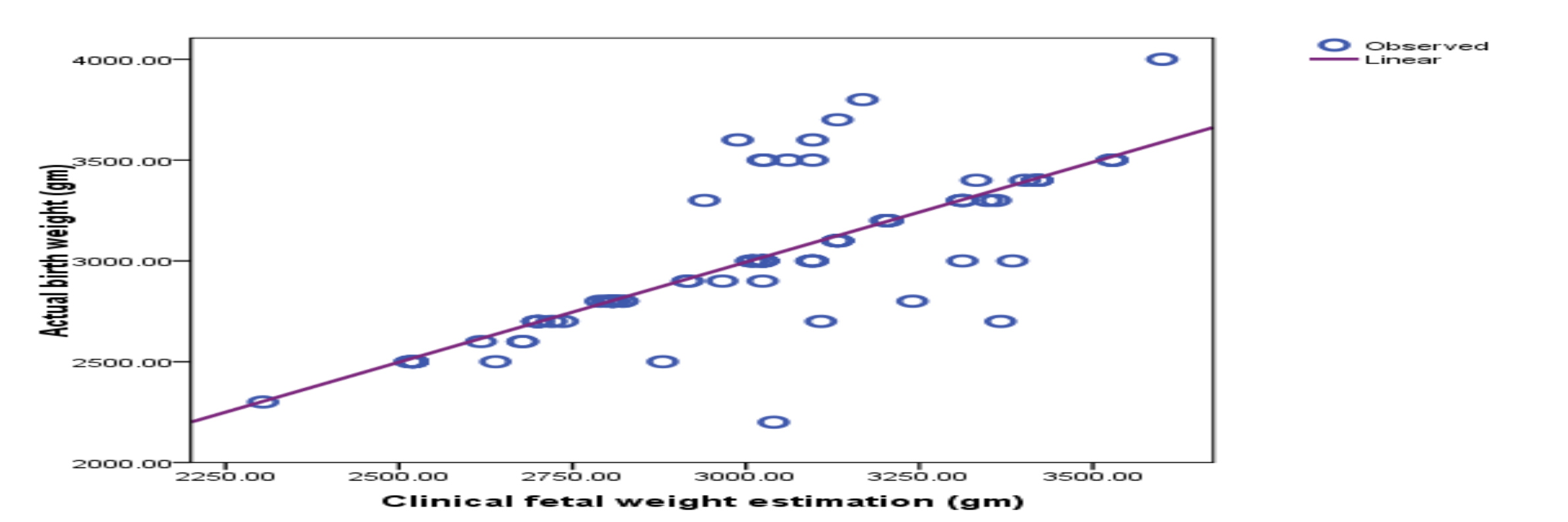
Table: Comparison of estimated weights

Method	Estimated weight (gm)	t-value	p-value
Actual	2998.0+325.5	0.136	0.892
Clinical	3004.1+283.5		

Distribution of the pregnant women according to age (n=100)



Relationship between clinical foetal weight estimation and actual birth weight



Reference

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