International Journal of Pharmaceutical and Medical Research
Volume – 2 Issue – 2 April 2014
Website: www.woarjournals.org/IJPMR *ISSN: 2348-0262*

An Assessment Of The Use Of Femoral Length And Biparietal Diameter In The Estimation Of Gestational Age In Second And Third Trimester Gestation In Edo Women In Benin City.

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Abstract: **This study seeks to investigate assessment of gestational age (GA) between the ultrasonic measurement of femoral length (FL) and biparietal diameter (BPD) in Edo women. The aim of this study was to determine if any significant difference exists between gestational ages (GA) estimate from femoral length (FL) and biparietal diameter (BPD), also aimed to determine which is the better estimator of gestational age in the second and third trimester between femur length and biparietal diameter and to develop model for the estimation of gestational age using combine index of femur length and biparietal diameter. The study population consisted of 116 pregnant Edo women between 14weeks and 40 weeks of gestation who were certain of the beginning of the last menses. The data were presented as mean and standard deviation; data were analysed using student t-test. The core findings of this research was that there was no significant difference between the mean of gestational age estimates from femoral length (FL) and biparietal diameter (P>0.05), and the model that incorporate femoral length and biparietal diameter to estimate gestational age, accounts for 86.3% of the accuracy in gestational age measurement (R^2=0.863).**

Keywords: Biparietal diameter, femoral length, gestational age.

1. Introduction

Gestational age is normally assessed by date of the woman's last menstrual period. Occasionally a woman may be uncertain of the date of her last menstrual period; however, ultrasound scan provides another possible method for determining foetal age (Gardosi and Geirson 1997).

Accurate determination of gestational age is very crucial in assisting both low and high risk obstetrics, most especially; uncertain gestational age has been related with unpleasant pregnancy outcomes including low birth weight, preterm delivery and perinatal mortality [2]. Measuring body parameters will allow verification of size and growth of the foetus and will greatly help in the diagnostic management of intrauterine growth retardation in late pregnancy[3].

Biparietal diameter is a straight line between the sides of the
head circumference; it has been stated by different researchers that
biparietal diameter measurement in assessment of foetal age before 30th
weeks can offer accuracy but after 30th weeks the accuracy decreases [4][5]. The determination
of biparietal diameter has been a problem due to the breech presentation
of the foetus.[6][7].

Best estimation of gestational age requires appropriate care for
pregnant women.[8]. However, this study helped to verify the best parameter to be used as an index of gestational age in Edo
indigenous women in Benin City

2. Materials and methods

The cross sectional study was carried out at the Omvial 4D ultrasound centre in Benin City, Edo State, Nigeria.

The study population consisted of 116 pregnant Edo Indigenous women between 14th weeks and 40th weeks of gestational age.

The following criteria were used for this study.

2.1 INCLUSION CRITERIA

- A maternal history for regular menstrual period
- Known date of the beginning of the last menses
- Normal pregnancies

2.2 EXCLUSION CRITERIA

- Foetal malformation
- Foetal growth retardation
- Maternal diabetics mellitus
- Maternal hypertension

2.3 METHODS OF TAKING MEASUREMENTS

The linear high resolution real time unit with its 3.5MHZ focused transducer was used.

Biparietal diameter is a straight line between the two sides of the head circumference. Biparietal diameter was measured by obtaining an oval transverse section of the head at the level of thalamus. The measurement was done from the upper edge of the proximal parietal bone to the upper edge of the distal one. The femur was measured from the major trochanter to the lateral femoral condyle along the longest axis of the central shaft exclusive of epiphysis, and the long shaft of the femur was placed exactly perpendicular to the ultrasound screen to give the accurate measurement of femur length

3. Data analysis

Data were presented as mean and standard deviation. Test of statistical significance of the mean for biparietal diameter and femur length was compared using student t- test.

4. Result

Tablet 1…… To determine whether any significant different exits

Between gestational age estimated from femoral length (N_1 116) and that estimated from biparietal diameter (N_2 116).

Parameter	Mean	SD	T	DF	P-value	Significant
FL	29.51	6.34	0.923	230	0.357	Not Significant
BPD	28.74	6.33				

Table 1 shows the test of significance between femoral length and biparietal diameter for the parameters measured. The result showed that there is no significant difference between gestational age estimated from femoral length and that estimated from biparietal diameter. (t =0.923, P =0.357)

TABLE 2 ---- Distribution of femoral length and biparietal diameter in area under the curve, the better estimator of gestational age in 2nd and 3rd trimester.

Test result variable(s)	FL(cm)	BPD(cm)
Area	0.983	0.977
Mean	29.51	28.74
SD	6.34	6.33
CV	0.265	0.231

Table 2 revealed that femoral length was found to be a significantly better estimator of gestational age in third trimester than biparietal (it had a larger area under the curve than biparietal diameter, $p < 0.001$). However, biparietal diameter would be a more stable estimator of gestational age (CV for BPD =0.231, CV for FL =0.265) where CV is the coefficient of variation.

$$CV = \frac{\text{standard deviation}}{\text{Mean}}$$

TABLE 3 -------To develop a model for estimation of gestational age using a combined index of femoral length and biparietal diameter.

Model	B	T	Significant
(constant)	3.008	2.692	0.008
FL in cm	2.101	3.457	0.001
BPD in cm	1.972	3.594	0.000

Table 3 Shows that biparietal diameter and femoral length in a model for the estimation of gestational age using a combined index ; the model that incorporate FL and BPD to estimate gestational age , accounts for 86.3% of the variability in gestational age measurement (R^2=0.863). This model differ significantly from the constant only model (F=355.916, DF=2, 113, P<0.001).

The model is as shown below

$Y=3.008+2.101X_1+1.972X_2$ where Y=estimated gestational age in weeks, X_1 =femoral length in cm, X_2= biparietal diameter in cm.

5. Discussion

This study investigated the significant difference that exists between ultrasonic gestational age estimated from femoral length and biparietal diameter and the result showed that there is no significant that exists between them. It is also designed to show the better estimator of gestational age in second and third trimester using ultrasonic measurements of biparietal diameter and femoral length and this result revealed that femoral length was found to be a significantly better estimator of gestational age in third trimester than biparietal diameter.

One of the interesting findings from this study is the model for the estimation of gestational age using a combined index of femoral length and biparietal diameter. The result shows that the model that combined femoral length and biparietal diameter to estimate gestational age, accounts for 86.3% of the accuracy in gestational age measurement which indicate that combined index of femoral length and biparietal diameter are better prediction of gestational age than only femoral length or biparietal diameter.

6. Conclusion

An assessment of the use of femoral length and biparietal diameter for the estimation of gestational age in second and third trimester has been studied. This research work showed that there is no significant difference exists between ultrasonic measurement of gestational age estimated from femoral length and biparietal diameter in Edo indigenous women and also, combined index of femoral length and biparietal diameter is a better predictor of gestational age than when femoral length and biparietal diameter are used separately.

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