TITLE:

Rasaki's formulae using Biparietal Diameter (BPD) for calculating fetal gestational age

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Hypothesis:

Rasaki's theory of life expectancy which states that "the strength of your brain is directly

Proportional to the length of your life"

Mathematical expression of Rasaki's theory of life expectancy:

$$BPD \propto G.A$$

$$BPD = \text{Ꞧ} G.A$$

$$G.A = \frac{BPD}{\text{Ꞧ}}$$

$$\text{Ꞧ} = \frac{BPD}{G.A.}$$

Where BPD = Biparietal diameter

G.A. = Gestational age

Ꞧ = Raskopotente (a constant factor)

ABSTRACT

Every part of a person's daily life is being controlled by the central nervous system, which is made up of the brain, spinal cord and peripheral nervous system.

The position and situation you found yourself at the moment is as a result of the decision you have taken, which was geared, driven and directed by your brain. Invariably, the strength of your brain is in a direct proportion to the length of your life – "Rasaki's theory of life expectancy".

This postulation serves as the bed rock for this study and which eventually resulted into the establishment of a mathematical relationship between fetal biparietal diameter and gestational age.

The brain consists of 3 parts which are the forebrain, midbrain and the hindbrain. The forebrain constitutes the cerebrum, thalamus and the hypothalamus. The cerebrum is the largest part of the human brain. It is associated with higher brain function, such as thought and action.

The cerebral cortex is divided into 4 parts which are collectively called the lobes. The 4 parts are; frontal lobe, parietal lobe, occipital lobe and the temporal lobe. Ultrasonographically, biparietal diameter measurement in fetus is always taken at the parietal lobe of the cerebral cortex of the fetus. Fetal biparietal diameter measurement is taken in a transverse plane from outer to inner edge considering the cavum septum pellucidum, thalami and the midline echo as the landmarks.

INTRODUCTION

Previous studies reported and showed that there exist a correlation between biparietal diameter and fetal gestational age. Ultrasonographically, biparietal diameter (BPD) can be used to determine fetal gestational age as well as fetal growth and abnormalities.

Many authors who discovered and wrote on the relationship between fetal biparietal diameter and gestational age, have no easy to calculate formula or method that can easily be understood.

Sequel to that, this study has come up with a straight forward, easy to understand and easy to calculate formulae that show accurate correlation between fetal biparietal diameter and gestational age.

This study used 200 pregnant women between 12-40weeks of gestation from FUNTOM Specialist and Medical Diagnostic Centre, Lagos, Nigeria, who had normal pregnancy without any maternal or fetal disease to establish a mathematical relationship between fetal biparietal diameter and gestational age.

OBJECTIVES

This research was carried out in order to provide information that can be used:

i. As a chart of ultrasonographic dating of pregnnacy
ii. For determining the fetal age whether the Last Menstrual Period (LMP) is known or not
iii. As a BPD and gestational age software package which can be installed into the ultrasound machines by the manufacturers
iv. By anyone who is given the value of the biparietal diameter and asked to determine the corresponding fetal gestational age.

MATERIALS AND METHODS

This was a cross sectional study of 200 pregnant women who had no maternal or fetal complication between 12-40weeks of intrauterine gestation, at FUNTOM Specialist and Medical Diagnostic Centre, Orile-Iganmu, Lagos, Nigeria.

A 3.5MHZ curve linear transducer from a SIEMEN sonoline prima ultrasound machine was ultrasonographically used to take measurement for Biparietal Diameter (BPD), Abdominal Circumference (AC), and the Femur Length (FL).

Fetal biparietal diameter's measurementwas taken in a transverse plane, considering the cavum septum pellucidum, thalami and the midline echo as the landmarks.

RESULTS

Using BPD

G.A = ~~R~~, from the mathematical expression of Rasaki's theory of life expectancy, the modal value of 2.6 was obtained by BPD that measures from 50mm above (≥50mm), 2.4 was the Raskopotente value (~~R~~) for BPD that measures from (41-49)mm, 2.2 for BPD that measures from (31-40)mm and 2.0 for BPD that measures less than or equal to 30mm (≤30mm).

Table of values: Formula	BPD	Gestational Age (GA)
1.	(1-30)mm	BPD / 2 i.e. BPD ÷2 = GA
2.	(31-40)mm	BPD / 2.2i.e. BPD ÷ 2.2 = GA
3.	(41-49)mm	BPD / 2.4i.e. BPD ÷2.4 = GA
4.	From 50mm and above (≥50mm)	BPD / 2.6 i.e. BPD ÷ 2.6 = GA

DISCUSSION

The application of ultrasonography into medical practices to estimate fetal biparietal diameter has brought about a great improvement in health care delivery. Most importantly, this has helped the obstetricians to know the size and shape of the fetal head and the relationship it has with the female pelvic brim and to know before hand whether delivery through the vagina would be possible or not.

Other biometric parameters that could also be used ultrasonographically to estimate fetal gestational age include the femur length, head circumference, humerus length, abdominal circumference, etc, but several studies proved the biparietal diameter to be the most important due to the fact that it's value is superior to the average cranial circumference.

Conclusively, the mathematical relationship analyzed by Rasaki's theory of life expectancy in this study showed that fetal biparietal diameter correlated significantly with the gestational age and this could be used as vital information and references for further studies.

CONCLUSION

To get the corresponding fetal gestational age; divide the biparietal diameter (BPD) that measures from 50mm and above (≥50mm) by 2.6, divide the BPD that measures between (41-49)mm by 2.4.

Divide the BPD that measures between (31-40)mm by 2.2 divide the BPD that measures less than or equal to 30mm (≤30mm) by 2.0.

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