FETAL SIZE CHARTS FOR THE SUDANESE POPULATION

Research Proposal

By

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BACKGROUND

- Ultrasound fetal biometry can serve for dating pregnancies or for assessment of fetal growth.
- Fetal growth restriction remains a major cause of perinatal morbidity and mortality.
- Fetal measurements can be combined in order to estimate fetal weight or can be compared to previous measurements in the same fetus in order to evaluate fetal growth longitudinally.

*Hui L, et al Best Pract Res Clin Obstet Gynaecol. 2008 Feb ;22(1):139-58.
**Salomon LJ, et al Ultrasound Obstet Gynecol. 2005 Jun ;25(6):559-65.

BACKGROUND CONT

- Fetal biometric measurements are plotted on reference charts for gestation in order to compare fetal measurements with the normal distribution of the reference population.

- Measurements are considered either adequate, small (i.e. <3rd, 5th or 10th centile) or large (i.e. >90th, 95th or 97th centile) and fetal biometry is therefore used as a screening test to identify fetuses that are below or above cut-off values for normality and thus are at increased risk for biometric or morphological abnormalities.

JUSTIFICATION

- Fetal size is affected by the fetal gender and the ethnicity of the parents.*
- As the fetal biometric size charts commonly used in Sudan are derived mainly from European and American populations, development of cross-sectional national reference charts is essential.

*Kierans WJ et al, BMC Pregnancy Childbirth. 2008 ;81.
Rodríguez G et al, J Perinat Med. 2008 ;36(6):527-30.

OBJECTIVE

To develop reference fetal size charts for the biparietal diameter, occipito-frontal diameter, head circumference, abdominal circumference and femoral length for Sudanese population.

MATERIALS AND METHODS

- **STUDY DESIGN**:

  A prospective cross-sectional study based on women presented for booking ultrasound examination at Soba University Hospital.

- **SELECTION OF THE SAMPLES:**
  - Women presented for routine booking scan but not for other clinical indication will be recruited to the study and Scanned only one time at a randomly allocated gestation.
  - The participants are women from Khartoum – the Capital – are mainly Afro-Arabs, representing the majority of the Sudanese population.

MATERIALS AND METHODS CONT

- **INCLUSION CRITERIA:**
  - Informed consent to participate in the study.
  - Regular menstrual cycle and certain last menstrual period date.

MATERIALS AND METHODS CONT

- **EXCLUSION CRITERIA:**
  - Multiple pregnancy.
  - Fetuses diagnosed to have congenital anomalies prenatally or after birth.
  - Maternal medical illness known to affect fetal size (DM, renal disease, hypertension requiring treatment and severe pre eclampsia).
  - Difference $\geq$4 days between the menstrual age and the first trimester scan age.

MATERIALS AND METHODS CONT

- **MEASUREMENTS:**
  - measurement will be done by 2 Fetal medicine physicians who have their training at the Fetal Medicine Department at King's College Hospital, London, UK.

➢ **HEAD MEASUREMENTS (BPD, OFD, HC)**

Fetal head measurements will be made in the axial plane at the level where the continuous midline echo is broken by the cavum septi pellucidi in the anterior third.

MATERIALS AND METHODS CONT

- **MEASUREMENTS:**
  - **ABDOMINAL CIRCUMFERENCE**

    AC will be measured on a transverse circular plane of the fetal abdomen at the level where the spine, descending aorta, anterior third of the umbilical vein and stomach bubble could be seen in the same plane.

MATERIALS AND METHODS CONT

- **MEASUREMENTS:**
  - **FEMUR LENGTH:**

    Femoral length will be measured on a longitudinal scan to show the whole femoral diaphysis imaged on a plane as close as possible to the right angle to the insonating beam. The measurement will be taken from one end of the diaphysis to the other.

MATERIALS AND METHODS CONT

DATA ANALYSIS:

- Reference centiles will be calculated using parametric methods assuming normal distribution of the observations around each gestational age.
- The mean and standard deviation (SD) at each gestational age will be estimated, and the 5^{th} and 95^{th} centiles will be calculated as mean $\pm$ 1.645. And the other centiles will be calculated in the same way.*

*Altman DG, Chitty LS, Br J Obstet Gynaecol. 1994 Jan ;101(1):29-34.

MATERIALS AND METHODS CONT

DATA ANALYSIS CONT

- Modeling the mean
- Calculating residuals
- Modeling the variability
- Calculating standard deviation scores
- Checking for goodness of fit of the model
- Deriving the centiles

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THANK YOU