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The role of maternal nutrition and other risk factors in foetal growth in Northern Ghana

Promotionsfach: Public Health

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Birth weight is an important indicator of the health of a given society. An increase in a population's mean birth weight has been associated with good health care and a high standard of living. Low birth weight (<2500g) a marker of intrauterine malnutrition, is closely associated with foetal and neonatal mortality and morbidity, chronic diseases in adulthood such as increased risk of diabetes type 2, hypertension, and cardiovascular diseases. However, at the other end of the spectrum, high birth weight (≥ 4000) gr, also termed macrosomia, is also associated with less unfavourable outcomes such as obesity later in life and complicated delivery; the latter posing a particular threat to the mother and the new-born baby in resource-limited settings such as Ghana because of the restricted availability of emergency obstetric and other essential care.

Maternal nutrition is considered as the most important modifiable factors that can determine the weight of an infant at birth. Thus, this study aimed at investigating the determinants of abnormal birth weight (low birth weight and macrosomic births). The main factors investigated included pre-pregnancy BMI, gestational weight gain, early pregnancy haemoglobin, socio-economic and demographic factors, maternal dietary patterns and practices, pre-existing diseases and ANC utilization.

The first phase of the study was conducted to ascertain the prevalence of abnormal birth weight in Northern region through facility based analysis of delivery register and took place in five hospitals. The second phase of the study followed a quantitative design and took place in three districts in the Northern region of Ghana. It consisted of two groups; a cohort of pregnant women who were recruited in the second trimester of their pregnancy and followed till after delivery and the second group consisted of a cross section of mothers who were attending postnatal services in the selected hospitals. Thus, all study participants (N=578) were interviewed postnatal, but a subgroup (N=210) was additionally interviewed prenatally. Secondary data was obtained from antenatal and delivery registers/records while the primary data were obtained through questionnaires and structured interviews. The variables included

weight of baby at birth, socio economic variables (such as maternal occupation, educational level, marital status, religion, ethnicity, age and household asset) and dietary habits (such as dietary practice and frequency of food consumption etc.) of the mothers.

The third phase used a qualitative design, which offered an opportunity to obtain an in-depth understanding on the factors that influence maternal dietary habits and food intake during pregnancy. The qualitative interviews were conducted using a semi-structured interview guide (in-depth interview guide). This was done to triangulate findings, and to combine the advantages of both the qualitative and quantitative methods, therefore increasing the credibility and validity of the findings.

The core findings were that generally it was observed that under nutrition (LBW) and over nutrition (hypertrophy/macrosomia) co-existed in infants thus reflecting the nutrition transition that is currently being experienced by low- and middle-income countries. Also, macrosomia was found to be increasing especially among the emerging urban middle and upper class, as evidenced by its high prevalence in women attending the private hospital. Moreover, the mothers were generally well nourished before conception but the majority did not gain adequate weight according IOM recommendation coinciding with a high proportion of infants with low birth weight. The study also revealed specific pregnancy related nutritional habits, such as taking high energy and carbonated drinks and 'pica' (perverted appetite for substances not fit as food or of no nutritional value) as a remedy or a way of managing 'morning sickness', which occur mostly during the early stages of pregnancy. The most important factors identified as militating against infant weight at birth included inadequate maternal weight gain, socio-economic factors such as mother's location, inappropriate nutrition during pregnancy and infections such as diarrhoea. If these results are confirmed it would have major implications for antenatal care and pregnancy planning.

The findings of this study buttress the importance of maternal diet during pregnancy in foetal growth. The qualitative analysis also revealed that the most important experience described by the women in this study was the influence of the physiological changes that occur during pregnancy on food consumption. On the whole, pre-pregnancy body mass index and gestational weight gain were found to be the most important determinants of birth weight after controlling for gestational age and other factors.