2. 0 ABSTRACT

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Course	International Health Development (MPH)	Name	Awuni Thomas Kwasi
Thesis Title	Prospective Facility-Based Validation Study of Maternal Mid-upper-arm Circumference Cut-off Relative to the Institute of Medicine Gestational Weight 2009 Guideline towards Advancing Primary Healthcare in Ghana		

Abstract of master's Dissertation

Background: Inappropriate (low /excess) gestational weight gain (GWG) defined in the Institute of Medicine, IOM 2009 guideline and early pregnancy body mass index (BMI <18.5 kg/m^2 and BMI ≥25kg/m^2) predicts adverse obstetric outcomes. In Ghana whilst antenatal care coverage is improving, maternal malnutrition also exists amidst scarce resources which impede quality care. Mid-upper-arm circumference (MUAC) measurements can predict pregnancy malnutrition. However, the lack of global consensus for universal MUAC cut-offs to indicate malnutrition in pregnant women have inhibited its routine use. Few studies have validated MUAC against IOM guidelines for GWG.

Objectives:

1. To assess the prevalence of inappropriate GWG (2009 IOM guideline) in women attending antenatal clinics (ANC) in southern Ghana and establish if MUAC can be used to predict inappropriate GWG.
2. To assess the prevalence of early pregnancy BMI and its relationship with GWG in women attending ANC in southern Ghana and establish MUAC cut-off.

Method: Pregnant women at 4th and 7th months (n = 365, 15 to 45 years) from four facilities in southern Ghana were studied from November 2018 to May 2019. Employing face-to-face interviews

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with structured questionnaires, primary data used and measured were socio-economic status, dietary intake and MUAC. Secondary data were mothers' and infants' anthropometry extracted from maternity records. The analysis for GWG and overweight used a sub-sample (n = 237) of mothers due to non-availability of the last recorded weight before delivery. Descriptive statistics, bivariable/multivariable logistic regression analysis and diagnostic test (sensitivity, specificity, receiver operating curve, ROC for test accuracy measure, and area under ROC, AUROC) were done using MUAC (main predictor). The outcomes examined were inappropriate GWG and early pregnancy BMI. MUAC cut-offs were evaluated at 0.5cm increments. Stata (StataCorp LLC [US]) was used for the analysis with $p<0.05$ considered statistically significant.

Results: Findings indicate 55.7% (132/237) of the respondents gained weight below the IOM guideline whilst 16.4% (39/237) had weight gain above that standard. Almost 51% (120/237) of the respondents were overweight/obese. About 71% (78/110) of the women with normal BMI (18.5 to 24.9) had GWG below the IOM, 2009 guidelines. MUAC as a continues measure (cm) significantly predicted women at risk of excess GWG aOR 1.5(95% CI: 1.2, 1.9) and overweight aOR 2.0(95%, CI: 1.7, 2.4). Established MUAC cut-offs of ≥36.0cm can predict risk of excess GWG (sensitivity 81.8%, specificity 94.8% and AUROC 0.91), ≤27.0cm distinguishes inadequate GWG (95.7 sensitivity, 86.6% specificity and AUROC 0.97), ≥33.0cm could predict risk of overweight (68.9% sensitivity, 87.9 specificity and AUROC 0.85) whilst ≤25.5cm might predict risk of underweight (sensitivity/specificity >90.0 and AUROC >95).

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Conclusion: Inappropriate GWG (IOM 2009 guideline), overweight and obesity were significantly high among pregnant women in Ghana. MUAC measured during 4th and 7th month significantly predicted higher risk of inappropriate GWG and overweight/obese. MUAC cut-offs established present a unique opportunity to advance primary healthcare for healthy pregnancy outcomes in Ghana. The results suggest that public health intervention to improve GWG and pregnancy outcomes should focus on all women attending ANC. Further research is also needed to validate the performance of MUAC cut-offs in other regions for policy decisions.