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Association between childhood obesity and atopy among school children aged 6-15 years living in rural and urban areas in Ghana in 2006

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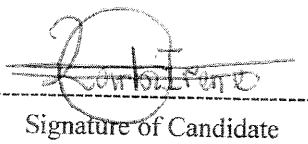
DECLARATION

I, Irene Akosua Larbi declare that this research report is my own work. It is being submitted for the degree of Master of Science in Medicine in the field of Epidemiology and Biostatistics in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.



Signature of Candidate

20 / OCTOBER / 2008

DEDICATION

ABSTRACT

Introduction: Studies have shown that atopy is more prevalent among children living in urban than in rural areas. Factors which determine the development of atopy and the observed rural-urban gradient in its prevalence are not fully understood. In developing countries, the transition from rural to urban areas has been associated with lifestyle changes and an increased prevalence of obesity. Although studies in industrialized countries have identified obesity as a risk factor for asthma, the relationship between obesity and atopy is not clearly established. Moreover, few studies have explored the effect of obesity on allergies in Africa.

Objectives: This study sought to determine the prevalence of atopy and body mass index (BMI) percentiles in a population of Ghanaian school children living in rural and urban areas in the Greater Accra Region; and to investigate the association between childhood obesity and atopy.

Materials and method: Data on skin prick testing to a panel of aero and food allergens, anthropometric measurements, parasitological and questionnaire data for 1,482 Ghanaian school children aged 6-15 years who participated in the Global View of Food Allergy (GLOFAL) study was analyzed. A cross-sectional analytic design was employed in the study. Atopy was defined as sensitization to at least one allergen whilst the Centers for Disease Control and Prevention (CDC) growth reference charts were used in defining obesity. Logistic regression was performed to investigate the association of obesity and atopy whilst adjusting for confounding factors.

Results: The prevalence of atopy in the study population was 21.5% and was significantly higher in the rural than the urban site (25.1% vs.17.8%). Participants in the urban site were

heavier and taller but a higher mean BMI and prevalence of obesity was observed among the rural participants. No association was observed between obesity and atopy but univariate analysis for urban participants showed significant associations between atopy and male sex [OR: 1.90, 95% CI: 1.30-2.79], age [OR: 1.76, 95% CI: 1.00-3.07], family history of asthma [OR: 1.58, 95% CI: 1.01-2.47] and occupational status of parent [OR: 0.33, 95% CI: 0.12-0.93]. In the rural site, atopy was associated with male sex [OR: 1.49, 95% CI: 1.06-2.08] and co-infection with two or more intestinal parasites [OR: 2.47, 95% CI: 1.01-6.04]. Male sex [OR: 2.10, 95% CI: 1.41-3.42] and age [OR: 1.89, 95% CI: 1.05-3.42] remained the significant predictors of atopy in multivariate analysis for the urban site whilst male sex [OR: 1.45, 95% CI: 1.03-2.04] remained the only significant predictor of atopy in the rural site.

Conclusion: This study indicates that obesity is not associated with atopy in a population of Ghanaian school children. However, the burden of obesity and atopy may not be limited to urban areas. It is possible that the burden of these health problems is shifting towards the poor.

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ACRONYMS

BMI: Body Mass Index

CDC: Centers for Disease Control and Prevention

CI: 95 % Confidence Interval

EIB: Exercise-Induced Bronchospasm

GLOFAL: Global View of Food Allergy

HIV: Human Immunodeficiency Virus

IgE: Immunoglobulin E

IL: Interleukin

ISAAC: International Study of Asthma and Allergies in Childhood

LPG: Liquefied Petroleum Gas

NHANES: National Health and Nutrition Examination Survey

OR: Odds Ratio

PUFA: Polyunsaturated Fatty Acids

SPT: Skin Prick Testing

Th2: T- helper lymphocyte type 2

TNFα: Tumor Necrosis Factor α

TX: Texas

US: United States

USA: United States of America