

Maternal waist circumference as a prediction of children's stunted status

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Introduction

The main objective of this paper was to explore the prevalence of Stunted Child and Overweight Mother (SCOM) pairs in a South African setting. After a literature review of existing South African studies, the authors plan to inspire South African researchers to investigate the region-specific prevalence of SCOM in their respective areas, and to create a series of discussion papers and reviews in order to harness evidence-based strategies that could support ongoing efforts with respect to mother and child malnutrition in South African. This pilot study, carried out in the QuaQua region of the Free State, indicates the existence of a linear association between a mother's waist circumference and her child's stunted status.

Maternal health has been found to have a direct impact on the health of children in that maternal malnutrition leads to malnourished children. The seemingly linear relationship of paired mother and child malnutrition has resulted in a public health challenge in low- and middle-income countries, of which South Africa is one.¹ *The Lancet's* 2007 series on maternal and child undernutrition attributes global child mortality (2.2 million) and disability-adjusted life years (21%) of children younger than five years of age to stunting, severe wasting and intrauterine growth restriction.¹ Many studies have confirmed that malnutrition, specifically SCOM, is a crucial factor in the relationship between maternal and child health outcomes.¹⁻⁶

The available South African literature reviewed at the time of writing this scientific letter focused mainly on the linear relationship

between mothers' stature, specifically in obesity or household socio-economic factors, and child stunting.^{2,5} This pilot study in QuaQua investigated the relationship between mothers' waist circumferences and their children's stature (stunting). The study found that there was a positive linear prediction and association between a mother's waist circumference and her child's stunted status (Table I). The linear regression model ($n = 6$, $r = 0.40$, p -value 0.042) of the mother's baseline waist measurement (p -value 0.010, standard beta coefficient 0.298) and the waist to height ratio (p -value 0.033, standard beta coefficient 0.259) were the only predictors of the child's height-for-age Z-scores (stunting). Thus, in this pilot study, mothers with a larger waist circumference had more children who were stunted [height-for-age Z-score (HAZ) < -2 Z-score] than mothers with a normal waist circumference, while the waist to height ratio was not significant (Table I).

Many studies²⁻⁶ have linked maternal malnutrition to child health consequences, the most notable of which is the global study group series on maternal and child undernutrition.¹ Two of the planned five papers focus on the prevalence of and relationship between maternal and child malnutrition, and possible consequences in countries undergoing global nutrition transition.¹ Our pilot study appears to be the first in South Africa to have examined the linear relationship between mothers' waist circumference and child stunting.

Studies outside of South Africa that measured the linearity of the waist circumference-stunting pairs were conducted in Mexico³ and Argentina.⁴ The Mexican study was similar to our pilot study

Table I: Factor analysis and correlations of waist circumference for height-for-age Z-score

Predictors	Factor analysis components			Pearson's product-moment correlation coefficient	Significance p-value < 0.05
	1	2	3		
Waist	0.835	-0.193	-0.422	0.223	0.033
Waist to height ratio	0.131	0.273	0.928	0.144	0.155

in terms of both parameters measured (waist circumference and stunting) and the association between the two variables. However, this study measured waist circumference, while the Mexican group measured maternal central adiposity, which can be more specific. The Argentine researchers investigated the mothers' metabolic syndrome status against that of their respective children. Waist circumference was included in the determination of metabolic syndrome in both the mother and child. In other words, the Argentine study found that maternal waist circumference was a significant predictor of the mothers' children's metabolic syndrome status, but stunting status was not one of the study variables. Interestingly, a meta-analysis carried out by Özaltın, Hill and Subramanian⁶ found an inverse association between the mother's stature (height) and the child's anthropometry (stunting, among other health parameters).

The authors of this scientific letter found a similar adverse association between mother waist and child stunting (unpublished data) and that larger studies have a tendency to mask smaller studies, and thus present a different picture in a meta-analysis. The masking tendency was found only after carrying out detailed statistical analysis of the same data.

Conclusion

In this study, there was a positive linear prediction and association between a mother's waist circumference and her child's stunting status. More studies and discussions paper are needed to establish the national prevalence of SCOM in South Africa.

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