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Double burden of malnutrition among child-mother pairs: magnitude, and associated factors of co-occurrence of child anemia and mother abdominal adiposity in an urban area in North Africa

Introduction. In the Middle East and North Africa (MENA) region, the nutrition transition has resulted in drastic increases in excess adiposity, particularly among women. Most of the studies are based on overall adiposity only, even though abdominal adiposity may be specifically predictive of adverse health outcomes. At the same time, malnutritions, partly linked to micronutrient deficiencies like anemia remains a public health problem especially among pre-school children. In this study, we assessed the magnitude of double burden of malnutrition among child-mothers pairs, as defined by the coexistence of anemic child with abdominal obesity in mother, and explored the associated lifestyle and sociodemographic factors.

Methods. A cross-sectional survey was carried out in the Greater Tunis (Tunisia) in 2009/2010 using a stratified two stage random cluster sampling of households with 20-49 y. women. Our analyses used the subsample of 437 child-mother pairs (children 6-59 months, living with their mothers). For children, anemia was defined by Hb <110 g/l. For mothers, abdominal adiposity was assessed by waist circumference (WC), with WC \geq 88 cm defining high risk abdominal obesity according to World Health Organization. Relative prevalence ratios (RPR) were used to assess associations between the double burden of malnutrition in 4 categories, and lifestyle and sociodemographic factors, using multinomial logistic regression models. Also, this modeling framework enabled to assess if the coexistence of these two types of malnutrition among child-mother pairs is synergetic, antagonistic or independent by deriving estimates of the ratios of the probability of the double burden over the product of the probabilities of each type of malnutrition (either overall or by categories of lifestyle or sociodemographic factors). All analyses (first type error rate=0.05) took into account sampling design.

Results. More than half of the mothers suffered from abdominal obesity (51.3% [45.4-57.2]) and third of the children were anemic (32.8% [28.3-37.7]). The coexistence of anemic child and central obesity in mother affected 16.8% [12.7, 21.8]. The co-occurrence of these two types of malnutrition among child-mother pairs was independent without specific synergetic or antagonistic association (P=0.80). Adjusted associations with sociodemographic factors showed that this double burden of anemic child-abdominal obesity mother was more frequent among pairs with younger children, and showed a strong decreasing gradient with child age (P=0.0001). Also, mother's energy intake was associated to the double burden (P=0.0092).

Conclusion. Our finding highlighted a significant prevalence of the paradoxical co-occurrence of two different types of malnutrition among child-mother pairs. Our data did not demonstrate a higher risk of child anemia when the mother suffered from abdominal adiposity, nor vice versa. But prevention programs should nevertheless simultaneously address anemia in children together with abdominal adiposity among mothers.

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