

Breastfeeding and an overweight child: A linkage?

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SUMMARY

This study investigated whether exclusive breastfeeding for ≥ 6 months had a protective effect against overweight in children aged 12 to 24 months. The study was nested in the Brazilian semi-arid region consisting of about 1500 municipalities in 11 states with an estimated population of 26.4 million. The study was based on secondary data from the 'Health and Nutrition Day' survey that evaluated children living in the semi-arid region of Brazil. These surveys were conducted by a research network led by the Ministry of Social Development and the Fight Against Hunger in partnership with the Ministry of Health.

A multistage sampling approach was used. Each state was a separate domain (total of 9 states) and 30 municipalities were selected per state. In each municipality surveyed, two vaccination centres were randomly selected as secondary sampling units. Data collection took place during the national immunization days (NIDs), while vaccination procedures were carried out. At each post, children were systematically selected from the queue. This method yielded 16 934 randomly selected children. A sub-sample of 2581 children aged 12 to 24 months was the group of interest for this study. Information on duration of breastfeeding was missing for 372 children, resulting in a final sample size of 2209 children.

After immunization, anthropometric examination was done using standard guidelines and the caregiver was interviewed using a two-page questionnaire. Each child's weight and length/height was measured twice, according to WHO recommendations, and recorded. Nutritional status was assessed using National Centre for Health Statistics (NCHS) as a reference. The questionnaire was designed to capture information on years of schooling of both parents, access to basic goods and public services, access to social benefits, breastfeeding, growth monitoring, occurrence of common childhood diseases and compliance with prenatal care. All the measurements and interviews were done by local health professionals recruited and trained especially for the survey.

The dependent variable was overweight and the independent variable was exclusive breastfeeding (categorized as ≥ 6 months or < 6 months). Means and standard deviations were calculated for the weight-for-length z-scores according to the breastfeeding categories. In the crude analysis, association between overweight, exclusive breastfeeding and covariates was tested on the basis of prevalence ratio (PR) and 95% confidence intervals (95% CI). The variables with $p < 0.2$ in the crude analysis were included in the Poisson regression model. Multiple linear regressions were used for assessing the effect of exclusive breastfeeding on weight-for-length z-scores, controlling for potential confounding factors such as socioeconomic classification, skin colour/race, age, height-for-age, birth weight and prenatal care.

A total of 2209 children (49.3% boys) were studied, of which

38.1% were exclusively breastfed for ≥ 6 months. After adjusting for potential confounding factors, the risk of being overweight was lower among children who were exclusively breastfed for ≥ 6 months than those who were exclusively breastfed for < 6 months (PR=0.63, 95% CI 0.45–0.89). The multiple regression analysis showed that exclusive breastfeeding for ≥ 6 months yielded 0.13 lower (95% CI 0.23–0.03) weight-for-length z-scores. There was a positive association with birth weight, i.e. the higher the birth weight, the greater the likelihood of being overweight at age 12–24 months, and the lower the socioeconomic status, the less likelihood of being overweight.

COMMENT

The 'camp-based' approach of this study may not be the best study design to document the relationship between exclusive breastfeeding and overweight in children. The study has some methodological deficiencies. It used data collected as a part of a 'Health and Nutrition Day' survey that was not collected to test an association between exclusive breastfeeding and overweight. Further, there is no mention of the sample size, in the absence of which it would be difficult to know whether the sample size was adequate or not. However, the confidence intervals for the estimates are narrow, which could be a proxy for adequacy of sample size. From each of the nine states, 60 vaccination sites were selected, i.e. a total of 540 vaccination sites. The authors have not mentioned if a similar number of children were selected from each vaccination site or they were limited to a few selected sites. This information would help assess the generalizability of the findings. The authors have also not mentioned any inclusion or exclusion criteria for selection of the study participants. Although children were systematically selected from the vaccination queues but details of the sampling strategy have not been given. It would have been better if the authors had given information on the vaccination rates in the study area. In the absence of this information, one cannot be sure if the children who visited the vaccination sites were representative of the children in the area. It is possible that caregivers who took their children to the vaccination sites had better and easier access to the health system, and were more aware of the benefits of breastfeeding. Hence, there was a higher chance of such caregivers exclusively breastfeeding their child compared to those who did not visit these vaccination sites.

Exclusivity of breastfeeding was obtained using a questionnaire. Thus, this important information was collected as reported by the caregivers. This could lead to reporting bias. It is not clear in how many instances this information was provided by mothers. It is possible to get accurate information on exclusive breastfeeding from the mothers and not from other caregivers. Further, there was a minimum recall period of 6 months (for children aged 12 months) and a maximum of 18 months (for children aged 24 months). Even if one considers a minimum recall period of 6 months, it would be difficult for the mother(s) to correctly report if the breastfeeding was exclusive or not. The study suffers from major ascertainment bias specifically related to key independent variables. Birth weight was self-reported and it is not clear whether any documents/records were used to establish the accuracy of the information provided. Further, when birth weight is self-reported, it tends to be reported in multiples of 500 g.^{1,2} This means that if a child reportedly weighed 2500 g at birth, she might have weighed less or more than that. Also, the criteria for categorizing birth weight as low (< 2500 g), underweight (2500–2999 g), normal (3000–3999 g) and high (≥ 4000 g) is not applicable to all contexts. For instance, in India, the birth weight of a healthy baby is around 2600–2800 g and, according to the

above classification, she would be classified as 'underweight'. Thus, the above classification cannot be applied across all geographical areas. The authors have not mentioned the information they gathered on prenatal care. In the regression analysis they have used data on prenatal care as, whether provided or not. This does not add much weight to the analysis as the frequency and quality of care is important. Further, there were no data available on children's feeding, which could influence the association observed between breastfeeding and overweight.

The present study is observational in nature and cannot demonstrate causality. One possible explanation for why breastfeeding reduces the risk of overweight is that the findings are influenced by confounding factors, other than those that were considered in the study.³ It may be that mothers who exclusively breastfeed choose a healthier lifestyle, including a healthy diet for themselves and their children. This healthier lifestyle could result in a spurious relationship between breastfeeding and reduced risk of overweight.³ Moreover, the NCHS criteria were used instead of WHO criteria even though the WHO criteria are more rigorous for assessment of children's nutritional status.

Relevance to India

India currently has high malnutrition and stunting rates among children under 5 years of age. Exclusive breastfeeding rates are also low. The findings of this study need to be viewed beyond the childhood period. Studies suggest that the protection against overweight from being initially breastfed may persist into adolescence and adulthood. Owen *et al.* in a review found that the unadjusted OR for obesity among those who were breastfed was 0.50 for infants (95% CI 0.26–0.94), 0.90 for young children (95% CI 0.87–0.92), 0.66 for older children (95% CI 0.60–0.72), and 0.80 for adults (95% CI 0.71–0.91).⁴ The association between breastfeeding and overweight appears to remain with increasing age of the child. It also appears to have an inverse dose–response association with overweight (longer duration, less chance of overweight).⁴ This makes a case for promoting exclusive breastfeeding in the first 6 months or so as the burden of overweight is high among adolescents and adults.

The National Family Health Survey (NFHS-3) 2005–2006 data showed that combined prevalence of obesity (body mass

index ≥ 25 kg/m²) was 9.3% and 12.6% among men and women aged 15–49 years, respectively.⁵ While undernutrition in children has been the major public health concern in India, little attention has been paid to childhood overweight and obesity. The upcoming evidence suggests an increase in overnutrition among children as well as adults. The problem is larger in India where a significant proportion of the population belongs to the younger age group. Obesity is associated with multiple comorbid conditions such as type 2 diabetes mellitus, dyslipidaemia, polycystic ovarian disease, hypertension, and the metabolic syndrome, which are increasingly becoming common among children and urban adolescents.^{6–8} Most importantly, childhood obesity has been associated with a higher risk of morbidity and mortality in adult life.

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