Exclusive Breastfeeding: A Potential Protective Factor for Childhood Obesity?

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ABSTRACT

Background: The rate of obesity in Canada has been increasing at an alarming rate with one-third of children and adolescents being overweight or obese. Canadians are closely following the American's lead in the obesity epidemic, which poses a serious public health concern. Childhood obesity increases the likelihood of long-term complications, and hence, burdens the healthcare system. The World Health Organization recommends exclusive breastfeeding as the golden standard in achieving the appropriate growth factors and nutritional needs for children. Thus, exclusive breastfeeding has gained researchers' attention as a potential protective or modifiable factor for childhood obesity.

Objective: The aim of this literature review was to assess whether exclusive breastfeeding for at least three months is protective against obesity in Canadian and American children ages 1 to 11, when comparing those who were not exclusively breastfed for at least three months.

Methods: A search of published studies using the terms "(child* OR pediatric) AND (obesity OR overweight) AND (breastfeed* OR breastfed)" in PubMed, Medline, and Scopus was conducted. Results were subjected to inclusion and exclusion criteria, yielding five relevant articles for further examination.

Results: One prospective cohort study and four cross-sectional studies were reviewed. Obesity was measured with BMI scales and nine-level figure drawings, and breastfeeding data was collected through interviews and surveys. Three studies found no significant relationship between exclusive breastfeeding and childhood obesity, while the remaining two studies found a significant association.

Conclusions: Exclusive breastfeeding for at least three months may be protective against obesity in Canadian and American children ages 1 to 11 when compared to no exclusive breastfeeding; however, discrepancies in the evidence make it difficult to ascertain the association, and further research is required. Although the benefits of exclusive breastfeeding are clear, further investigation into the underlying social factors predisposing children to obesity should also be conducted.

INTRODUCTION

Both Canada and the United States are facing an obesity epidemic. In Canada, the prevalence of overweight and obese children and adolescents has been rising since the late 1970s.[1] Today, about 33% of Canadian children and adolescents are overweight or obese – approximately 1.6 million.[2] In contrast, the prevalence of obesity among American children and adolescents has been stable at roughly 17%; however, around 12.7 million children and adolescents are affected.[3,4] Childhood obesity increases the risk of long-term complications, such as diabetes, hypertension, and obesity in adulthood, and consequently, strains the healthcare system.[2] Therefore, childhood obesity is a public health concern, and the development of effective interventions requires the identification of modifiable factors contributing to childhood obesity.

Exclusive breastfeeding is defined as the practise of feeding an infant strictly breastmilk.[5] According to the World Health Organization, exclusive breastfeeding for the first six months in infancy is deemed as the golden standard in achieving the appropriate amount of growth factors, nutrients, and immunological needs for a child.[5] Exclusive breastfeeding has thus caught researchers' attention as a potential protective or modifiable factor for childhood and long-term obesity.

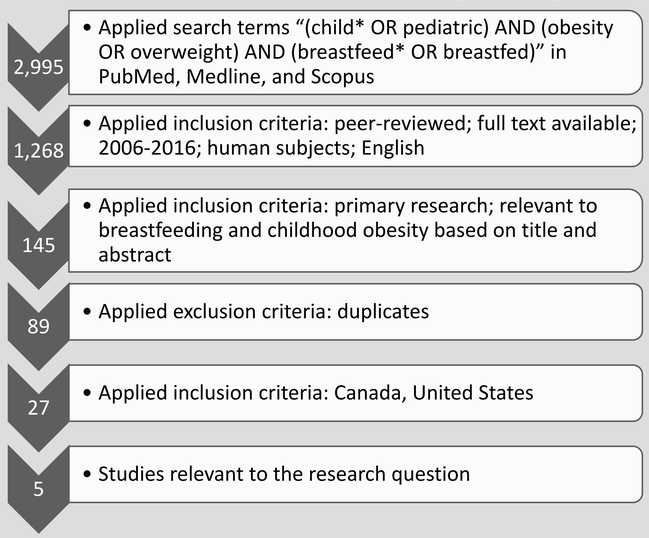
RESEARCH QUESTION

Is exclusive breastfeeding for at least three months protective against obesity in Canadian and American children ages 1 to 11, when compared to those who were not exclusively breastfed for at least three months?

METHODS

The systematic review began with the selection of a general topic (i.e., breastfeeding and childhood obesity) and the creation of inclusion and exclusion criteria. The literature search was conducted individually by the two authors, and any discrepancies were discussed and resolved.

Figure 1. Overview of the literature search with the number of articles listed on the left, and the article selection methodology on the right.



RESULTS

Table 1. Summary of the reviewed articles. (Abbreviations: *n, sample size; AOR, adjusted odds ratio; CI, confidence interval; BMI, body mass index)*

Article	Study Design	Sample	Results
Davis et al. (2014)[6]	Cross-sectional	• n = 2,295 • American, low-income children ages 2 to 4 • Primarily Hispanic (n = 1,918; 83.6%)	• Compared to never breastfed, exclusive breastfeeding for 6 months was associated with a reduced prevalence in obesity • No significant relationship between exclusive breastfeeding and obesity prevalence in children [AOR 0.60 (95% CI 0.3-1.1); *P* = 0.08]
Michels et al. (2007)[7]	Prospective cohort	• n = 35,526 • American women from the Nurses' Health Study II • Primarily Caucasian white (96%)	• No significant relationship or trend between exclusive breastfeeding for 3 months and body shapes at: - age 5 [AOR 0.98 (95% CI 0.81-1.19)] - age 10 [AOR 1.12 (95% CI 0.95-1.31)]
Novotny et al. (2007)[8]	Cross-sectional	• n = 420 • American children ages 6 months to 10 years • Native Carolinian (n = 8); native Chamorro (n = 54); Filipino (n = 69); other/mixed ethnicity (n = 289)	• Any breastfeeding was significantly associated with a lower BMI (*P* = 0.043) • No significant relationship among BMI, exclusive breastfeeding, and duration of breastfeeding
Shi et al. (2013)[9]	Cross-sectional	• n = 968 • Canadian children ages 6 to 11 from the Canadian Health Measures Survey → covers 96.3% of Canadian population	• Exclusive breastfeeding for 6 months has a significant protective effect on childhood obesity [AOR 0.45 (95% CI 0.32-0.63)], when compared to non-exclusive breastfeeding for 6 months • Risk reduction for child obesity: - 75% for exclusively breastfeeding for 6 months - 50% for non-exclusive breastfeeding for 6 months
Twells & Newhook (2010)[10]	Cross-sectional	• n = 1,026 • Canadian children born in 2001 from the Pre Kindergarten Health Fairs	• Exclusive breastfeeding for 3 months has a protective effect against preschool obesity [AOR 0.66 (95% CI 0.45-0.97)], when compared to exclusive formula feeding for 3 months

DISCUSSION

The literature on the association between exclusive breastfeeding and childhood obesity is inconsistent. Three of the five articles found no significant relationship between exclusive breastfeeding and child obesity, compared to non-exclusive breastfeeding. The remaining two studies concluded a significant relationship; however, Shi et al. analyzed the protective effect of exclusive breastfeeding for six months rather than three months.[9] Variances may be explained by heterogeneity of measures in body fat (i.e., BMI scale and nine-level figure drawing).

Several limitations of this review should be considered. By including only English studies, which are often published based on significant results, publication bias poses as a limitation. Assumptions of homogeneity between the studies are also limitations. Four studies used BMI scales while one used a nine-level figure drawing, resulting in different definitions of obesity. Odds ratios were also adjusted for different confounders, limiting the review further. Information bias was minimized through individual literature searches.

Future research on the modulating and preventative factors of child obesity is imperative due to the rising prevalence of obesity. Although the association between exclusive breastfeeding and childhood obesity is inconclusive, the known benefits of exclusive breastfeeding, such as protection against infections and diarrhea, should provide reason to encourage breastfeeding promotion by health professionals regardless of the association with obesity.[5]

CONCLUSIONS

Exclusive breastfeeding for at least three months may be protective against obesity in Canadian and American children, when compared to children who were not exclusively breastfed for at least three months. Due to discrepancies, further research is required to investigate the covariates that may predispose or protect a child from obesity.

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