

# RIASE

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## **EXCLUSIVE BREASTFEEDING AND OBESITY IN PRESCHOOL: WHAT RELATIONSHIP?**

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## ABSTRACT

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**Introduction:** Exclusive breastfeeding (EB) is recommended by the World Health Organization until 6 months of age. Childhood obesity is currently a public health problem, and its prevention is fundamental.

**Objectives:** To identify the benefits of EB in reducing childhood obesity in pre-school children.

**Methods:** Studies that correlate EB and obesity in pre-school children were included. The research was conducted through the EBSCO and Pub Med search engine with the time interval between 2013 and 2017. We identified 82 articles and considered 4 studies for the review.

**Results:** The studies analyzed demonstrate the positive effect of EB in reducing childhood obesity.

**Conclusion:** EB has different benefits for children, including decreased risk of obesity. There are different variables that can influence obesity and it is essential that research strategies be standardized to find successful strategies in the long-term implementation of EB, which will lead to health gains.

**Keywords:** Exclusive breastfeeding; childhood obesity; preschool children.

## INTRODUCTION

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Breast milk is a living, complete and natural food, suitable for almost all newborns and its advantages exist for both the baby and the mother. It is the cheapest and safest method to feed the babies and it is assumed worldwide as the best way to feed children up to 6 months of age<sup>(1)</sup>.

The support, protection and promotion of breastfeeding are an added value for the public health simply by the fact that dietary practices condition the nutritional state of infants and children<sup>(2)</sup> and this way, we can foment the promotion of health and the prevention of the disease in children, betting on a healthy diet since the beginning of their life cycle.

The most recent recommendations of the European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN), include timing and different types of foods which should constitute food diversification, highlighting the benefits of EB<sup>(3)</sup>.

According to the Register of Breastfeeding<sup>(2)</sup>, EB implies that the infant receives breast-milk, (even if removed with a breast pump or donated by a wet nurse), and it allows to receive oral rehydration serum, drops, syrups (vitamins, minerals, medicines), and nothing else.

ESPGHAN reiterates that prolonged EB may be associated with reduced risk of gastrointestinal and respiratory infections and that there may be an increased risk of allergy if solids are introduced before 3 or 4 months of age. The moment of introduction of a diverse diet at 4 or 6 months of age showed no influence on growth or adiposity during childhood or early childhood, however, the same introduction before 4 months of age, may be associated with an increase in posterior adiposity<sup>(3)</sup>.

A healthy child will gain in health, while an overweight child or obese, will have health problems and will produce financial expenses for the country. The numbers of childhood obesity have increased in recent years, constituting this disease as a public health problem, or even as the epidemic of the 21st century<sup>(4-7)</sup>.

COSI Portugal completed its fourth round at the end of 2017 with the publication of the nutritional status of school-age children during 2015/2016. The national prevalence was as follow: 30.7% overweight and 11.7% obesity, reducing the figures compared to those of 2008<sup>(8)</sup>. However, despite the progression, according to the Programa Nacional para a Promoção da Alimentação Saudável (PNPAS), the goal is to completely prevent the increase of overweight children and adolescents by 2020<sup>(9)</sup>.

The direct consequences of obesity on children's health are not clearly defined, still, there is a connection between the disease and the risk for chronic noncommunicable diseases, such as diabetes, orthopedic pathologies, oncological diseases and psychosocial problems such as discrimination, isolation and low self-esteem. Furthermore, it is essential to mention its association with the decrease of school success<sup>(10)</sup>.

Overweight and obese children are more likely to be obese adults and more prone to develop noncommunicable diseases such as diabetes mellitus, cardiovascular diseases at a younger age and dental caries. Overweight and obesity, as well as diseases related to this morbidity are, in large part, avoidable, therefore, the prevention of childhood obesity requires an important priority<sup>(11,12)</sup>.

According to the previously stated, there is a growing need to associate the role of EB regarding childhood obesity. Different studies have investigated that connection; thus, it is relevant to protect and implement fast and effective strategies to reduce childhood obesity in pre-school children, where most problem were identified, and interventions are not yet over.

On that note, this review aims to identify the benefits of EB in reducing childhood obesity in pre-school children.

## METHOD

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For the elaboration of this systematic review, the methodology of the Joanna Briggs Institute<sup>(13)</sup> was followed and the research question that guides this review was formulated: *What are the benefits of exclusive breastfeeding in reducing childhood obesity in preschool children?*

According to the research question, the criteria of inclusion for the articles of this review were elaborated according to the PICO (Participants, Intervention, Comparisons, Outcomes) methodology.

- Participants: preschool children;
- Intervention: exclusively breastfed children;
- Comparison: does not apply to this review;
- Outcomes: reducing childhood obesity;

The research was carried out between September 2017 and January 2018 in the databases that make up the EBSCO search engine, and in the PubMed, using as lower limit the year 2013 and as superior limit the year of 2017. The time interval that was considered is intended to reflect the most recent evidence on the subject to be investigated. Studies in Portuguese, English and Spanish were considered to be included in this review. The following keywords and Booleans were used: exclusive breastfeeding AND obesity in children.

The initial research resulted in 82 articles, nevertheless, after reading and analyzing the titles, 69 articles were excluded. Considering the inclusion criteria and full reading of the abstracts, 5 documents were excluded: 2 per repetition and the remainder by age of the participants.

Out of the 8 articles that were analyzed and submitted to an evaluation of the methodological quality, 4 were excluded because they did not comply the requirements identified by the critical evaluation tools of Joanna Briggs Institute.

The evaluation of the methodological quality of the studies and the process of collecting and synthesizing the data was done by two reviewers independently, using tables to facilitate its analysis. The tables will allow to quickly view elements as identification of the study; country and date; participants; study subject and its results. Finally, a summary of all the results will be presented, verifying whether EB benefits in reducing obesity in preschool children.

## RESULTS

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The found studies originate in different countries and those that were included were developed in Brazil (2 studies), United States of America (1 study) and China (1 study).

As for the participants, it can be mentioned that the age varies between 2 and 6 years of age, thus encompassing the preschool age accordingly to the defined inclusion criteria. The samples ranged from 219 to 42550 participants.

Regarding the design, they present different characteristics: 2 cross-sectional studies and 2 cohort studies.

Table 1 presents the summary of the extracted data, with the aim of systematizing, visualizing and comparing the obtained results.

Table 1 – Summary of the analyzed articles.

Study Identification	Objective	Sample	Results
Excesso De Peso E Sua Relação Com a Duração Do Aleitamento Materno Em Pré-Escolares Caldeira, K; Sousa,J; Souza,S Brasil - 2015	Verify the remainder of overweight and its relation with breastfeeding in infants between 48 to 60 months old.	219 children from 48 to 60 months of age	The prevalence of overweight children was 9.6%. EB up to 6 months or more was offered to 32.11% of the children. The study points to a positive relation between the presence of EB and the absence of overweight children aged from 48 to 60 months for the EB category of 6 months or more. A similar relation was not found for supplemented breastfeeding.
Differences in the Protective Effect of Exclusive Breastfeeding on Child Overweight and Obesity by Mother's Race. Ehrenthal, D; Wu, P; Trabulsi, J EUA - 2016	Explore the relation between exclusive breastfeeding and the risk of overweight and childhood obesity at 4 years of age, in a mixed breed ethnic community.	2172 dyads mother-baby	At 4 years of age, exclusively breastfed children had lower body mass index (BMI) and a >85th percentile probability reduction (compared to those exclusively fed with formula or mixed-feeding). The subpopulation analysis showed a significant effect for the >85th percentile for only children of white non-Hispanic mothers. For children of non-Hispanic black mothers, exclusive breastfeeding was not associate with BMI difference, however, there was a greater likelihood of overweight or obesity.
Exclusive Breastfeeding Is Inversely Associated with Risk of Childhood Overweight in a Large Chinese Cohort Zheng, Ju-Sheng et al. China - 2014	Investigate the relation between EB and the risk of childhood overweight in children from 4 to 5 years of age in the Southeast of China.	42550 children from 48 to 60 months of age	Children with a higher duration of EB had a significantly lower risk of overweight.
The role of exclusive breastfeeding and sugar-sweetened beverage consumption on preschool children's weight gain. Silveira, J; Colugnati, F; Poblacion, A; Taddei, J Brasil - 2015	Investigate, simultaneously, the role of EB and the consumption of sugary drinks in preschool infants weight gain.	2421 children from 24 to 59 months of age	There was a significantly protective effect of the duration of EB on weight gain during the first year of life. The consumption of sugary drinks promoted a 2.5 times higher effect than the EB in the weight gain of the children.

## DISCUSSION OF THE RESULTS

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The 5 analyzed articles are different from each other, not only by sample, but also by the variables studied and geographic location where they were performed.

The E1<sup>(14)</sup> is a cross-sectional study conducted in Brazil, with a sample of 219 children. The methodology consisted in evaluating the anthropometric data, for later calculation of BMI, nutritional classification in 2 categories (overweight or without excess weight) and the application of a questionnaire with questions about the duration of breastfeeding, current diet, demographic and socioeconomic data.

Among 219 children, the prevalence of overweight found was 9.6% and the EB for 6 months or more presented as a protective factor against childhood overweight. There was also a high prevalence in children who never received EB and low prevalence rates related to breastfeeding for 12 months or more and EB for 6 months or more. Other data have been analyzed, however, they are not relevant to this discussion therefore will not be described.

Regarding breastfeeding data, it should be noted that about 83% of the sample was breastfed for some period and that the EB up to 6 months, as recommended, was verified in 32.11% of the children. The authors state that the positive relation between breastfeeding and protection against overweight is present only with EB, not being verified with merely breastfeeding. This study emphasizes the fact that the figures for supplemented breastfeeding and EB are lower than national averages and to what is recommended in literature.

The E2<sup>(15)</sup> has taken place in a specific community and raises an interest in suggesting that the protective effect of breastfeeding, in the face of overweight and obesity, may be different across different ethnicities and races. This is a cohort study with a sample of 2172 mother and baby dyads and the used methodology consisted of obtaining data from the children through the consultation of electronic records. The sample was divided in three groups and, besides the baby's feeding data, sociodemographic data were collected.

In this study, at 2 months of age, the prevalence of EB is 19.9%, exclusively formula feeding is 68.6% and mixed feeding is around 11.5%. The differences between the three groups are significant: non-Hispanic white mothers were the most likely to breastfeed exclusively, while the non-Hispanic black mothers were those who would report less EB, and Hispanic mothers would report more on mixed feeding. It was found that the EB would be related to older mothers, lower BMI, married, born outside the USA and who did not smoke during the pregnancy.

The results show that children exclusively fed with baby formula or mixed form, showed a higher BMI than EB children. The observed protective effect was limited to children of non-Hispanic white mothers. Researchers alert that the increased risk of overweight/obesity in breastfed children of black mothers suggests further investigation at this point, since it might be justified by different health habits and child feeding practices. In this way, more research needs to be conducted in this direction and measures that consider both racial and ethnic needs, should be taken to promote EB.

The authors of this study point out as limitations the short amount of time in which the EB was evaluated (2 months) and the potential error if the diet type has not been accurately registered at the time<sup>(15)</sup>.

The study conducted in China E3 is also a cohort and has a sample of more than 42.000 children<sup>(16)</sup>. The followed methodology was similar to other studies and consisted in the evaluation of anthropometric data and a questionnaire to the parents of the children involved about their diet at different times (1, 3, 6, 9, 12 months and the yearly up to 5-6 years of age).

The prevalence of EB superior to 6 months is 14.8%, whereas at 4-5 years of age, the risk of overweight is 11.4% and the excess weight is 3.2%. It should be noted that the prevalence of EB is higher in the female gender and the risk of overweight and excess of weight is lower.

As in previous studies, relations were established with other variables that can help in understanding the results.

The results of this study suggest that a longer period of EB or any breastfeeding method was associated with a lower risk of childhood overweight.

The sample size is one of the strengths of the study as along as the information collected by pediatricians well documented at each exposition.

The E4 study is a cross-sectional study and aims to evaluate the role of EB on weight gain in preschool children, as well as the role of sugary drinks consumption<sup>(17)</sup>. It has sample of 2421 children between 24 to 59 months of age and the methodology consisted in evaluating the anthropometric data for calculation of BMI, birth weight verification and questionnaires on dietary habits and economic and social data.

The authors of the study suggested a hypothesis on how EB would have a protective effect in face of weight gain and the ingestion of sugary drinks would do the opposite. As conclusions, the authors corroborated the established hypothesis and found that the



effect of ingestion of sugary drinks is higher than that of EB. Furthermore, they suggest the promotion of a healthy diet, as well as that of EB, in the political agendas, as it is important not to waste time for posteriorly there being benefits.

Despite the reduced number of the studies analyzed, it can be stated that EB has benefits in reducing overweight/obesity at pre-school age. The interest on this age group is because most interventions and strategies are directed to children at school age, notwithstanding the fact that childhood obesity begins to have expression since an early age. Usually, it is in this period that there is the introduction and frequency increase of processed foods and sugary drinks consumption<sup>(14,15,17)</sup>.

It is not possible to generalize the objective data collected in these studies for several reasons: the age of the children is not the same (despite all belonging in the pre-school age); the variables studied besides EB and the anthropometric data differ from one study to the other; and the dimension and representativity of the sample is different.

Apart from the similar main objective, the four studies evaluated other data to characterize the relation between EB and weigh excess/obesity in pre-school children. Obesity is multifactorial and there are several elements that can influence the disease. According to the interests of each study, researchers included different variables such as socioeconomic, demographic or even educational. E1 verified socioeconomic conditions; E2 was interested in ethnic and racial specificities and it also included maternal variables, such as smoking or BMI during the pregnancy; the E3 in addition to differentiating the data by gender, collected different maternal data; E4 also included socioeconomic data from the mother<sup>(14,15,16,17)</sup>.

Study E1 reveals a prevalence of 9.6% of excess weight in children from 4 to 5 years of age, as well as that 83% of the children were breastfed at any time and 32.11% maintain EB at 6 months of age<sup>(14)</sup>. Study E2 shows a prevalence of EB at 2 months of age of 19.9%, in children who were studied at 4 years of age<sup>(15)</sup>. Study E3 divulges a prevalence of overweight of 14.6% in children aged 4 and 5 years old and EB at 6 months of 14.8%<sup>(16)</sup>. In the study E4 there are no absolute values related to prevalence, however, evidence is shown that the ingestion of sugary drinks is positively associated with weight gain while EB is associated negatively<sup>(18)</sup>.

In Portugal, the data provided by Direcção Geral da Saúde (DGS) for the year of 2013, indicated that more than 98% of the newborns initiated breastfeeding before discharge and about 22% maintained EB between the 5th and the 6th month of age<sup>(2)</sup>. A Portuguese study of the year 2015 reveals data on the prevalence of EB, collected between 2007

and 2011. Despite not correlating the data with childhood obesity, it seems to reflect the current reality regarding the adherence of this type of food in the north of the country. It is a comparative study of the rural and urban environment that presents the prevalence of EB at 6 months, respectively, 18.7% and 17.1%<sup>(18)</sup>. The data revealed suggests that there was a slight increase of EB in Portugal, since the data referring to the study were collected from children born up to the year 2011 and did not reach the 20%, while DGS's data for 2013 point to rates in the order of 22%.

Regarding the prevalence of overweight and childhood obesity, the most recent data refer to COSI 2016 and this study also revealed that 40.7% of the same children were breastfed for more than 6 months. Although there is no reference to EB, the data evidenced by this study complies with the guidelines of the World Health Organization<sup>(8)</sup>.

## CONCLUSION

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After analyzing the studies, it is important to mention that the variables and methodologies used are not uniform, however, the result were common: there is a benefit in EB in face of childhood overweight/obesity in the studied children. Whether it is for EB or for its duration, each study reveals lower BMI, lower prevalence of obesity or even lower risk of obesity in the presence of EB.

The conclusions of the various studies show the same evidence: EB for 6 months or more is associated with the absence of excess weight; the protective effect of breastfeeding against childhood obesity may differ according to race or ethnicity; a longer duration of EB is associated with a lower risk of excess weight and the beneficial effect of EB on weight gain.

Some studies examined the influence of maternal variables on the obtained results and that is, perhaps, an indication that breastfeeding promotion should focus in a more persistent way during the prenatal period, as well as healthy lifestyle habits might be addressed in the context of family planning consultations, promoting health literacy and preventing noncommunicable diseases.

It seems evident that focusing on promoting EB is unquestionable and it becomes an increasing imperative investment, more intense and more precocious so that the results are more expressive in children's health.

Through these findings we verified that this is a vast field of research with worldwide interest and relevance. As such, it would be important to standardize methodologies to initiate an increasingly early prevention of obesity and encompass common and cross-cutting patterns of research strategies so that all authors might share the same language, the same tools.

It is a daring suggestion that would go through new studies in this area, conducted in a standardized way at a national or even European level, in the attempt to replicate more and successful strategies in the long-term implementation of EB.

The promotion and establishment of EB relies on the intervention of different health professionals, and it is essential to continuously disseminate its benefits so that, along with breastfeeding protective policy measures, it becomes possible to obtain contributions in the reduction of childhood obesity and consequently, health gains.

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