

Breastfeeding as a Protective factor Against Overweight and Obesity in Preschoolers

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ABSTRACT

Background: According to the World Health Organization (WHO) reports in 2015, the occurrence of obesity among children and young people is on the rise globally, with the most rapid increases observed in low- and middle-income nations. The global prevalence of overweight or obesity in babies and young children rose from thirty-one million in 1990 to forty-two million in 2013.

Objective: Exclusive breastfeeding for the first 6 months of life serves as a preventive measure against future malnutrition caused by overconsumption.

Patients and method: Case-control study conducted in our hospital during the period of the study from the January of 2020 to the end of Dec 2021, patients <5 years+11 months old were included who referred from many primary health care centers to our hospital.

Results: The study included a cohort of 209 individuals, male were more than female with and less than 2/3rd were breastfed for the initial 6 months of their lives. More than half of them (51.7%) were classified as eutrophic, whereas 29.7% were overweight and 18.6% were obese. The patients' ages ranged from 2 to 3 years and 11 months. The adjusted Odds Ratio of breastfeeding compared to formula feeding during the initial 6 months of infancy in patients with average weights versus overweight children was 0.442

Conclusions: Engaging in exclusive breastfeeding during the initial 6 months of an infant's life substantially diminishes the likelihood of malnutrition. caused by overeating in Iraqi preschool children.

Keywords: Breastfeeding, protective factor, preschool child, obesity.

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1. INTRODUCTION

The occurrence of childhood overweight and obesity has experienced a substantial rise in the global pediatric population (1). There is a high prevalence of obesity and overweight among Iraqi children. However, there were no notable disparities between genders in terms of the occurrence of obesity or overweight among Iraqi children (34). In addition, Subhi noted that 7.3% of school pupils in Baghdad, who were between the ages of 6 and 12, were classified as obese (2). A study conducted by Ghazi HF, et al., revealed that the total prevalence rate of underweight children was 18.2%. There was no statistically significant disparity in the prevalence rate between males and females ($p=0.797$). Nevertheless, the proportion of underweight children was marginally greater among females (18.9%) in comparison to men (17.6%) (3). High rates of malnutrition continue to increase worldwide, and even infants and preschoolers are being affected by this veritable epidemic (4). Based on the information that research has been providing, it is considered that efforts to prevent obesity and its consequences as a metabolic disease in adulthood should be focused on the first years of life. In relation to the above, breastfeeding has been described as a protective factor for overweight and obesity in adulthood (5). Breastfeeding is considered the best food for infants under 6 months, as it provides optimal nutritional elements in addition to having immunological, cognitive, emotional, economic and environmental benefits (6,7). In addition, it contains various hormones (leptin and ghrelin) that according to recent studies would be involved in the regulation of growth and development during childhood. These hormones could also influence the regulation of energy balance in both pediatric and adult (7). Because the treatment of childhood overweight and obesity has not managed to reverse the problem, it is considered extremely important to focus efforts on its prevention, and breastfeeding is an excellent cost-effective alternative for this goal (9). The hypothesis of our study is that Exclusive breastfeeding for the first 6 months of life serves as a preventive measure against future malnutrition caused by overconsumption.

2. METHODOLOGY

Type of Study: Case-control study conducted in our hospital during the period of the study from the January of 2020 to the end of Dec 2021

Criteria for Inclusion. patients <5 years+11 months were included who referred from many primary health care centers to our hospital.

Their clinical record was reviewed, and the nutritional diagnosis of these between 2 years and 3 years and 11 months was obtained retrospectively. In addition, information was obtained about the diet administered during the first 6 months of life. Those children in whom this information was not available were excluded.

Children with a diagnosis of overweight or obesity (malnutrition due to excess) between the ages of 2 years and 3 years and 11 months were defined as a case. Those with this condition maintained over time were included, having to have at least one altered nutritional evaluation between 2 years and 2 years and 11 months, and another between 3 years and 3 years and 11 months, these all correspond to prevalent cases. Eutrophic patients were defined as control at all times between 2 years and 3 years and 11 months.

Variables. A database was created to capture the following data: gender, age, weight, height, nutritional diagnosis, type of diet during the first 6 months of life, socioeconomic status, education and obesity of the parents, hours spent watching television, and attendance at kindergarten. The nutritional diagnosis was made using the curves published by the WHO in 2007. In them, it is defined in children under 6 years of age as overweight at weight for height between +1 and +2 standard deviations (SD) or between the 85th and 97th percentiles; and as obesity at weight for height $\geq +2$ DS or ≥ 978.9 percentile. The nutritional diagnosis was made by pediatricians working at the medical center.

Exclusion criteria: Patients with chronic pathologies, with a history of prematurity and those in whom incomplete information was found on the feeding history during the first 6 months of life and nutritional status during the 2 years and 3 years and 11 months were excluded.

Ethics committee. This study was approved by the Research Ethics Committee of Iraqi MOH.

Statistical analysis: For the calculation of sample size, it was considered that 60% of the controls receive predominant breastfeeding during the first 6 months of life, versus 40% of

the cases. For a confidence of 95% and power of 80%, the calculated sample size corresponded to 210 subjects (105 cases and 105 controls).

The categorical variables were expressed in terms of number and percentage, being compared by the chi-square test. The risk of presenting the history of feeding with milk formula versus predominant breastfeeding during the first 6 months of life in cases versus controls was expressed in terms of odds ratio (OR) and its respective confidence interval (CI) of 95%, both in crude form and adjusted for confounding covariates. Any variable that presented a statistically significant association with the case or control condition was considered as a confounding variable. Logistic regression models were used to calculate the OR. Results with a p-value of < 0.05 were considered statistically significant. The calculations were achieved using SPSS 25.0 software

3. RESULTS

During the period of the study, the clinical records of 658 patients < 5 years+11 months who referred to our hospital. Of these, 209 patients who met the inclusion criteria were included, of which 53.1% of the individuals were male, and 60.3% of them experienced exclusive breastfeeding for the majority of their first 6 months of life. A total of 449 (68.2%) were excluded. Between the ages of 2 years and 3 years and 11 months, 51.7% of individuals had a normal nutritional status, 29.7% were classified as overweight, and 18.6% were classified as obese. The rest of the evaluated characteristics of the study population are summarized in (**Table 1**). Considering the totality of cases and controls evaluated ($n = 209$), the crude risk of having presented the predominant breastfeeding history versus feeding with milk formula predominant during the first 6 months in cases versus controls was an OR = 0.442 (95% CI 0.204-0.961). The association between the different covariates of the study and the case or control condition are summarized in (**Table 2**), where only the variable "nutritional status of the parents" was statistically significant ($p = 0.013$), which was considered confusing of the main association in study. Since this variable was recorded only in 132 subjects, the previously reported crude OR was calculated based on this number of patients, which was 2.32 (95% CI 1.12-4.81). When the latter OR was adjusted for the confounding variable "parents' nutritional status", an OR = 2.34 was obtained (95% CI, 1.11-4.94).

Table 1. Characteristics of the population under study

Features		No.	%
Nutritional status	Eutrophic	108	51.7
	Overweight	62	29.7
	Obesity	39	18.6
Feeding in the first 6 months	Predominant breastfeeding	126	60.3
	Predominant formula	83	39.7
Sex	Male	111	53.1
	Female	98	46.9
Socioeconomic status	Medium/medium-low	111	53.1
	High/ medium-high	98	46.9
Education of parents*	Primary	135	84.4
	secondary	23	14.4
	College or higher	2	1.3
Nutritional status of parents**	Both eutrophic	31	23.5
	At least one parent who is overweight or obese	101	76.5
Hours of daily television	< 1 hour	60	28.7
	Between 1 and 4 hours	97	46.4
	> 4 hours	52	24.9
Kindergarten attendance	No	80	38.3
	Yes	129	61.7

*Missed data of 49 patients ** Missed for 77 patients

Table 2. Characteristics of the population under study according to nutritional diagnosis

Variable		Eutrophic		Overweight or obesity		P. value
		No.	%	No.	%	
Feeding for the first 6 months	Predominant breastfeeding	74	68.5	52	51.5	0.01
	Predominant formula	34	31.5	49	48.5	
Sex	Male	63	58.3	48	47.5	0.1
	Female	45	41.7	53	52.5	
Socioeconomic status	Medium/medium-low	61	56.5	50	49.5	0.3
	High/ medium-high	47	43.5	51	50.5	
Education parents*	Primary	76	87.4	59	80.8	0.2
	Secondary	11	12.6	12	16.4	
	College or higher	0	0.0	2	2.7	
Nutritional status of parents**	Both eutrophic	23	32.4	8	13.1	0.01
	At least one parent who is overweight or obese	48	67.6	53	86.9	
Hours of daily television	<1 hours	28	25.9	32	31.7	0.6
	Between 1 and 4 hours	53	49.1	44	43.6	
	>4 hours	27	25	25	24.8	
Kindergarten attendance	No	40	37	40	39.6	0.7
	Yes	68	63	61	60.4	

*Absence of 49 data. ** Absence of 77 data

4. DISCUSSION

The findings of our study confirm that breastfeeding exclusively throughout the first 6 months of life has a preventive effect against malnutrition caused by overeating in children aged between 2 and 3 years and 11 months. These findings align with the outcomes reported in other global research (10-12). An investigation carried out in the United States by the Centers for Disease Control and Prevention examined national data from the pregnancy nutrition surveillance system (PNSS). According to the study, non-Hispanic white children who were breastfed within their first six to twelve weeks of life had a lower chance of being overweight or obese. An increased risk of overweight and obesity was linked to not breastfeeding. The study found that nursing for longer than 12 months was associated with a

decreased risk compared to not breastfeeding at all (13). The Agency for Healthcare Research and Quality (AHRQ) conducted a review that assessed three systematic studies and a meta-analysis of good to moderate methodological quality. The evaluation discovered a correlation between breastfeeding and a decrease in the likelihood of becoming overweight or obese. In this investigation, the adjusted odds ratio (OR) for overweight when comparing the presence against absence of breastfeeding was 0.76, and for obesity it was 0.93. The AHRQ paper references a previous meta-analysis conducted by the WHO, which discovered that extending the time of breastfeeding was linked to a 4% reduction in the likelihood of becoming overweight (14). An analysis of data from a longitudinal study conducted in Japan from 2001 to 2009 revealed that exclusive breastfeeding was linked to a reduced risk of overweight and obesity when compared to formula feeding (15). In our study, various confounding factors were evaluated, such as gender, socioeconomic status, parental education, parental nutritional status, TV time and kindergarten attendance. Of all of them, only the nutritional status of the parents was statistically significant, which has been reported in other works¹⁸⁻²¹. In our study, a higher proportion of overweight or obese parents were observed in overweight or obese children. The above could be explained by a genetic tendency or by an inadequate education in terms of eating habits in the family. In addition, some studies have shown that mothers with malnutrition due to excess tend to finish breastfeeding earlier than eutrophic mothers, which could reinforce the association observed according to our finds (16). Although our study did not show a significant association with the other confounding factors analyzed, it has been observed in various studies. Socioeconomic state, low birth weight, parental education, maternal smoking, age of the fathers and *raison* have been considered important confounding factors, which should be taken into account when assessing the association between breastfeeding and excess malnutrition (13,16-18). Although the mechanism by which breastfeeding could protect against overweight and obesity is not completely clear, multiple hypotheses have been mentioned in this regard, among which it stands out that breastfeeding could influence the nutritional programming of individuals (19). Changes in the composition of breast milk during feeding have been described, which provides satiety signals (release of leptin and ghrelin) so that the infant stops breastfeeding. In infants fed with milk formula, the amount

consumed is regulated mainly through the indicated volume, which can result in overfeeding. Given the above, breast-fed infants they can acquire greater control over their nutritional behavior than formula-fed infants (16,20,21). Furthermore, there is a notable increase in plasma insulin levels in children who are given milk formula compared to those who are breastfed. This could promote the accumulation of fat and the early formation of fat cells in youngsters who are fed formula. Children who are breastfed exhibit significantly lower calorie metabolization and protein intake compared to those who are fed milk formula. Furthermore, studies have shown that consuming a lot of protein during early childhood may raise the chance of obesity in the future, which may have long-term implications for adult body composition and glucose metabolic programming (13,19). Breastfeeding is a natural, economical option with multiple benefits, including protection against malnutrition due to excess in the future could be an alternative of prevention against the global obesity epidemic.

5. CONCLUSIONS

Engaging in exclusive breastfeeding during the initial 6 months of an infant's life substantially diminishes the likelihood of malnutrition. caused by overeating in Iraqi preschool children.

Ethical Approval:

All ethical issues were approved by the author. Data collection and patients enrollment were in accordance with Declaration of Helsinki of World Medical Association , 2013 for the ethical principles of researches involving human. Signed informed consent was obtained from each participant and data were kept confidentially.

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