

Breastfeeding and its Correlation with Maternal and Infant Weight: A Mini-Review

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Abstract

The purpose of this paper was to review the impact of breastfeeding on weights of both mothers and infants. The present review focuses on two points: the effect of breastfeeding on the mother's weight; the effect of breastfeeding on the baby's weight. With the development of breast milk research methods and technology, the understanding of breastfeeding will be further deepened, while underlying mechanisms, metabolic pathways, and determinants should be further studied in the future.

Keywords: Breastfeeding; Pregnancy outcome; Nutritional status; Postpartum weight retention

Introduction

Human breast milk is well known as the ideal source of nutrition during early life, ensuring optimal growth during infancy and early childhood. Breast milk is also the source of many unique and dynamic bioactive components that play vital roles in immune system development [1]. The World Health Organization recommends that infants should be exclusively breastfed up to before six months of age, with breastfeeding continuously to be an essential part of dietary intake until at least two years old [2,3]. Governments worldwide are taking measures to increase the breastfeeding rate and prolong the breastfeeding time, whereas the breastfeeding rates still remain low [4]. Breastfeeding is beneficial to both newborns and mothers. Breastfeeding helps the mothers to reduce accumulated weight after childbirth. Through breastfeeding, additional hundreds of kcal of energy can be consumed every day. Moreover, breastfeeding has both short-term and long-term beneficial effects on infants [5-9]. Human breast milk, especially colostrum, is important for increasing newborns' and infants' nutritional and health status, preventing infectious disease, and reducing the risk of allergic diseases and death. Based on the DOHaD (Developmental Origin of Health and Disease theory (published in 1986), the environment in early life would also affect children's susceptibility to chronic diseases in adulthood. Scientific feeding in infancy is not only an essential factor for growth and development, but also the cornerstone of lifelong health [10].

Effect of Breastfeeding on Maternal Weight

Postpartum weight retainment is common in women, increasing the long-term likelihood of overweight or even obesity. On the other hand, breastfeeding entails a high energy cost that contributes to the total energy expenditure of the mothers, increasing the chances of a negative energy equilibrium which could potentially lead to weight loss [11]. Several studies reported

a positive association between breastfeeding and postpartum weight loss, while others reported no significant association. In a study conducted in Brazil, 350 pairs of mothers and children in hospitals were followed up for two years. It was found that 23.6% of mothers and children were overweight. Pregnant women who breastfed for < 2 months were more likely to be overweight than pregnant women who breastfed for 2 months \geq 6 months (OR= 2.9; 95% CI 1.1, 8.1), the shorter the time of breastfeeding, the greater the possibility of maternal overweight [12].

A meta-analysis of the results of 14 cohort studies found that breastfeeding mothers significantly reduced postpartum weight by -0.38kg compared with bottle-fed mothers (95% CI -0.64, -0.11kg) [13]. One study investigated the physical and mental health status of 70 obese women who were exclusively breastfed or mixed-fed (including formula milk) and 70 healthy weight women within 72 hours and 6~8 weeks after birth and reassessed the breastfeeding rate at 6-8 weeks [14]. The results showed that the breastfeeding rate and maintenance rate of obese women were lower than those of healthy-weight women. The reason may be that obese women have delayed lactation, which can further aggravate the degree of postpartum obesity.

Effect of Breastfeeding on Infant Weight

Breastfeeding plays an essential role in preventing different forms of child malnutrition, including weight loss, growth retardation, underweight, and micronutrient deficiency [15]. Whether in developed or developing countries, the problem of childhood obesity has aroused widespread concern. The rate of childhood obesity has shown a rapid upward trend and has become a severe public health problem. Although it is still controversial whether breastfeeding can reduce the risk of obesity in children, more and more epidemiological evidence supports that adequate breastfeeding and prolonging breastfeeding time can effectively delay the growth rate of children's body mass index and reduce the risk of obesity in children [16].

In the Brazilian study mentioned above, children breast-fed for <2 months were more likely to have excess body weight than children breast-fed for \geq 6 months (OR = 2.4; 95% CI 1.1,5.1) [12]. A study interviewed mothers and infants from seven cities in China at 3, 10, 60, 120 and 180 days postpartum, 130 lactating mothers attended 5 visits. For non-exclusive breastfeeding (nEBF) infants, intake of formula replaced intake of breastmilk due to lack of breastfeeding frequency, which did not bring weight gain for nEBF infants [17]. An earlier study showed that there were more overweight children in the formula feeding group, and exclusive breastfeeding could prevent this from happening [18]. Owen's study suggest that compared with infants fed with artificial infant formula, the incidence of obesity in youth and adulthood is reduced by 15-30%, and the duration of breastfeeding is inversely proportional to the risk of overweight [16]. A meta-analysis also showed a significant negative correlation between the duration of breastfeeding and the incidence of childhood obesity: the obesity rate decreased by 4% every month of breastfeeding [19]. Maternal obesity is a risk factor of childhood obesity. At present, it is reported

that more than 40% of pregnant women are overweight or obese. Elvira found that maternal obesity is associated with changes in the human milk metabolome. Obese mothers can affect the body shape of infants through milk metabolites. While only a subset of metabolites correlated with both maternal and infant weight, these point to potential milk-dependent mechanisms for mother-child transmission of obesity [20].

Conclusion

According to the review of literatures above, we know that many previous studies have found the effects of breastfeeding on maternal and infant weight while the vast majority of studies support the benefits of breastfeeding on healthy weight of mothers and infants. Future research may focus on potential mechanism in order to provide more evidence to support breastfeeding. The underlying mechanisms, metabolic pathways, and determinants should be further studied in the future.

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