

Exclusive Breastfeeding and its Impact on Child's Physical Health in Duwakot, Nepal

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Abstract

Background: Several research studies have identified breastfeeding as a significant factor for normal infant growth and development. Childhood obesity is the major ailment seen in formula fed infants which clearly demonstrates the protective role and effect of the exclusive breastfeeding. The objective of this study was to compare the physical health among exclusive breastfed and formula fed infants. The aim of our study was to find the impact of Exclusive Breastfeeding on child's physical growth parameters among formula fed and exclusive breastfed infants.

Materials and Methods: This was a cross-sectional study done to compare the growth patterns of breast fed and formula fed babies of Duwakot. The growth patterns of 81 exclusive breastfed babies (39 male, 42 female) and 81 formula fed babies (44 male, 37 female) were compared. The weight for age (WA), Height for age (HA), and weight for Height (WH) Z scores were calculated in 6 to 24 months babies by WHO Anthro Software Version 3.2.2.

Results: The prevalence of overweight in exclusively breastfed infants was 6.1% ($> +2SD$) and in formula fed infants was 17.3%. The prevalence of overweight was significantly higher among formula fed infants. The prevalence of obesity in formula fed infants was 2.5% ($> +3SD$) and 1.2% in breastfed infants. The study revealed that overweight was significantly associated with formula feeding but no statistically significant difference was observed in the other

physical parameters like wasting, stunting and underweight. In Breastfed infants the mean Z score for WA was -0.22, WH was 0.1 and BMI was 0.06 whereas in formula fed infants the mean Z score for WA was 0.3, WH was 0.68 and BMI was 0.71.

Conclusion: The physical growth pattern of exclusive breast fed and formula fed Nepalese babies showed overweight tendency in formula fed babies as compared to breastfed babies.

Keywords: Exclusive breastfeeding; Formula fed; Growth pattern.

Introduction

The role of breast feeding on infant health for growth and development has been the subject of scientific interest for decades (1). The consequences of feeding type on infant physical health and development were first noticed more than seven decades ago when breastfed infants were shown to have better cognitive function over non-breastfed infants with normal physical health (2). The relation between breastfeeding and body composition is of considerable significance to human health. Particular interest highlights the vital role of infant feeding in influencing body composition, overweight, and obesity later in life. Systematic reviews that investigated a relation between early feeding and later-life obesity or BMI have been questionable (3, 4). Breast milk and colostrum are the first natural feeding sources for infants, providing all nutrients including vitamins, necessary growth factors and immunological factors, which are vital for the newborn's optimum physical development and health. Duration of exclusive breast feeding and time of introduction of solid foods is a crucial factor that may alter the Child's physical growth and development (5). More remarkable results have been revealed between formula-fed infants and rapid infant weight gain. Formula-fed infants gained weight more rapidly out of proportion to length than breast-fed infants during the first year of life, which results in a higher BMI and therefore, a higher risk for future obesity. It has been stated that breastfeeding may enhance self-regulatory mechanisms on an infant's energy consumption (6, 7). Beneficial effects of breastfeeding for a child's normal physiological mental health may result from the fact that mothers' milk is a rich source of fatty acids and other vital components essential for the brain development and physical growth of infants (8, 9). The physical touch, affection, mother's and child's positive attitude are significantly enhanced during breastfeeding compared with bottle-feeding which help in enhancing physical growth and mental health. Breastfeeding may also be an indicator of other unmeasured maternal characteristics such as maternal intelligence (10).

The WHO recommends that an infant should be exclusively breast fed for six months and then continued breast feeding for two years with supplementary foods along with breast milk. Globally, less than 40% of infants under six months of age are exclusively breast fed. Increase in this rate can be achieved by improving breast feeding awareness for mothers and families (11). Breastfeeding should be initiated during the hour after the birth of baby and allowed till the baby needs. During the first few weeks of life babies may be nursed eight to twelve times per day. The normal duration of a feeding is usually ten to fifteen minutes on each breast. The frequency of feeding diminishes as the child gets older (12).

Evaluating and assessing the true influence of breastfeeding on child development is difficult for several reasons. There are many potential confounding factors. Parental and family status, mothers' educational level, child's birth weight and stimulation of the child during infancy are all associated with child's growth and development (2).

Mothers who breastfeed have been found to report lower levels of perceived stress and negative mood, higher levels of maternal attachment, and perceive their infants with high bonding than mothers who formula-feed (13).

The aim of this study was to find the variations in physical growth patterns among exclusive breast fed and formula fed infants.

Materials and Methods

A community based cross sectional study was conducted in May 2023 - May 2024 after getting ethical clearance and approval from the Institutional Review Committee (IRC) of Kathmandu Medical College. The study populations were the babies aged between 6 and 24 months. Three study subjects of Duwakot were selected by random sampling. 81 exclusively breastfed babies and the same number (81) formula fed babies of ages 6 to 24 months were enrolled in the study.

Anthropometric assessment of the child was done; their weight and height was measured three consecutive times. Later on, mean was taken as their actual weight and height, which helped in calculating the BMI (body mass index). Anthropometric measurement of the baby was done by LG digital weighing machine (with a difference of only 10 gram), Stadiometer and non-stretchable measuring tape. Internationally recognized and accepted WHO Anthro Software Version 3.2.2 (11) was used for the analysis of the data.

Inclusion criteria: The infants were selected randomly from three wards out of seven in Duwakot. The children aged between 6 and 24 months were enrolled for the study.

Exclusion criteria: The Mothers and children who were not in good health and those who were uncooperative.

During primary selection, all mothers were interviewed thoroughly to learn their medical history (including child), food habits, economic status etc. Before the examination, the purpose of the study was explained to all the mothers and written consent was obtained from them.

Results

A total of 162 infants (81 exclusively breastfed & 81 formula fed) aged between 6-12 months were enrolled in the study. Of these 162 participants 51.07% were males and 49.93% were females (Table 1). Among the exclusively breastfeeding mothers, 59.26% (44) were unemployed and 40.74% (33) were employed whereas in formula feeding mothers, 32.10% (26) were unemployed and 67.90% (55) were employed (Table 2).

Males were more overweight compared to females in both the groups. The prevalence of overweight in males in breastfed males and females was 3.9% and 2.2% respectively whereas it was 11.1% and 6.2% in formula fed males and females respectively. Among the breastfed infants 67% had sound sleep whereas in formula fed infants 58% had sound sleep (Table 3).

The infants who were overweight, including obesity in the formula fed group were 17.3% (14) compared to only 6.1% (05) in the breastfed group. The prevalence of obesity in formula fed infants was 2.5% (> +3SD) and 1.2% in breastfed infants. The right shift of histogram in formula fed babies clearly demonstrates the significant differences (Figures 1 & 2).

Table 1: Prevalence of overweight and obesity in the study population

| Participants | Total No | No of overweight Children | Percentage Overweight (> +2SD) | Percentage Obese (> +3SD) | Percentage overweight or obese children | Mean Z Score | SD | P Value |
|----------------------------|----------|---------------------------|--------------------------------|---------------------------|---|--------------|------|---------|
| Formula fed | | | | | | | | |
| | 81 | 14 | 14.8 % | 2.5 % | 17.3% | 0.68 | 1.33 | 0.49 |
| Exclusive Breastfed | | | | | | | | |
| | 81 | 05 | 4.9 % | 1.2% | 6.1% | 0.10 | 1.25 | 0.92 |

Table 2: Socio-demographic characteristics of breastfed (81) & formula fed (81) infants (6 to 24 months)

| Variables | Numbers | Percentage (%) |
|---------------------------------------|---------|----------------|
| <u>Sex of the children</u> | | |
| Breastfed | | |
| Male | 39 | 48.18 |
| Female | 42 | 51.82 |
| Formula fed | | |
| Male | 44 | 54.32 |
| Female | 37 | 45.68 |
| <u>Employment of Mothers</u> | | |
| Breastfed | | |
| Employed | | |
| Unemployed | 33 | 40.74 |
| | 48 | 59.26 |
| Formula fed | | |
| Employed | | |
| Unemployed | 55 | 67.90 |
| | 26 | 32.10 |
| <u>Annual Household Income</u> | | |
| Breastfed | | |
| Less than 2000\$ | 15 | 18.51 |
| 2000 \$ to 5000 \$ | 46 | 56.79 |
| More than 5000\$ | 20 | 24.70 |
| Formula fed | | |
| Less than 2000\$ | 08 | 09.87 |
| 2000 \$ to 5000 \$ | 47 | 58.02 |
| More than 5000\$ | 26 | 32.11 |

Table 3: Life style factors of the study children

| Variables | Numbers | Percentage (%) |
|--|---------|----------------|
| <u>Feeding trends</u> | | |
| Breastfed | | |
| Usually takes normal meals | 56 | 69.13 |
| Difficulty in taking normal meals | 21 | 25.92 |
| Overeating trend | 04 | 04.95 |
| Formula fed | | |
| Usually takes normal meals | 46 | 56.79 |
| Difficulty in taking normal meals | 23 | 28.39 |
| Overeating trend | 12 | 14.82 |
| <u>Eating habit</u> | | |
| Breastfed | | |
| Watches TV/Tablets/Mobiles in Duwakot, Nepal | 33 | 40.74 |
| Doesn't watch anything while eating | 48 | 59.26 |
| Formula fed | | |
| Watches TV/Tablets/Mobiles while eating | 42 | 51.85 |
| Doesn't watch anything while eating | 39 | 48.15 |
| <u>Sleeping habit</u> | | |
| Breastfed: | | |
| < 6 hours | 13 | 16.04 |
| 6-8 hours | 14 | 17.28 |
| >8 hours | 54 | 66.68 |
| Formula fed | | |
| < 6 hours | 15 | 18.51 |
| 6-8 hours | 19 | 23.45 |
| >8 hours | 47 | 58.04 |

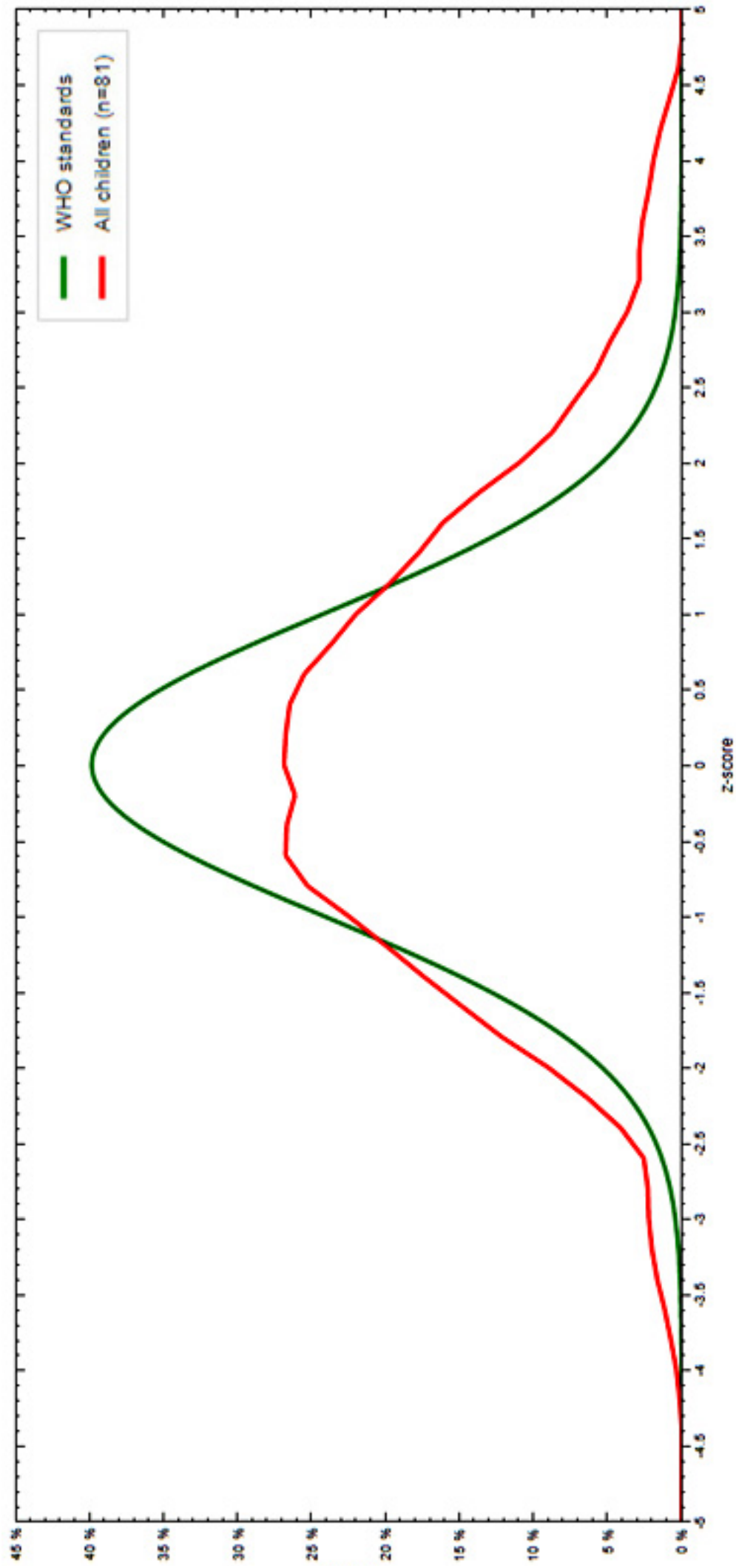


Figure 1: Distribution of breastfed babies with respect to WHO standards (N=81).

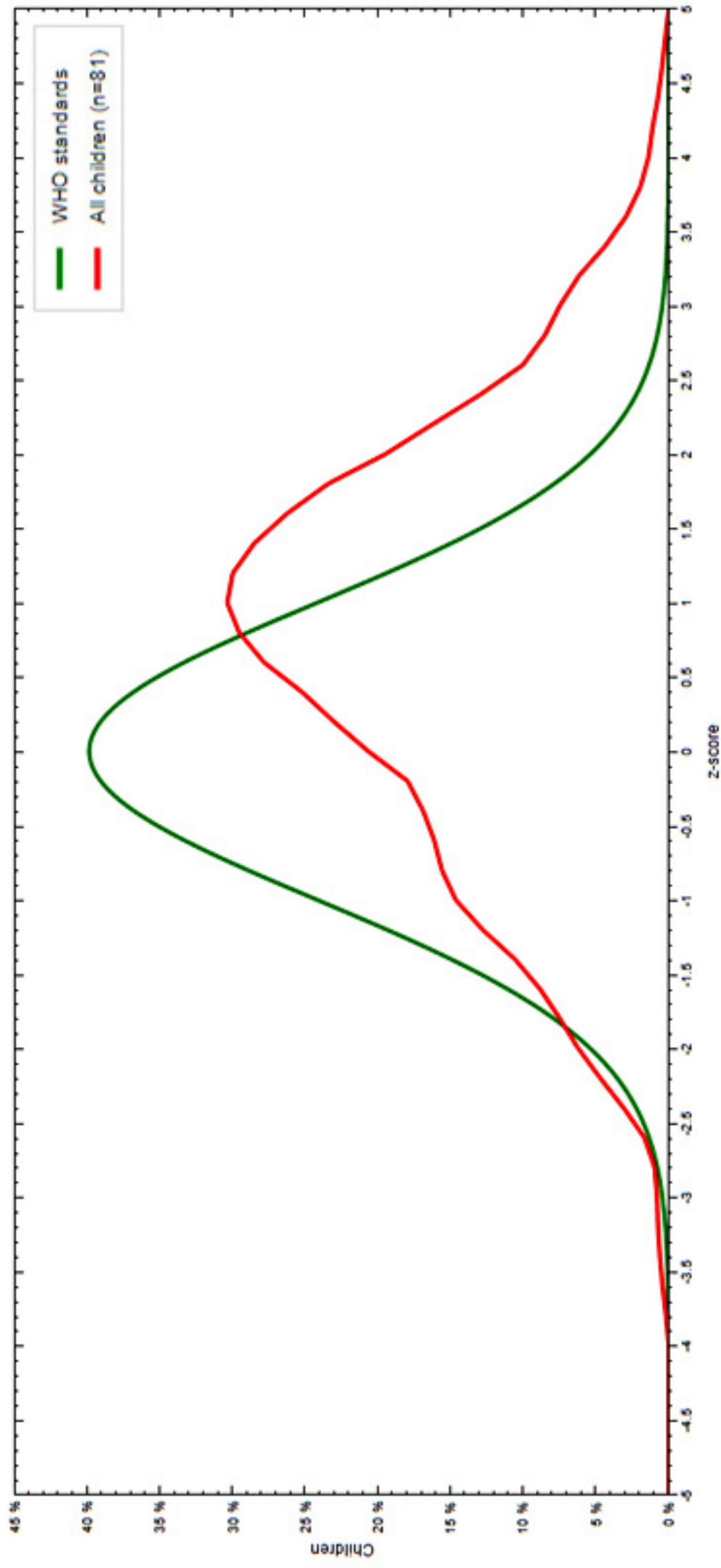


Figure 2: Distribution of formula fed babies with respect to WHO standards (N=81).

Discussion

This cross-sectional study was done to determine the variations in physical health patterns in exclusively breast fed and formula fed infants in urban city of Nepal.

According to our study results in their physical growth, significant difference was found between the breast fed and formula fed babies in terms of overweight and obesity. The higher prevalence of overweight was seen in formula fed infants as compared to breast fed infants. The infants who were overweight, including obesity, in formula fed were 17.3% compared to only 6.1% (05) in breastfed. The prevalence of obesity in formula fed infants was 2.5% (> +3SD)) and 1.2% in breastfed infants. No significant differences were seen in other parameters like wasting, underweight and stunting in the two groups. Our results show similar trends with other studies which also found that children introduced to formula within four months have increased risk of overweight in Western Australia(14), prevalence of childhood obesity in the United States (US) and overweight or obesity trends in the UK based on a very large cohort study (15, 16). Unlike our study results a study done by Ahmed, et al. showed no statistical significant differences between the weight, length, head, and chest circumference of breast-fed and formula fed infants in relation to anthropometric measurements although they studied infants up to 3 months only (17). A very convenient recent study has shown that the development of electrical activity in the brain during infancy differs between those who are breastfed and those fed either with cow's milk or soya milk (18). These studies suggest that the differences in brain electrical activity between breastfed and milk-formula-fed infants could have been influenced by omega-3 polyunsaturated fatty acids that are normally present in breast milk or other bioactive components essential for physical development of a child. There are other possible causes that may explain the relation between breastfeeding and sound maternal attachment status, which has been shown to have a positive influence on the child's psychological and physiological development into later age (19, 20). Moreover, in a similar type of study of 675 mother–infant dyads, longer duration of breastfeeding was associated with mothers' sensitive responsiveness, enhanced attachment security, and diminished attachment disorganization when infants were 14 months of age (21). In another similar study they also found that breast fed infants have better physical growth compared to infants on formula feeding. Moreover, the length was also greater with breast feeding than formula fed infants. The results of our study support the WHO expert recommendations on exclusive breastfeeding for six months (11). Moreover, our study also provides evidence that exclusive breastfeeding of infants brings about beneficial effects in the physical growth of children.

Conclusion

Our study results showed that formula fed infants were overweight compared to exclusively breastfed infants; however no statistically significant difference was observed in the other physical parameters like wasting, stunting and underweight in breast fed and formula fed infants. In our study we found that the overweight tendency in formula fed babies was related to overeating, job compulsion of mothers and socioeconomic factors.

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Conflict of interests: None

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