



The Effect of Modes of Feeding in Months 0-6 on Childhood Obesity and Eating Behaviors: A Cross-Sectional Research

Ayten TAŞPINAR¹

¹ Aydın Adnan Menderes Üniversitesi, Sağlık Bilimleri Fakültesi, Ebelik Bölümü

Sorumlu Yazar / Corresponding Author: Ayten TAŞPINAR

e-mail: aytaspinar@yahoo.com, Aydın Adnan Menderes Üniversitesi, Sağlık Bilimleri Fakültesi, Ebelik Bölümü, Aydın Türkiye

Geliş Tarihi / Received: 17.04.2020, **Kabul Tarihi / Accepted:** 04.06.2020

Copyright holder Balıkesir Sağlık Bilimleri Dergisi

Adnan Menderes Üniversitesi Bilimsel Araştırma Projeleri Birimi tarafından desteklenmiştir-ASYO-14004.

Bu çalışma 5. Uluslararası & 9. Ulusal Ebelik Öğrencileri Kongresinde poster bildiri olarak sunulmuştur (03-05 Mayıs 2018, Amasya)

ABSTRACT

Aim: To determine the effect of modes of feeding in months 0-6 on childhood obesity and eating behaviors.

Materials and Methods: Conducted as cross-sectional research, this study was carried out over the period September 2015-February 2016 at public kindergartens operating under the Provincial Directorate of National Education in Aydın. The sample of the study comprised 305 children, aged 49-72 months, enrolled in the kindergartens, and their mothers (N=623). The data were collected with a data collection form and the Children's Eating Behavior Questionnaire. Descriptive statistics, Chi-square, ANOVA and Bonferroni test were used in the data analysis.

Results: The rate of exclusive breastfeeding in the first six months was 58% in the participating children and obesity frequency was 18.4%. The obesity frequency of children exclusively breastfed in the first six months (16.4%) of life was lower than the rates of children fed with formula (26.2%) or with a mixed regimen (18.6%) but this difference was not statistically significant (p=0.336). It was found that, outside of the emotional overeating and fussiness dimensions modes of feeding children in the first six months did not affect the other subscales of the Children's Eating Behavior Questionnaire (p>0.05). The emotional overeating and food fussiness mean score of children exclusively breastfed was lower than that of children fed a mixed regimen and formula (p=0.041 and p=0.042).

Conclusion: In our study, about one out of every five children were obese and it was found that being exclusively breastfed over the first six months did not impact the frequency of obesity; It was found that it effects on eating behaviors of emotional overeating and fussiness.

Keywords: Exclusive Breastfeeding, Formula, Childhood Obesity, Eating Behavior.

0-6 Ay Beslenme Özelliklerinin Çocuklarda Obezite ve Yeme Davranışları Üzerine Etkisi: Kesitsel Bir Araştırma

ÖZ

Amaç: 0-6 ay beslenme özelliklerinin çocuklarda obezite ve yeme davranışları üzerine etkisini belirlemektir.

Gereç ve Yöntem: Kesitsel olarak yapılan araştırma Aydın il merkezinde Milli Eğitim Müdürlüğü'ne bağlı devlet anaokullarında, Eylül 2015-Şubat 2016 tarihleri arasında yapılmıştır. Çalışmanın evrenini, bu anaokullarında öğrenim gören 49-72 aylık çocuklar ve anneleri (N=623), örnekleme ise 305 çocuk ve annesi oluşturmuştur. Veriler, veri toplama formu ve Çocuklarda Yeme Davranışı Anketi ile toplanmıştır. Verilerin analizinde tanımlayıcı istatistikler, Student t testi, ANOVA, Ki-kare, Bonferroni testi kullanılmıştır.

Bulgular: Çocuklarda, ilk altı ay sadece anne sütü ile beslenme oranı %58 ve obezite sıklığı %18.4'dür. İlk altı ay sadece anne sütü alan çocukların obezite sıklığı (%16.4), mama (%26.2) veya karma beslenen (%18.6) çocuklardan daha düşüktür ancak bu fark istatistiksel düzeyde anlamlı değildir (p=0.336). Çocukların ilk altı ay beslenme özelliklerinin duygusal aşırı yeme ve yemek seçiciliği dışında, Çocuklarda Yeme Davranışı Anketinin diğer alt boyutlarını etkilemediği bulunmuştur (p>0.05). Sadece anne sütü ile beslenen çocukların duygusal aşırı yeme (p=0.041) ve yemek seçiciliği puan ortalamaları mama ve karma beslenen çocuklara göre daha düşüktür (p=0.042).

Sonuç: Çalışmamızda yaklaşık her beş çocuktan biri obezdir ve ilk altı ay sadece anne sütü ile beslenen çocuklarda obezite sıklığını etkilemediği; yeme davranışlarından duygusal aşırı yeme ve yemek seçiciliği davranışlarını etkilediği bulunmuştur.

Anahtar Kelimeler: Anne Sütü, Mama, Çocukluk Obezitesi, Yeme Davranışı.

INTRODUCTION

Obesity has been described as one of the most serious health issues of the twenty-first century and its prevalence in every age group is increasing (Çalışır & Karaçam, 2011; World Health Organization, 2016). Obesity and obesity-related diseases are now detected in children as well. The treatment of childhood obesity is difficult and it appears before us as both a physical and an emotional condition (World Health Organization, 2016; Yan et al., 2014). In many countries, childhood overweight and obesity have reached epidemic proportions. According to the World Health Organization, in 2016, 41 million children of the ages of five and below around the world are obese (World Health Organization, 2020). Studies conducted in different countries have examined the prevalence of overweight and obesity in children. In Canada, 2009-2013 statistics showed that 11% of children between the ages of 3-6 were obese in France, 4% of children 3-4 years of age are obese in Greece, 16% of children between the ages of 1-5 are obese, and in Brazil %8,8 among boys and %7,1 among girls (ages 2-6) (Carroll et al, 2020; Jouret et al., 2007; Manios et al., 2007; Rocha et al., 2020).

In a national study in Turkey 2018, it is reported that prevalence of obesity among children aged five and younger is 8% (Turkey Demographic and Health Survey, 2018). In research carried out in Turkey, prevalence rates for overweight in preschoolers vary between 8%-24% and between 6%-31% for obesity (Özkaya, 2019; Yabancı et al, 2009; Önder, 2011; Inal et al., 2015). Among the leading causes of obesity in children are genetic, environmental and many other factors (Taveras et al., 2013; Kelishadi & Poursafa, 2014). Besides research on these factors that influence obesity, there are many studies that investigate the relationship between obesity and children's basic staple of breast milk. While there are many studies asserting that breastfeeding reduces obesity, (Yan et al., 2014; Yabancı et al., 2009; Huus et al., 2008; Owen et al., 2005; Twells & Newhook, 2010; Horta et al., 2015) other studies emphasize that breast milk has no protective function in this respect (Vafa et al., 2012; Edem, 2013).

In the same way, the eating habits that children acquire when they are young affect their later lives and may provide the foundation for a solution to the problem of preventing eating issues in adulthood. This is because eating habits have an impact on a child's physical, social and emotional development and behavior (Yan et al., 2014; Yılmaz et al., 2011; Özer et al., 2014). Studies have shown that among the important factors playing a part in the development of childhood obesity are the way parents feed their children and the child's own type of eating behavior (Yılmaz et al, 2011). Knowing the effect of the manner of feeding in the first 0-6 months of an infant's life on the child's eating habits in the preschool period, which is the time in which eating habits are acquired, is believed to be important in

terms of preventing any eating problems that may emerge in later years of life. The present study was planned and conducted to determine the effect of modes of feeding in months 0-6 on childhood obesity and eating behaviors.

Research Questions:

- Do modes of feeding children at 0-6 months have an effect on preschool obesity?
- Do modes of feeding children at 0-6 months have an effect on preschool eating habits?

MATERIALS AND METHODS

Study design and population

Conducted as cross-sectional research, this study was carried out over the period September 2015-February 2016 at public school kindergartens in Aydın, Turkey. There are 32 public school kindergartens in Aydın. Because of the large number of schools, the difficulties of transport and time restrictions, only five schools were taken into the study by way of simple random sampling. The universe of the study consisted of children, aged 49-72 months (N=623), enrolled at these kindergartens in the fall semester of the 2015-2016 academic year. The sample size was calculated using the finite population sample method, which yielded 238 children and their mothers (with a confidence interval of 95% and sampling error at 0.5) (Sümbüloğlu & Sümbüloğlu, 1995). The study was completed with 305 children.

Included in the study were mothers with children who had completed their 48th month, were younger than 73 months, whose gestational ages were 37 weeks or more, and with no barriers to communicating. Children with congenital abnormalities (cleft lip/palate, etc.), who had a twin or a triplet, any condition that would prevent growth and development, a genetic disease (Down's syndrome, etc.), whose mothers had died or had been separated from the father and who was being raised by someone other than the mother, whose birthweight was 2500 gr or less, 4500 gr or more, were excluded from the study.

Data collection tools

The data for the study were collected with a data collection form containing questions about the child and the child's parents and the Children's Eating Behavior Questionnaire-CEBQ that evaluated children's eating habits. The data collection form queries information on the family's socio-demographic characteristics, and about the child and the history of the child's mode of feeding over the 0-6-month period. In the data collection form, the feeding mode of children who had been fed on formula plus breast milk in the first six months was designated as "mixed."

Children's Eating Behavior Questionnaire-CEBQ was developed by Wardle et al. (2001) and is used to determine children's eating behavior. It is a 35-item, 5-point (1=never, 5=always) Likert-type of questionnaire for parents.

Cronbach's alpha coefficients for the eight subscales varied between 0.74-0.91 (Yılmaz et al., 2011; Wardle et al., 2001). Subscales of the Children's Eating Behavior Questionnaire: These are food responsiveness (FR), emotional overeating (EO), enjoyment of food (EF), desire to drink (DD), satiety responsiveness (SR), slowness in eating (SE), emotional undereating (EU) and food fussiness (FU). The CEBQ makes a multidimensional assessment of eating behavior related to the risk of obesity based on parent statements. Encompassing different styles of eating and aiming to identify a child's eating behaviors from eight different perspectives, the CEBQ's food responsiveness, emotional overeating, enjoyment of food and desire to drink behaviors subscales relate to having an appetite, while satiety responsiveness, slowness in eating, emotional undereating and food fussiness mostly signify a lack of appetite (Yılmaz et al., 2011; Özer et al., 2014). The CEBQ's validity and reliability studies for use with Turkish children were conducted by Yılmaz et al. (2011). The scale's Cronbach alpha coefficients are between 0.61-0.84 (Yılmaz et al., 2011). In our study, the scale's Cronbach alpha coefficients were found between 0.60-0.81.

Data collection

The researchers met with the administrators of the schools where the study would be conducted as well as with the teachers of the classes that would be involved to provide an overview of the aim of the research and how the data would be collected. All of the mothers of the children on the list of students who matched the study inclusion criteria and had been recruited from all of the classes were sent an invitation via the children explaining the purpose of the meeting that would take place, the aim of the study, and specifying the meeting date and time. The date and time of the meeting had been previously agreed upon with the kindergarten administration. Mothers who were unable to come to the meeting, mothers who dropped their children off at school and picked them up later were reached and they were asked to fill out the forms whenever they came to school--morning, noon or in the afternoon hours-- in the meeting room of the school designated by the school administration. After the mothers attending the meeting or bringing their child to school were informed about the aim of the study, they were asked to read and sign the informed consent form and then fill out the data collection form, the CEBQ. The children's weight and height measurements were taken in school at the time and in the classrooms designated by the school principal and teachers. The

measurements were taken by the researcher to avoid discrepancies. The children's weight was measured as they stood upright on the scale without holding on to anything, after they had taken off their coats, jackets, shoes and any other heavy clothing. A digital floor scale with a sensitivity of 100 gr was used in weighing the children. Height was measured, with the child standing upright, back to the wall, shoes off, feet together with heels touching the wall, with an inflexible measuring tape sensitive to 1 millimeter. Filling out the data collection forms took approximately 20 minutes. The children whose mothers did not consent to participating or who did not match the inclusion criteria were also weighed and measured but these measurements were not included in the study. The measurement results of all children were shared with the classroom teachers. The children with poor eating habits or who were obese were referred to the teachers so that they might direct the child's parents to specialists. To calculate obesity, each child's body mass index (BMI: weight-kg/height-m²) was calculated according to age and gender. In the BMI Percentile Assessment, the growth graphs developed by Neyzi et al. (2008) for Turkish children were used. Children in the BMI percentiles of 85-95 were grouped as overweight, those in the 95th percentile and above were grouped as obese and the assessments made according to these BMI percentiles were used in the presentation of the research findings (World Health Organization, 2020; Neyzi et al., 2008).

Data analysis

The data analysis was performed with the Statistical Package for the Social Sciences (SPSS) 15.0 package program. Descriptive statistics, Chi-square, ANOVA and Bonferroni post-hoc test were used in the data analysis. For significance testing, α was set at 0.05.

Ethics approval

Ethical permission for the research was obtained from the Adnan Menderes University Medical School Non-Interventional Clinical Studies Ethics Committee (protocol number: 2015/595). The mothers were informed about the research with the subject informed consent form and their written consent was obtained.

RESULTS

The participants' socio-demographic characteristics are provided in Table 1. It was found that 58% of the children were exclusively breastfed during the first six months and the mean duration of breastfeeding was 15.14 ± 9.71 months (Table 1).

Table 1. Characteristics of children and their parents (n=305)

Characteristics	n (%)
Children's genders	
Girl	153 (50.2)
Boy	152 (49.8)
Mode of delivery	
Vaginal	142 (46.6)
Caesarean section	163 (53.4)
Birth order	
First	151 (49.5)
Second	104 (34.1)
Third and higher	50 (16.4)
Children's modes of feeding for the first six months	
Exclusively breastfed	177 (58.0)
Mixed	86 (28.2)
With formula	42 (13.8)
Breast-feeding duration (month) (n=241)	
Ever breast-fed	12 (5.0)
≤12	98 (40.7)
13-24	118 (49.0)
25≤	13 (5.3)
Maternal weight category (BMI: kg/m²)**	
Underweight (<18.5)	12 (3.9)
Normal (18.5-24)	138 (45.2)
Overweight (25.0-29.9)	84 (27.5)
Obese (≥30)	44 (14.4)
Paternal BMI weight category (BMI:kg/m²)	
Underweight (<18.5)	2 (0.7)
Normal (18.5-24.9)	93 (30.5)
Overweight (25.0-29.9)	135 (44.3)
Obese (≥30)	34 (11.1)
Mother's age (mean±SD), (range)	33.19±5.73 (21-55)
Father's age (mean±SD), (range)	36.00±6.14 (23-58)
Gestational age (mean±SD)* (week), (range)	38.89±1.27 (37-42)
Birthweight (mean±SD) (g), (range)	3339.31±452.59 (2500-4500)
Breast-feeding duration (mean±SD), (month)	15.14±9.71

*Standard deviation, ** Body mass index

The frequency of obesity in children who had been exclusively breastfed in the first six months was 16.4%; that of the children in the mixed and with formula groups were 44.8% among the children fed. However, the statistical analysis did not reveal any statistical difference in terms of feeding modes ($p=0.336$). There was also no statistically significant difference in the state of obesity of boys and girls in

terms of the way they had been fed in the first six months of life ($p=0.619$ for girls, $p=0.528$ for boys). While it was found that 25% of the children receiving no breast milk, 16.3% of those who received breast milk for 1-12 months, and 18.6% of those receiving breast milk for 13-24 months were obese, it was found that the duration of receiving breast milk did not affect obesity ($p=0.878$), (Table 2).

Table 2. Obesity status of children according to their modes of feeding for the first six months (n=305)

Children's modes of feeding	Girl (n=153)		Boy (n=152)		Total (n=305)	
	Obese n(%)	Not obese n (%)	Obese n (%)	Not obese n (%)	Obese n (%)	Not obese n (%)
Exclusively breastfed	14(16.3)	72(83.7)	15(16.5)	76(83.5)	29(16.4)	148(83.6)
Mixed	8 (18.6)	35 (81.4)	8 (18.6)	35 (81.4)	16 (18.6)	70 (81.4)
With formula	6 (25.0)	18 (75.0)	5 (27.8)	13 (72.2)	11(26.2)	31 (73.8)
Total	28(18.3)	125(81.7)	28(18.4)	124(81.6)	56(18.4)	249(81.6)
p-values	0.619		0.528		0.336	
Duration of breast-feeding (month) (n=241)						
Ever breast-fed					3 (25.0)	9 (75.0)
≤12					16 (16.3)	82 (83.7)
13-24					22 (18.6)	96 (81.4)
25≤					2 (15.4)	11 (84.6)
p-values					0.878	

When the eating behavior of children who were exclusively breastfed in the first six months were examined, the mean scores of food responsiveness, emotional overeating, enjoyment of food, desire to drink, and food fussiness were lower than those fed with mixed and formula. It was seen that children who had been exclusively breastfed displayed lower mean

values in the subscales of emotional overeating and food fussiness compared to the children who had been fed with only formula and mixed regime; this difference was found to be statistically significant ($p=0.041$ and $p=0.042$). It was found that, modes of feeding children did not affect the other subscales of the CEBQ ($p>0.05$), (Table 3).

Table 3. The mean score of eating behavior questionnaire subscales according to modes of feeding of children for the first six months (n=305)

Subscales of the CEBQ	Exclusively breastfed (n=177)	Mixed (n=86)	With formula (n=42)	p
	mean±SD	mean±SD	mean±SD	
Food responsiveness	8.90±3.59	10.08±4.32	9.64±4.26	0.064
Emotional overeating	6.25±2.22	7.10±3.12	6.57±2.96	0.041*
Enjoyment of food	14.75±4.53	15.16±4.80	15.50±5.01	0.586
Desire to drink	7.98±3.18	8.96±3.36	8.42±3.27	0.073
Satiety responsiveness	21.30±5.72	21.88±5.79	20.45±5.52	0.400
Slowness in eating	11.27±4.02	11.20±3.66	10.80±4.09	0.790
Emotional undereating	11.79±3.70	12.63±3.58	11.73±3.47	0.184
Food fussiness	7.46±2.79	7.90±3.03	8.66±2.52	0.042*

*Bonferroni post-hoc test p- values

DISCUSSION

In the study conducted to determine the effect of modes of feeding between 0-6 months on childhood obesity and eating behaviors, approximately one out of four children was overweight (85th-95th percentile); one out of five children was obese (≥ 95 p). The prevalence of obesity in children in Canada (ages 3-6) is 11%, 4% in France (ages 3-4), 16% in Greece (ages 1-5), and in Brazil %8,8 among boys and %7,1 among girls (ages 2-6) (Carroll et al., 2020; Jouret et al., 2007; Manios et al., 2007; Rocha et al., 2020). In a nation-wide study conducted in Turkey, it was found that the prevalence of obesity in children under the age of five was 9,3% among boys and 6,8% among girls, a total of 8,1% (Turkey Demographic and Health Survey, 2018). Local studies in Turkey have shown prevalence of overweight among preschool children to vary between 8%-24% and the prevalence of obesity to be 6%-31% (Özkaya, 2019; Yabancı et al., 2009; Önder, 2011; Inal et al., 2015; Edem, 2013). The results of our study are similar to both international and national data and it is clear that obesity in preschool children is a global public health issue.

A little more than half of the children in our study had been exclusively breastfed in the first six months of life and about half had received breast milk for 13-24 months, as stated by their mothers. While the rate of exclusive breastfeeding in the first six months is globally 38%, this rate varies from country to country in Turkey, the rate as of 2018 was 41% (World Health Organization, 2017; Turkey Demographic and Health Survey, 2018). These data from around the world and Turkey indicate that despite programs that advocate exclusive breastfeeding, rates of exclusive breastfeeding in the first six months are not at the desired level in all societies. Among the leading causes of obesity in children are genetic,

environmental and many other factors that encompass heredity, gender, ethnic background, a sedentary lifestyle, minimal physical activity, and eating habits (Taveras et al., 2013; Kelishadi & Poursafa, 2014). Besides these factors that have an impact on obesity, the relationship between obesity and breast milk, a child's most basic food, is being investigated. In our study, although differences in the frequency of obesity between children who had been exclusively breastfed in the first six months and other groups were not statistically significant, it was still observed that this rate was lower in exclusively breastfed children than in children who had been fed a mixed regime or those who had been fed formula. Furthermore, it was also found that the total duration of breastfeeding did not affect obesity frequency. Huus et al. (2008) reports in a study carried out in Sweden that breast milk reduces overweight. Owen et al. (2005) assert that BMI in children fed on formula is higher than in breastfed children. Twells and Newhook (2010) found in their study with four year-old children in Canada that when children exclusively breastfed for three months were compared with children receiving formula or a mixed regime, being exclusively breastfed for three months reduced the risk of becoming overweight. In a meta-analysis of 25 studies in 12 different countries, it was found that breastfeeding reduced the risk of obesity in children (Yan et al., 2014). In a systematic scan by Horta et al. (2015) the researchers reported that exclusive breastfeeding in the first six months and then transitioning to appropriate supplementary foods significantly reduced obesity. In a study conducted in Ankara with children ages 5-6, a negative and significant correlation was found between the duration of exclusive breastfeeding and body weight and BMI (Yabancı et al., 2009). Besides studies reporting that breastfeeding reduces obesity, there are also some that stress that breast milk does not have a protective

effect. It has been stated in a study in Iran that there is no relationship between exclusive breastfeeding and the breastfeeding duration and being overweight (Vafa et al., 2012). In a study carried out in Izmir with children ages 3-6, it is reported that the duration of breastfeeding does not affect obesity (Edem, 2013). Included in a systematic review carried out over the period 2003-2006 were three studies asserting that increased durations of breastfeeding reduced the risk of overweight/obesity in childhood, six studies stating that breastfeeding had no preventive effect, while still another study pointed to the protective impact of breastfeeding (Ryan, 2007). Besides studies that showed, as in our own research, that exclusive breastfeeding in the first six months and the duration of breastfeeding did not reduce the risk of obesity, the fact that there are studies that assert that the risk of obesity diminishes as a result of these two factors indicates that there is a need for continued research on this subject. At the same time, regardless of its effect on obesity, when the benefits of breast milk for children are considered, promoting the practice of exclusive breastfeeding for the first six months and continuing on for two years should be a matter to emphasize and mothers should be provided with education and supported in this respect.

Children exclusively breastfed in the first six months had lower mean scores in the FR, EO, EF, DD, FU subscales compared to children who were fed on a mixed regime or only with formula, although the difference was not statistically significant. In the study conducted by Sirirassamee and Hunchangsith (2016) to test the Thai language validity of the CEBQ and children's eating behavior, boys' EF, DD subscale scores were higher than girls and positive correlation was found in children's FR, EF, EOE, DD subscales (Sirirassamee & Hunchangsith, 2016). In the study in which Daniels et al. (2014) evaluated the effect of early feeding on 4 months on child eating behavior, food preference, diet intake, parenting practices, emotional overeating ($p=0.010$), desire to drink ($p=0.010$), satiety responsiveness ($p=0.030$), food fussiness ($p=0.010$) were found statistically significant in children who started early feeding on the CEBQ subscale (Daniels et al., 2014). In the study where Möller et al. (2012) examined the relationship between eating behaviors, fruit and vegetable consumption, and nutrition and nutritional duration of 5-year-old children, statistically between groups (breastfeeding, breastfeeding and solid food, breastfeeding and formula, formula/solid food) and CEBQ averages was no difference in terms of. In the study in which Jansen et al. (2012) examined the relationship between preschool children's eating behaviors and parent nutrition practices with body mass index, a significant relationship was found between EU, SR, FF, FR, EF and Body Mass Index ($p<0.001$). In our study, although there was no statistically significant difference in the Children's Eating Behavior Questionnaire, there was a

significant difference in other studies. Detailed studies are needed in this regard.

Food preferences are learned in the first years of life. The sense of taste and smell at birth is functional, but it continues to develop in the first year. Breastfeeding increases food acceptance when complementary feeding begins. The positive effect of breastfeeding on food acceptance is due to the recognition of the taste in breast milk by the child (Nicklaus, 2017). It was found that children exclusively breastfed had lower EO mean scores on this subscale that inquired into children's pattern of eating when they were anxious, sad, restless or upset compared to children who had been nourished with a mixed regime and that on the FU subscale that inquired into whether the child liked to eat new foods or a variety of different foods, the mean score of exclusively breastfed children was lower than the children fed formula. In the study of Sirirassamee and Hunchangsith (2016), the average subscores of EF and DD, which questioned girls and boys about drinking, finding something to drink, and eating habits when they were anxious, sad, troubled, uneasy, were found statistically significant. When the studies conducted are examined, the differences in the Children's Eating Behavior Questionnaire subscales may result from sociocultural and environmental factors. In the study where Specht et al. (2018) examined the relationship between breastfeeding time in vegetables and fruits, starchy foods, sugar-sweetened beverages or selective eating behavior in normal weight children between the ages of 2-6, selective eating of children fed only breast milk for 4-5 months behavior was found to be lower than those fed with breast milk only for 0-1 months. In addition, in the study of Specht et al., (2018) children who received only breast milk for 6-10 months had higher daily intake of vegetables ($p=0.040$). It has been determined that Daniels et al. (2014) started feeding early when they were 4 months old, they liked fruit ($p=0.008$), juices without seeds ($p=0.030$), and they did not like vegetables ($p=0.008$). It has been reported that vegetable consumption of children who have never breastfed is less than that of children breastfed for 6 months or more (Möller et al. 2013). Considering the effects of breast milk on eating behaviors, we think that it is important for mothers to become conscious about breastfeeding.

The fact that the EO and FU subscores of the exclusively breastfed children were low showed that exclusive breastfeeding seemed to have a positive impact on children's eating behavior and thus these children can be said to have been protected from obesity. Although the content and amount of energy of formula and breastfed similar, the composition of breastfed required for growth and development of newborn varies according to age and condition of the baby. Besides, mothers who are feeding their baby with formula thinking about feeding their baby better and to insist on finishing the feeding bottle should infants get formula more than their requirement, but

infants who feeding with breastfed control this situation and this infants feeding more frequent and get less amounts than infants who are feeding with formula (Aktaç, 2017). It is thought that these forms of feeding during infancy may have an effect on the child's feeding habits and obesity in the elderly, but there is a need for more study to support these nutritional behaviors as well as findings of our study.

CONCLUSION

It was observed that one out of every four children in our study was overweight and one out of every five was obese. Although the difference in frequency of obesity between children who had been exclusively breastfed in the first six months and other groups was not statistically significant, it was still observed that this rate was lower in exclusively breastfed children compared to children who had been fed a mixed regime and those who had been fed formula. In addition, there was no significant relationship between breastfeeding duration and frequency of obesity. It was seen that the EO and FU subscale mean scores of children exclusively breastfed were lower than in children fed a mixed regime and with formula. The planning of more comprehensive studies will be of benefit in terms of clarifying the impact of breastfeeding on obesity and children's eating behavior.

Limitations

There are certain limitations to the study. The inquiry into the modes of feeding in months 0-6 was based on the mothers' reporting. Considering the present ages of the children, it may be possible that the mothers may have forgotten details in retrospect.

Acknowledgment

I wish to thank Midwife Gizem Uzun for her ideas and her contribution to the scan of the literature and all of the school administrations and teachers who supported us in reaching parents and taking the students' anthropometric measurements as well as supplying us with space for our study. We also extend our gratitude to all the mothers who took the time to participate in our research.

Funding: "Has been sponsored by the Adnan Menderes University Scientific Research Projects Department "Project number: ASYO-14004.

Conflict of Interest: None.

REFERENCES

Aktaç, Ş. (2017). Human milk hormones and its relation with obesity. *Türkiye Klinikleri J Nutr Diet-Special Topics*, 3(2), 80-87.

Carroll, M. D., Navaneelan, T., Bryan, S., & Ogden C. L. (2020, February 21). Prevalence of obesity among children and adolescents in the United States and Canada. NCHS Data Brief No. 211. https://www.cdc.gov/nchs/pressroom/db_211.pdf.

Çalışır, H., & Karaçam, Z. (2011). The prevalence of overweight and obesity in primary school children and its correlation with sociodemographic factors in Aydın, Turkey. *Int J Nurs Pract*, 17(2), 166-173.

Daniels, L. A., Mallan, K. M., Battistutta, D., Nicholson, J. M., Meedeniya, J. E., Bayer, J. K., & Magarey, A. (2014). Child eating behavior outcomes of an early feeding intervention to reduce risk indicators for child obesity: The NOURISH RCT. *Obesity A Research Journal*, 22(5), 104-111.

Edem, P. (2013). Obesity prevalence and risk factors in 3-6 years old children living in central districts of the metropolitan (Unpublished doctoral dissertation). Dokuz Eylül University.

Horta, B. L., Loret de Mola, C., & Victora, C. G. (2015). Long-term consequences of breastfeeding on cholesterol, obesity, systolic blood pressure and type 2 diabetes, A systematic review and meta-analysis. *Acta Paediatr*, 104(467), 30-37.

Huus, K., Ludvigsson, J. F., Enskär, K., & Ludvigsson, J. (2008). Exclusive breastfeeding of Swedish children and its possible influence on the development of obesity, A prospective cohort study. *BMC Pediatr*, 8, 42.

Inal, S., Canbulat, N., & Bozkurt, G. (2015). The effects of healthy life style behaviors of mothers on obesity in preschool children. *J Pak Med Assoc*, 5(10), 1079-1084.

Jansen, P. W., Roza, S. J., Jaddoe, V. W., Mackenbach, J. D., Raat, H., Hofman, A., Verhulst, F. C., & Tiemeier, H. (2012). Children's eating behavior, feeding practices of parents and weight problems in early childhood: Results from the population-based Generation R Study. *Int J Behav Nutr Phys Act*, 9, 130.

Jouret, B., Ahluwalia, N., Cristini, C., Dupuy, M., Nègre-Pages, L., Grandjean, H., & Tauber, M. (2007). Factors associated overweight in preschool-age children in southwestern France. *Am J Clin Nutr*, 85(6), 1643-1649.

Kelishadi, R., & Poursafa, P. A. (2014). Review on the genetic, environmental, and life style aspects of the early-life origins of cardiovascular disease. *Curr Probl Pediatr Adolesc Health Care*, 44(3), 54-72.

Manios, Y., Costarelli, V., Kolotourou, M., Kondakis, K., Tzavara, C., & Moschonis, G. (2007). Prevalence of obesity in preschool Greek children, in relation to parental characteristics and region of residence. *BMC Public Health*, 7(1), 178.

Möller, A. M., de Hoog, M. L. A., van Eijdsden, M., & Gemke, R. (2013). Infant nutrition in relation to eating behavior and fruit and vegetable intake at age 5 years. *British Journal of Nutrition*, 109(3), 564-571.

Neyzi, O., Günöz, H., Furman, A., Bundak, R., Gökçay, G., & Darendeliler, F. (2008). Weight, height, head circumference and body mass index references for Turkish children. *Journal of Child Health and Diseases*, 51(1), 1-14.

Nicklaus, S. (2017). The role of dietary experience in the development of eating behavior during the first years of life. *Ann Nutr Metab*, 70(3), 241-245.

Owen, C. G., Martin, R. M., Whincup, P. H., Davey-Smith, G., Gillman, M.W., & Cook, D. G. (2005). The effect of breastfeeding on mean body mass index throughout life, A quantitative review of published evidence. *Pediatrics*, 115(5), 1367-1377.

- Önder, Öz. (2011). Examination of obesity with anthropometric data pre-school age between 3-6 years [Unpublished doctoral dissertation]. Ankara University.
- Özer, S., Bozkurt, H., Sönmezgöz, E., Bilge, S., Yılmaz, R., & Demir, O. (2014). Evaluation of eating behaviour in obese children. *J Child*, 14(2), 14, 66-71.
- Özkaya, Ş. Ö. (2019). *Prevalence and risk factors of obesity among children aged 3-5 years in private and state schools of Bursa* [Unpublished doctoral dissertation]. İstanbul Medipol University.
- Rocha, S. G. M. O., Rocha, H. A. L., Leite, Á. J. M., Machado, M. M. T., Lindsay, A. C., Campos, J. S., Cunha, A. J. L. A., e Silva, A. C., & Correia, L. L. (2020). Environmental, socioeconomic, maternal, and breastfeeding factors associated with childhood overweight and obesity in Ceará, Brazil: A population-based study. *Int. J. Environ. Res. Public Health*, 17(5), 1557.
- Ryan, A.S. (2007). Breastfeeding and the risk of childhood obesity. *Coll Antropol*, 31(1), 9-28.
- Sirirassamee, T., & Hunchangsih, P. (2016). Children's eating behavior questionnaire: Factorial validation and differences in sex and educational level in Thai school-age children. *Southeast Asian J Trop Med Public Health*, 47(6), 1325-1334.
- Specht, I. O., Rohde, J. F., Olsen, N. J., & Heitmann, B. L. (2018). Duration of exclusive breastfeeding may be related to eating behavior and dietary intake in obesity prone normal weight young children. *Plos One*, 13(7), 1-11.
- Sümbüloğlu, K., & Sümbüloğlu, V. (1995). *Biostatistics*. (6th ed.). Ozdemir Publishing.
- Taveras, E. M., Gillman, M.W., Kleinman, K. P., Rich-Edwards, J. W., & Rifas-Shiman, S. L. (2013). Reducing racial/ethnic disparities in childhood obesity, The role of early life risk factors. *JAMA Pediatr*, 167(8), 731-738.
- Turkey Demographic and Health Survey (2018). *Hacettepe University Institute of Population Studies, T.C. Ministry of Development and TUBITAK*, Ankara, Turkey.
- Twells, L., & Newhook, L. A. (2010). Can exclusive breastfeeding reduce the likelihood of childhood obesity in some region of Canada? *Can J Public Health*, 101(1), 36-39.
- Vafa, M., Moslehi, N., Afshari, S., Hossini, A., & Eshraghian, M. (2012). Breastfeeding and childhood obesity. *J Health Popul Nutr*, 30(3), 303-310.
- Wardle, J., Guthrie, C. A., Sanderson, S., & Rapoport, L. J. (2001). Development of the children's eating behaviour questionnaire. *Child Psychiat*, 42(7), 963-970.
- World Health Organization (2016). *Report of the commission on ending childhood obesity*. The Document Production Services, Geneva, Switzerland.
- World Health Organization. (2017, September 20). *Infant and young child feeding data by country*. <https://www.who.int/nutrition/databases/infantfeeding/countries/en/>
- World Health Organization. (2020, February 19). *Obesity and overweight*. <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>.
- Yabancı, N., Şimşek, I., İstanbulluoğlu, I., & Bakır, B. (2009). The prevalence of obesity and associated factors in a kindergarten in Ankara. *TAF Prev Med Bull*, 8(5), 397-404.
- Yan, J., Liu, L., Zhu, Y., Huang, G., & Wang, P. P. (2014). The association between breastfeeding and childhood obesity, A meta-analysis. *BMC Public Health*, 14, 1267.
- Yılmaz, R., Esmaray, H., & Erkorkmaz, Ü. (2011). Adaptation study of the Turkish Children's eating behavior questionnaire. *Anatolian Journal of Psychiatry*, 12(4), 287-294.