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THE EFFECT OF NUTRITION EDUCATION FOR MOTHERS ON EATING AWARENESS, CHILDREN'S FEEDING BEHAVIOURS AND ANTHROPOMETRIC MEASUREMENTS: A PILOT RANDOMIZED CONTROLLED TRIAL

Annelere Yönelik Beslenme Eğitiminin Yeme Farkındalığı Çocuk Besleme Davranışları ve Antropometrik Ölçümler Üzerine Etkisi: Randomize Kontrollü Pilot Çalışma

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ABSTRACT

This pretest-posttest randomized controlled, pilot study was conducted to determine the effect of nutrition education for mothers on eating awareness, child feeding behaviors and anthropometric measurements. It was conducted with 24 mothers with three to six-year-old children attending a public kindergarten. An eight-week education consisting of eight sessions on mother and child feeding was given to mothers in the intervention group. The data were collected using the Information Form, the Eating Awareness Scale, and the Behavioral Pediatric Feeding Assessment Scale and performing anthropometric measurements. After the education program, the eating awareness mean score of the mothers in the intervention group was higher than the control group; however, the increase was not statistically significant ($p > 0.05$). Prior to the education, the mean behavioral pediatric feeding assessment scale score of the intervention group was higher than that of the control group ($p>0.05$). There was no significant difference in Body Mass Index (BMI) of the mothers in the intervention and control groups ($p > 0.05$). In line with the results obtained from this pilot study, it is recommended to increase the effectiveness of education by integrating programs containing web-based, game-supported applications into education as well as nutrition education.

Keywords: Children, Education, Mother, Nursing, Nutrition.

ÖZ

Bu öntest-sontest randomize kontrollü pilot çalışma, annelere yönelik beslenme eğitiminin yeme farkındalığı, çocuk besleme davranışları ve antropometrik ölçümler üzerine etkisini belirlemek amacıyla yapılmıştır. Çalışma bir devlet anaokulunda öğrenim gören, üç-altı yaş arası çocuğu olan 24 anne ile yürütüldü. Müdahale grubundaki annelere, anne ve çocuk beslenmesine yönelik sekiz oturumdan oluşan sekiz haftalık bir eğitim verildi. Veriler; Bilgi Formu, Yeme Farkındalığı Ölçeği, Davranışsal Pediatrik Besleme Değerlendirmesi Ölçeği ve antropometrik ölçümler ile toplandı. Eğitimden sonra müdahale grubundaki annelerin yeme farkındalığı puan ortalaması kontrol grubuna göre daha yüksek, ancak istatiksel olarak anlamlı değildi ($p>0.05$). Müdahale grubunun eğitim öncesi davranışsal pediatrik besleme değerlendirme ölçeği puan ortalaması kontrol grubuna göre daha yüksektir ($p>0.05$). Müdahale ve kontrol grubundaki annelerin Beden Kitle İndeksi (BKİ)'nde anlamlı bir fark görülmedi ($p>0.05$). Bu pilot çalışmadan elde edilen sonuçlar doğrultusunda, beslenme eğitimlerinin yanı sıra web tabanlı, oyun destekli uygulamalar içeren programlar eğitime entegre edilerek eğitimin etkinliğinin arttırılması önerilir.

Anahtar kelimeler: Çocuk, Eğitim, Anne, Beslenme, Hemşirelik.

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INTRODUCTION

In the period between the ages of three and six, which is called the preschool period (CDC, 2020), the personality of the child is shaped and many habits that form the basis for adulthood are developed. It is important to develop healthy eating habits as well as having an adequate and balanced diet. Feeding is essential for healthy growth and development in the first years of life (Merdol, 2012).

The eating habits a child develops at an early age may affect the health in adulthood and form the basis of feeding problems in the future (Merdol, 2012; Young, Anderson, Beckstrom, Bellows, & Johnson, 2003). Feeding is one of the important factors in the etiology of childhood obesity. The World Health Organisation (WHO) has reported that childhood obesity is one of the most serious public health problems of the 21st century and that they aim to improve the mother, infant and young child feeding by 2025, as one of six global feeding goals (WHO, 2018). Parental behavior has a significant impact especially during the preschool period, as parents are role models for children who are highly dependent on them (Warkentin, Mais, Latorre, Carnell, & Taddei, 2018). The correlations between the behavior of mother and childhood obesity have led to the view that the focus should be on the way the child is fed rather than mere feeding (Benton, 2004; Wardle, Sanderson, Guthrie, Rapoport, & Plomin, 2002). Therefore, parents have become the focal point of public health interventions to improve child feeding and to prevent childhood obesity (Clark, Goyder, Bissell, Blank, & Peters, 2007).

Studies have shown that parental attitudes have a profound effect on child development (Golan & Crow, 2004). This also applies to the development of the child's feeding behavior. There is a strong correlation between the development of healthy eating behaviors in the child, making these behaviors a habit, and family's attitude (Wardlaw, Insel, & Seyler, 1994). Parents, friends, school, media and individual preferences are among the factors influencing child feeding (Benton, 2004; Krushnapriya et al., 2015; Wardle, Carnell, & Cooke, 2005; Williams & Greene, 2018).

In this period, in order to help the child develop healthy eating habits, parents should know the eating behaviors that child should exhibit during this period and they should be aware of what kind of an attitude they should adopt towards the positive and negative eating behaviors the child exhibits (Bulduk, Yabancı, & Demircioğlu, 2002). The child's knowledge of food, preferences and consumption depend on the preferences, beliefs and attitudes of the parents (Skinner, Carruth, Bounds, Ziegler, & Reidy, 2002).

This pilot study aims to examine the effects of nutrition education for mothers on eating awareness, children's feeding behaviors and anthropometric measures. The nutrition education for mothers was examined in line with the following research hypotheses:

H_1: There is a difference in eating awareness scores between the groups that received and did not receive nutrition education.

H_2: There is a difference in terms of the Behavioral Pediatric Feeding Assessment Scale scores between the groups that received and did not receive nutrition education.

H_3: There is a difference in terms of anthropometric measurements between the groups that received and did not receive nutrition education.

MATERIAL AND METHOD

Study Type

The study is a pretest-posttest randomized controlled experimental pilot study. It was conducted in Konya, Turkey.

The Sample

Since the study was a pilot study, time and cost evaluations were made, and the mothers of 40 students in the randomly selected two classes of a kindergarten were included in the study. The inclusion criterion was being the mother of a child between the ages of three and six. The mothers whose children were receiving inclusive education, who had children with chronic diseases, who were pregnant, who were foreigners, who do not attend the education regularly, who fill in the survey form incompletely, and mothers who want to quit research were excluded from the study.

Recruitment

The participants were selected from among the mothers who had children between ages 3-6 in a kindergarten affiliated to the Ministry of National Education in Konya, Turkey. The mothers who met the inclusion criterion were included in the study. The mothers received the healthy nutrition education for child-mother given by the researchers.

Randomization and Blinding

Randomization was done through the random assignment and random selection. Among the 40 mothers identified, 16 mothers who did not meet the inclusion criteria were excluded from the study. The selected 24 mothers were assigned to the intervention group (n:12) and the control group (n:12) by a statistician using the simple randomization method

(randomizer.org.tr). During randomization, the groups were determined by assigning the first mother to the intervention group and the second mother to the control group. Blinding was done in reporting. The research data were coded and transferred to the computer by the assistant researchers without specifying the intervention and the control group.

Intervention

The education was held in eight sessions for eight weeks in the 2019-2020 academic years. The intervention group was given education on healthy feeding of mothers and children. The first four sessions were held face-to-face by the researchers in a classroom in the kindergarten, and the last four sessions of the education were conducted online via the zoom program. Our education continued online as a result of the closure of schools due to the COVID-19 pandemic. Each session lasted 45 minutes. The content of the education sessions is presented in Table 1.

No intervention was made in the control group. Since there was no feeding program for students and their families in the school curriculum, individuals in this group continued their routine practices. After the data collection process was completed, the education given to the intervention group was also given to the control group.

Table 1. Weekly Education Content

Healthy Nutrition Education for Child-Mother		
Education Session	**Aim of the session**	**Method**
1. Child and mother nutrition	Helping mothers acquire knowledge of healthy feeding for themselves and their children	Face-to-face
2. Factors affecting a healthy diet	Helping mothers learn the factors affecting healthy feeding	Face-to-face
3. The effect of parental attitudes and behaviors on child nutrition	Gaining awareness about the importance of parental attitudes and behaviors in child nutrition	Face-to-face
4. Food storage and cooking techniques	Helping mothers learn food preparation and storage techniques	Face-to-face
5. Selective eating and food refusal in children	Being aware of selective eating and food refusal behaviors of children and adopting strategies to cope with them	Via Zoom
6. Parents' roles and responsibilities regarding nutrition	Being aware of the roles and responsibilities of parents in child nutrition	Via Zoom
7. Obesity and nutrition relationship	Understanding healthy eating principles to prevent obesity	Via Zoom
8. Watching videos on nutrition and discussing wrong eating habits	Helping mothers gain awareness about the malnutrition behaviors of themselves and their children	Via Zoom

Data Collection

The intervention and the control groups were administered the pre-test and the post-test between February and May 2020. The data were collected by the researchers in a room in the

specified kindergarten. The primary outcomes of the study are the "anthropometric measurements" of the mothers, and the secondary outcomes are the "Eating Awareness Scale" and the "Behavioral Pediatric Feeding Assessment Scale" mean scores of the mothers.

Data Collection Tools

The Information Form, the Eating Awareness Scale, the Behavioral Pediatric Feeding Assessment Scale, and anthropometric measurements form were used to collect data.

Information Form: The information form, which was developed by the researchers, includes a total of 29 questions regarding participants' sociodemographic characteristics (age, marital status, the place where the participant has lived longest, perception of economic status, family type), health characteristics (chronic disease status, continuous drug use, smoking and alcohol use) and feeding characteristics (the number of meals, skipping meals, duration of breastfeeding, the status of only breastfeeding in the first six months, age of starting supplementary food, reading food labels, cooking regularly at home, and frequency of convenience food consumption).

Eating Awareness Scale (EAS): The scale was developed by Framson et al. (Framson et al., 2009) and was adapted to Turkish by Köse et al. (Köse, Tayfur, Birincioğlu, & Dönmez, 2016). This scale was developed to determine the eating habits and awareness of individuals. The scale is a five-point Likert-type scale with 30 items and seven sub-dimensions (Disinhibition, Emotional Eating, Control of Eating, Eating Discipline, Mindfulness, Conscious Nutrition, Interference). The Cronbach's alpha reliability coefficient is 0.73. The lowest score that can be obtained from the scale is 70 and the highest score is 110. Higher scores indicate higher levels of eating awareness. In this study, the Cronbach's alpha coefficient of the scale was found to be 0.91.

Behavioral Pediatric Feeding Assessment Scale (BPFAS): The scale was developed by Crist et al. (Crist & Napier-Phillips, 2001) and was adapted to Turkish by Önal et al. (Önal, Var, & Uçar, 2017). This scale was developed by parents to detect negative eating behavior in pediatrics. The scale is a five-point Likert type scale consisting of 24 items and four sub-dimensions (picky eating, early period food refusal, early period grainy food refusal, late period food refusal). Cronbach alpha was found to be 0.82 in the original and 0.88 in the Turkish version. The increase in the total scale score signifies higher levels of eating problems, and higher levels of problematic eating behavior and eating habits. In our study, the Cronbach's alpha was found to be 0.89.

Anthropometric Measurements Form: The height (cm) and weight (kg) of the mothers were measured by the researchers. The height of the mothers was measured using an inelastic tape measure (Rolfix automatic tape measure-1.5mt), with the feet next to each other and the head on the frankfort plane (eye triangle and upper auricle aligned). The weight of the mothers was measured with a calibrated Seca weighing scale sensitive to 0.1 kg while the mothers were standing at an upright position without shoes, with both feet next to each other and with light clothes (Gibson, 2005). Anthropometric measurements were measured by the researchers twice, before and after the education at the kindergarten's meeting room. The body mass index (BMI) weight/height * height formula of the WHO was used to evaluate the anthropometric measurements of the mothers. The data were classified using the BMI ranges (BMI <18.5 underweight, BMI = 18.5-24.99 normal weight, BMI = 25.0-29.99 overweight, BMI≥30 obese) (WHO, 2020).

Statistical Analysis

The data were analysed using the SPSS 23 program. The Chi-square analysis (Fisher's exact test and Continuity Correction) was used to compare the demographic characteristics of the intervention and the control group. The within group variation of the scale scores of the intervention and the control group was tested using the Wilcoxon Signed Ranks Test. In independent groups, the Mann Whitney U test was used for the inter-group comparison of the pre-test and post-test scores of the intervention and the control group. The findings were considered significant at $p<0.05$. The Intention to treat (ITT) analysis was not performed since there was no data loss. The effect size and confidence intervals were calculated. A webpage was used to calculate the effect size (https://campbellcollaboration.org/escalc/html/EffectSizeCalculator-Home.php). Cohen [18] was taken into account in the evaluation of the effect size ($d\leq0.20$ small; $0.20<d<0.80$ medium; $d\geq0.80$ large).

Ethical Considerations

Prior to the study, ethical permission was obtained from the Non-Invasive Research Ethics Committee Faculty of Health Sciences of Selcuk University (2019/14571), and institutional permission was obtained from the kindergarten where the study was conducted. All the mothers were informed about the study and their written consent was obtained. Permission was obtained from the authors for the scales.

RESULT

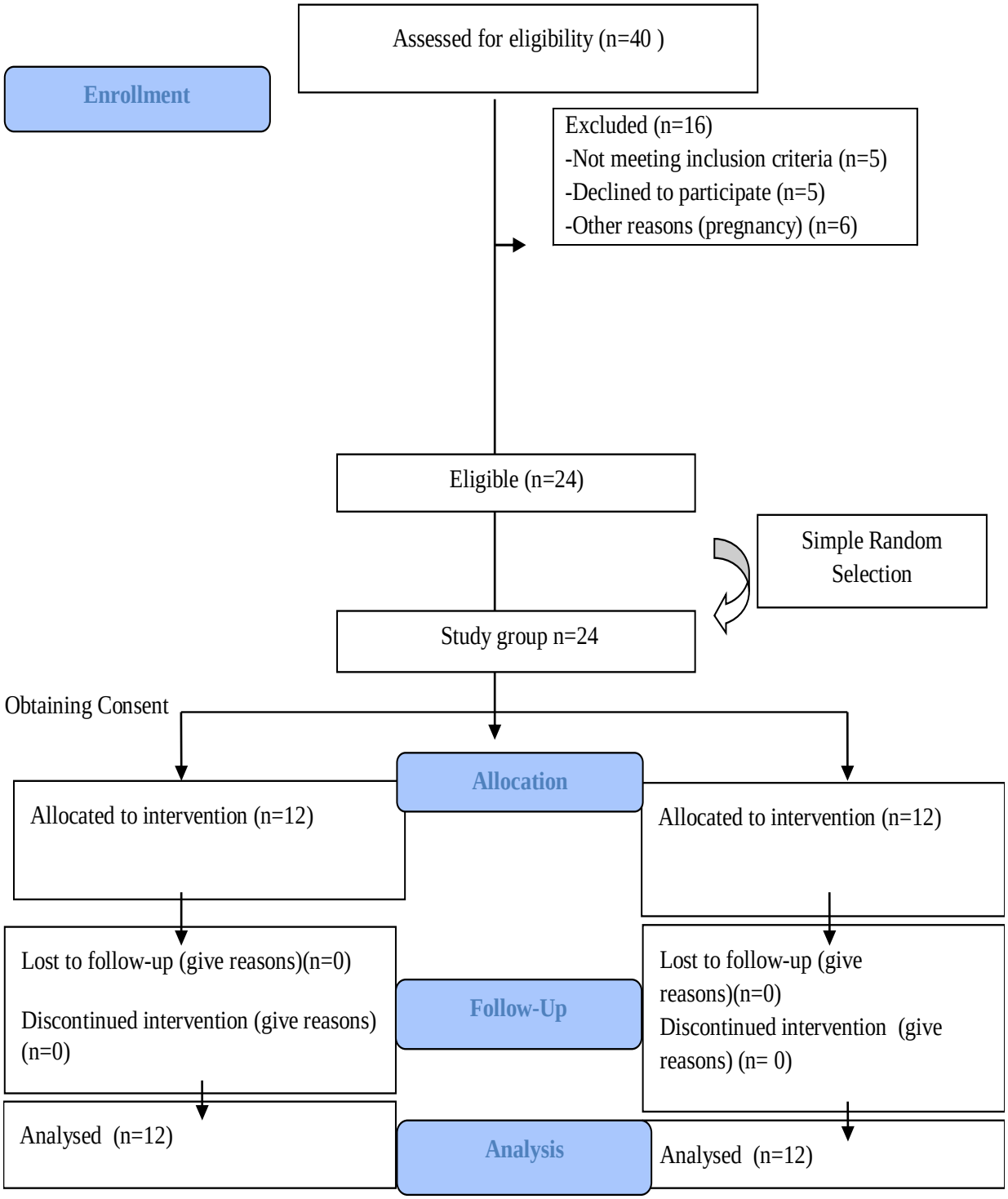

Figure 1: CONSORT Flow Diagram [19].

Forty eligible mothers who could participate in the study were identified; however, 16 of them were excluded from the study because five mothers had chronic illnesses, six were

pregnant, and five mothers did not want to participate in the study. 24 mothers were randomly assigned to the intervention and the control group after their consent was obtained (Figure I).

Sociodemographic and Feeding Characteristics of Mothers and Children

The comparison of the sociodemographic characteristics of the mothers by groups is shown in Table 2. The mean age of the mothers in the intervention and the control group is 31.42±5.50 and 35.00±4.95 years. The mean age of the children in the intervention and the control group is 65.17±9.39 and 65.58±7.56 months, respectively. While 50.0% of the women in the intervention group graduated from high school and higher, this rate was 58.3% in the control group. While 58.3% of the mothers in the intervention group perceive their income as a medium, 66.7% of the mothers in the control group perceive it as a medium. A statistically significant difference was not found between the groups in terms of sociodemographic and feedings characteristics (p> 0.05).

Table 2. The Sociodemographic and Feeding Characteristics of the Mothers and Children by Groups (N= 24).

Characteristics	**Intervention Group (n= 12)**		**Control group (n= 12)**		**Chi-square test**	***p-Value***
	n	**%**	**n**	**%**		
Age, year						
25-35	10	83.3	7	58.3	0.371	[a]0.185
≥ 36	2	16.7	5	41.7		
Education						
Primary/Secondary school	6	50.0	5	41.7	0.000	[b]1.000
High school and over	6	50.0	7	58.3		
Longest living environment						
City	6	50.0	8	66.7	0.680	[a]0.340
Suburb	6	50.0	4	33.3		
Perceived Economic Status						
Good	5	41.7	4	33.3	1.000	[a]0.500
Medium	7	58.3	8	66.7		
Age of children (month)						
36-60	2	16.7	4	33.3	0.640	[a]0.320
≥ 61	10	83.3	8	66.7		
The number of children in pre-school period						
First	4	33.3	4	33.3	1.000	[a]0.667
≥ Second	8	66.7	8	66.7		
Duration of breastfeeding						
0-23 month	8	66.7	10	83.3	0.640	[a]0.320
≥ 24 month	4	33.3	2	16.7		
Time to transition complementary feeding						
≤ 6 months	3	25.0	2	16.7	1.000	[a]0.500
≥ 6 months	9	75.0	10	83.3		
Exclusive breastfeeding for the first 6 months						
Yes	8	66.7	12	100	0.093	**[a]0.047**
No	4	33.3	0	0		

[a] Fisher's exact test, [b] Continuity Correction

Comparison of Mothers' Eating Awareness and Pediatric Feeding Scores

The distribution of the Eating Awareness Scale mean scores across groups according to the pre-test and post-test measurements is shown in Table 3. It was determined that there was no statistically significant difference between the groups in terms of eating awareness mean scores (p> 0.05), and the effect size was medium (d = 0.274). Eating awareness mean scores decreased in both groups in the post-test; however, the mean score of the intervention group (84.25 ± 10.18) was found to be higher than that of the control group (81.41 ± 10.95).

Table 3. Distribution of Mothers' Eating Awareness Scale Mean Scores by Groups of Pre and Post-Test (N= 24).

	n	Pre-Test Mean±SD	Median (IQR)	Post-Test Mean±SD	Median (IQR)	Within group difference Z	p	Effect size (95%CI) d
Intervention Group	12	86.66±7.08	86.50 (6.50)	84.25±10.18	81.50 (16.50)	-1.425	[b]0.154	0.274 (-0.533-1.075)
Control group	12	83.16±10.81	85.00 (15.25)	81.41±10.95	84.50 (16.00)	-0.919	[b]0.358	0.1608 (-0.643-0.961)
Difference between groups	**z**	-[a]0.520		-0.116				
	p	[a]0.603		0.908				
Effect size (95% CI)	**d**			0.268 (-0.539-1.069)				

[a] Mann Whitney U testi, [b] Wilcoxon Signed Ranks Test
IQR, interquartile range; SD, standard deviation; CI, confidence interval

Table 4 indicates that there is no statistically significant difference (p> 0.05) between the intervention and the control group in terms of the mothers' behavioral pediatric feeding assessment scale mean scores, and the inter-group effect size is small (d=0.116). However, the post-test mean score of the intervention group (60.25 ± 11.58) decreased compared to the pre-test mean score (61.50 ± 9.75).

Table 4. Distribution of Mothers' the Behavioral Pediatric Feeding Assessment Scale Means Scores by Groups of Pre and Post-Tests (N= 24)

	n	Pre-test Mean±SD	Median (IQR)	Post-test Mean±SD	Median (IQR)	Within group difference z	p	Effect size (95%CI) d
Intervention Group	12	61.50±9.75	61.00 (16.75)	60.25±11.58	61.50 (21.00)	-0.770	[b]0.441	0.116 (-686-0.916)
Control group	12	58.00±8.26	57.00 (10.00)	58.08±9.28	56.00 (18.00)	-0.044	[b]0.965	-0.009 (-0.791-0.809)

Difference between groups	**z**	-0.954	-0.260
	p	[a]0.340	[a]0.795
Effect size (95% CI)	**d**		0.206 (-0.599-1.006)

[a] Mann Whitney U testi, [b] Wilcoxon Signed Ranks Test
IQR, interquartile range; SD, standard deviation; CI, confidence interval

Comparison of Mothers' Body Mass Indexes

No statistically significant difference (p> 0.05) was found between the groups in terms of mean BMI, and the effect size was found to be small (d: 0.052) (Table 5).

Table 5. Distribution of Mothers' the Body Mass Index Means by Groups of Pre-Test and Post-Test (N= 24).

	n	Pre-test Mean±SD	Median (IQR)	Post-test Mean±SD	Median (IQR)	Within group difference z	p	Effect size (95%CI) d
Intervention Group	12	25.72±4.97	25.46 (6.73)	25.44±5.66	25.67 (6.95)	-0.078	[b]0.937	0.052 (-0.749-0.852)
Control group	12	25.78±3.03	26.23 (6.24)	25.61±2.53	26.09 (5.12)	-0.415	[b]0.678	0.060 (-0.740-0.861)
Difference between groups	**z**	-0.635		-0.722				
	p	[a]0.525		[a]0.470				
Effect size (95% CI)	**d**			0.038 (-0.763-0.838)				

[a] Mann Whitney U testi, [b] Wilcoxon Signed Ranks Test
IQR, interquartile range; SD, standard deviation; CI, confidence interval

DISCUSSION

The study was carried out to evaluate the effect of nutrition education for mothers with preschool children on eating awareness, pediatric feeding behavior and anthropometric measurements. The findings revealed that the feeding intervention for mothers did not lead to any statistically significant difference between the anthropometric measurements, eating awareness and behavioral pediatric feeding assessment scores.

Eating Awareness of Mothers

After the education program, it was observed that there was no significant increase in the eating awareness of the mothers in the intervention group (Table 3). Studies (Brazeau et al., 2014; Chung et al., 2016; Knol et al., 2016) found that long-term (8 weeks and more) education initiatives had a significant effect on the post-education eating awareness scale scores. Studies have shown that awareness plays an important role in eating behaviors (Alberts, Thewissen, & Raes, 2012; Pandya, 2020). This result does not coincide with the findings of our study. It may be due to the implementation of the study with a small sample

size compared to other studies and the short duration of education initiatives. Maternal feeding is a strong determinant of child feeding. If the mother is empowered through various methods such as education , this education can play an important role as an agent for change both in the family and in the society (Scarinci, Hansen, & Kim, 2020).

Pediatric feeding behavior based on the reports of mothers

In the study, no significant decrease was found in the post-test behavioral pediatric feeding assessment mean scores of the mothers in the intervention group (Table 4). Mothers' attitude is important in helping 3-6 year-old children develop healthy eating behavior and habit in the preschool period (Connor & Davidson, 2003). It is reported that mothers who receive nutrition education and who have a certain education level (high school and above) exhibit a positive approach towards child feeding. This is important for the child to develop a positive feeding behavior. While short-term education programs may increase the knowledge level of mothers, it may require longer periods of time to convert knowledge into behavior. In addition, various factors such as parents' feeding behavior, parenting practices, eating environment at home, and socioeconomic status can affect children's feeding behavior (Stage et al., 2018). It is stated that ensuring family participation in preschool nutrition education programs is effective in improving the knowledge and awareness of families as well as developing positive feeding behavior in children (Aktaç, Kızıltan, & Avcı, 2019). However, since there was no significant increase in the eating awareness of the mothers in our study, it is an expected result that there was no significant improvement in child feeding behavior.

Body Mass Indexes of Mothers

In our study, no significant decrease was found in the BMI measurements of the mothers in the intervention group after the education program (Table 5). Studies have shown similar results (Aktaç et al., 2019; Morshed, Tabak, Schwarz, & Haire-Joshu, 2019). Factors such as the participants' physical activity status, lifestyle and food preferences may have affected the results. The absence of a significant change in BMI measurements may suggest that a larger sample size is needed.

Limitations

The strength of the study is that the education was given by multidisciplinary educators. The study includes some limitations. First, the sample size is small. Since pre-school education has started to be given through distance education due to the Covid-19 pandemic,

the sample size was limited. The small sample size limits the generalizability and external validity of the study.

CONCLUSIONS

In our study, no difference was found between the BMI measurement, eating awareness and behavioral pediatric feeding assessment scores of the mothers after the education program. If a continuous education on feeding for both mothers and children is provided by health professionals in schools, it can be ensured that all family members develop healthy eating habits and behaviors. It is also recommended to conduct cohort studies with a larger sample.

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