Obesity Status, Mindful Eating, and Dietary Intake Among Primary School Children in Kütahya: A Cross-Sectional Study

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Abstract

Aim: This study aims to evaluate obesity status, mindful eating, and dietary intake among primary school children.

Method: This cross-sectional study included 298 children aged 10–11 years living in Kütahya. Sociodemographic data, the Mindful Eating Questionnaire for Children, and 24-hour dietary recall were collected through face-to-face surveys. The researcher took anthropometric measurements.

Results: The mean age of the participants (50% girls) was 10.3±0.4 years. The prevalence of overweight was 19.7%, and obesity was 13.7%. Obesity rates were significantly higher in boys compared to girls ($p<0.05$). Children with obese mothers or fathers with a high school education or below had higher obesity rates ($p<0.05$). Mindless eating scores were higher among boys, children whose mothers had a high school education or below, those with more than two hours of daily screen time, and those who did not bring a lunchbox to school ($p<0.05$). Dietary intake did not differ significantly according to children's mindful eating and obesity status.

Conclusion: Children's obesity status varied by gender, maternal obesity, and paternal education. Lower maternal education, longer screen time, and being male were associated with higher mindless eating scores. It is important to include family-based mindful eating practices in programs aimed at promoting healthy lifestyles in children. In this way, acquiring mindful eating from an early age can lay the foundation for the transfer of healthy eating behaviors into adulthood.

Keywords: Mindful eating, childhood obesity, dietary intake.

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ETHICAL STATEMENT: Ethical approval for the study was obtained from the Non-Interventional Clinical Research Ethics Committee of Kütahya University of Health Sciences (Decision No: 2025/06-53, Date: 06/05/2025).

Kütahya'da Yaşayan İlkokul Çocuklarında Obezite Durumu, Yeme Farkındalığı ve Diyet Alımı: Kesitsel Bir Çalışma

Öz

Amaç: Bu çalışma obezite durumu ile yeme farkındalığı ve diyet alımının değerlendirilmesi amacıyla yürütülmüştür.

Yöntem: Kesitsel tipte yapılan bu çalışma, Kütahya'da yaşayan 10-11 yaş grubu 298 çocuk ile gerçekleştirilmiştir. Sosyodemografik bilgiler, Çocuklar İçin Yeme Farkındalığı Ölçeği ve 24 saatlik besin tüketim kaydı, yüz yüze anket yöntemi ile elde edilmiş ve araştırmacı tarafından antropometrik ölçümler alınmıştır.

Bulgular: Yaş ortalaması 10,3±0,4 yıl olan katılımcılarda (%50 kız) hafif şişmanlık %19,7; obezite %13,7'dir. Erkeklerde kızlara göre obezite oranı daha yüksektir (p<0,05). Annesi obez, babası lise ve altı eğitim seviyesine sahip olan çocuklarda obezite oranı daha yüksek bulunmuştur (p<0,05). Bilinçsiz yeme skoru erkeklerde, annesi lise ve altı eğitim düzeyine sahip, günde 2 saatten fazla ekran süresi olan ve okula beslenme çantası götürmeyen çocuklarda daha yüksektir (p<0,05). Çocukların yeme farkındalığı ve obezite durumu ile diyet alımları arasında anlamlı fark yoktur.

Sonuç: Çocuklarda obezite durumu cinsiyete, anne obezitesi ve baba eğitim düzeyine göre değişmektedir. Anne eğitim düzeyinin düşük, ekran süresinin fazla olması ve erkek cinsiyeti, bilinçsiz yeme skorunu etkilemiştir. Çocuklarda sağlıklı yaşam tarzının benimsenmesine yönelik planlanan çalışmalara aile katılımlı yeme farkındalığı uygulamalarının da eklenmesi önemlidir. Böylelikle, erken yaşlardan itibaren yeme farkındalığının kazanılması, sağlıklı beslenme davranışlarının yetişkinlik dönemine aktarılmasına zemin hazırlayabilir.

Anahtar Sözcükler: Yeme farkındalığı, çocukluk çağı obezitesi, diyet alımı.

Introduction

The World Health Organization (WHO) considers childhood obesity to be one of the most serious global health challenges of the 21st century. Over the past 40 years, the prevalence of childhood obesity has increased more than eightfold. In 2020, 150 million children aged 5-19 years were classified as overweight or obese, and this number is estimated to be 254 million by 2023[1,2]. In parallel with global trends, the prevalence of childhood obesity in Türkiye has also been steadily increasing. In a study conducted by the Türkiye Ministry of Health, which evaluated the anthropometric measurements of 3 750 999 students aged 10 to 14, the prevalence of overweight was found to be 19.6%, while the prevalence of obesity was 10.5%[3]. In various cross-sectional studies conducted in Türkiye, the prevalence of obesity in similar age groups has been reported to range between 15.8% and 28.4%[4-6].

According to the WHO Childhood Obesity Surveillance Initiative (COSI 2022), the prevalence of overweight and obesity among children aged 7-8 years in Türkiye is 12.5% and 9.9%, respectively[7]. Children with obesity are highly likely to be obese in adulthood too. In addition, they are at increased risk of developing multiple non-communicable diseases. Moreover, obesity during childhood and adolescence often leads to negative experiences such as stigmatization, discrimination, and bullying, which in turn cause

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psychosocial consequences that adversely affect academic performance and overall quality of life[8]. Psychological problems and the decline in quality of life further increase the burden of childhood obesity on individuals[9].

Eating awareness is not about what is eaten, but how and why eating behavior occurs. It involves the internalization of physical hunger and satiety cues and promotes taking pleasure in food with a sense of understanding and compassion[10,11]. In other words, it is the application of awareness to thoughts, emotions, bodily sensations, and behaviors related to eating[12].

Due to the limited success in maintaining weight loss, developing mindful eating has increasingly been emphasized in recent years as a potentially important component of treatment[13]. For this reason, there has been a growing number of studies examining the effects of mindful eating in children on the regulation of eating habits and the prevention of obesity. Mindful eating practices have been reported to increase fruit consumption and decrease the intake of unhealthy foods, total energy intake, and impulsive food choices among primary school children[13-15]. School-based mindfulness and cognitive-behavioral programs implemented to enhance emotional regulation in children aged 10-12 have been found to result in significant improvements both in the development of mindfulness and in the regulation of positive and negative emotional states[16]. In Türkiye, only a limited number of studies have examined the relationship between obesity status, mindful eating, and dietary intake in this age group[13]. Accordingly, this study aims to evaluate obesity status in relation to mindful eating and dietary intake in the Aegean Region, where the prevalence of childhood obesity is high.

Material and Methods

Study Design

A non-interventional, cross-sectional study design was employed. The study was conducted between May 10 and May 30, 2025, with children aged 10-11 residing in the Tavşanlı district of Kütahya. Announcements for the research were made via social media, as well as through family and social networks. A total of 298 children were selected using a convenience sampling method among those who volunteered to participate, ensuring a balanced distribution of boys and girls. The sample size was calculated using the statistical power analysis program G*Power, based on 85% power, an effect size of 0.5, and a significance level of $\alpha=0.05$. Children who were following a special diet were excluded from the study.

Informed consent was obtained from the parents for participation in the study, and data were collected through face-to-face interviews with a structured questionnaire. The body weight and height information of the parents was recorded based on self-reports provided by the family.

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Assessment of Anthropometric Measurements

Children's body weight (kg) was measured without shoes using a professional digital scale (Seca 813) with a sensitivity of 0.1 kg. Height (cm) was measured with children standing upright in a straight position, without shoes, using a portable stadiometer (Mesilife 13539) with a precision of 0.1 cm. Waist and hip circumferences (cm) were measured using a non-elastic measuring tape with a sensitivity of 0.1 cm. Children's Body Mass Index (BMI) was calculated using the formula: body weight (kg)/ height (m)^2. Age- and sex-specific percentile values were determined using the WHO AnthroPlus software[17]. WHO age-specific BMI percentile classification was used, where <3rd percentile indicates severe underweight, 3rd to <15th percentile underweight, 15th to <85th percentile normal weight, ≥85th to <97th percentile overweight, and ≥97th percentile obesity[8]. For the assessment of parental BMI, the WHO classification was used[18]. For the evaluation of waist circumference, percentile curves developed specifically for Turkish children were used[19]. Additionally, while evaluating waist-to-height ratio (used for identifying abdominal obesity and elevated cardiometabolic risk), a value greater than 0.5 was considered at-risk[20].

Assessment of Mindful Eating

The validity and reliability of the Mindful Eating Questionnaire's Turkish version were established by Bozkurt et al.[21-23]. The first section of the questionnaire consists of 8 items measuring mindless eating, while the second section includes 4 items assessing awareness. Scores from each section were summed and divided by the number of items to obtain two separate total scores. Higher awareness scores indicate higher awareness, whereas higher mindless eating scores reflect greater engagement in mindless eating.

Assessment of Dietary İntake

To evaluate the children's dietary intake, a retrospective 24-hour dietary recall was conducted by the researcher. A food atlas with meal and portion photographs was used to aid recall and improve the accuracy of dietary records[24]. The collected data were analyzed using the Nutrition Information Systems software (BeBiS 9.0).

Ethical Statement

Ethical approval for the study was obtained from the Non-Interventional Clinical Research Ethics Committee of Kütahya University of Health Sciences (Decision No: 2025/06-53, Date: 06/05/2025). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Statistical Analysis

The data obtained were analyzed using IBM SPSS Statistics version 24.0. Continuous variables were reported as mean ± standard deviation ($\bar{X}$±SD), while categorical variables were presented as frequency (n) and percentage (%). The Kolmogorov-Smirnov

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test was used to assess the distribution characteristics of the data. For continuous variables that did not show a normal distribution, non-parametric analysis methods were applied. Children were classified as obese if BMI-for-age ≥85th percentile, and non-obese if <85th percentile. The Chi-square (χ^2) test was used to compare categorical variables such as gender and obesity status (obese vs. non-obese), while the Mann–Whitney U test was employed for the analysis of continuous variables between two independent groups. For comparisons involving more than two independent groups, the Kruskal–Wallis test was applied. Using quartile classification, mindless eating and awareness scores were split into four groups, and the associations of energy and nutrient intakes with the lowest and highest score quartiles were analyzed. A significance level of $p < 0.05$ was considered for all statistical analyses.

Results

Table 1 presents selected descriptive characteristics of the children according to obesity status. The mean age of the participants was 10.3±0.4 years. Among all children, the combined prevalence of overweight and obesity in mothers was 47.0%. The mean BMI of mothers of children with and without obesity was determined as 26.0±4.4 and 24.4±4.6, respectively, and this difference was found to be statistically significant (p=0.003). The prevalence of obesity among the mothers of obese children (18.0%) was found to be significantly higher than that among the mothers of non-obese children (11.0%) (p=0.045). No statistically significant difference was found between children's obesity status and the fathers' mean BMI. Children's sleep duration and screen time did not differ significantly by obesity status (p>0.05).

Table 1. Selected descriptive characteristics of the children according to obesity status

Variables	**Total (n:298)**	**Obese (n:100)**	**Non-obese (n:198)**	**p**
Age (mean±SD)	10.3±0.4	10.3±0.4	10.3±0.4	0.853[a]
Maternal BMI (kg/m²) (mean±SD)	25.0±4.6	26.0±4.4	24.4±4.6	**0.003[a*]**
Paternal BMI (kg/m²) (mean±SD)	25.9±3.3	26.2±3.5	25.7±3.6	0.278[a]
Maternal BMI (n(%))				
Underweight/Normal	158 (53.0)	44 (44.0)	116 (58.6)	**0.045[b]**
Overweight	101 (33.9)	38 (38.0)	60 (30.3)	
Obese	39 (13.1)	18 (18.0)	22 (11.1)	
Paternal BMI (n(%))				
Underweight/Normal	129 (43.3)	42 (42.0)	87 (43.9)	0.569[b]
Overweight	130 (43.6)	42 (42.0)	88 (44.4)	
Obese	39 (13.1)	16 (16.0)	23 (11.6)	
Maternal Education (n(%))				
Less than high school	82 (27.5)	31 (31.0)	51 (25.8)	0.339[b]
High school or above	218 (72.5)	69 (69.0)	142 (74.2)	
Paternal Education (n(%))				
Less than high school	33 (11.1)	16 (16.0)	17 (8.6)	**0.044[b*]**
High school or above	265 (88.9)	84 (84.0)	181 (91.4)	

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Sleep Duration (n(%))				
Less than 8 hours	8 (2.6)	4 (4.0)	4 (2.0)	0.318[b*]
8 hours or more	290 (97.5)	96 (96.0)	194 (98.0)	
Screen Time (n(%))				
Less than 2 hours	168(56.4)	50(50.0)	118(59.6)	0.115[b]
2 hours or more	130(43.6)	50(50.0)	80(40.4)	

p<0.05 significant level, a: Mann Whitney U test, b: Chi Square test

Table 2 presents selected anthropometric measurements and dietary habits of the children according to obesity status. The prevalence of obesity was found to be significantly higher in boys compared to girls (p<0.05). Among all children, the combined prevalence of overweight (19.7%) and obesity (13.7%) was found to be 33.4%. The waist-to-height ratio was significantly higher in obese children compared to non-obese children; 33% of obese children had a waist-to-height ratio greater than 0.5, whereas this rate was 4% among non-obese children (p<0.05).

Table 2. Selected anthropometric measurements and dietary habits of the children according to obesity status

Variables	**Total (n:298)**	**Obese (n:100)**	**Non-obese (n:198)**	**p**
Body Weight (kg) (mean±SD)	34.6±8.0	42.1±8.1	30.8±4.5	**<0.001[a]**
Height (cm) (mean±SD)	137.7±9.0	139.5±7.9	136.8±9.4	**0.023[a]**
BMI (kg/m²) (mean±SD)	18.3±5.0	22.2±6.9	16.3±1.7	**<0.001[a]**
Gender (n(%))				
Girl	149 (50.0)	41(41.0)	108 (54.5)	**0.036[b]**
Boy	149 (50.0)	59 (59.0)	90 (45.5)	
BMI Percentile (n(%))				
<15.	42 (14.0)	-	42 (22.2)	**<0.001[b]**
15-84.9.	156 (52.3)	-	156 (77.8)	
85-96.9.	59 (19.7)	59 (59.0)	-	
≥97.	41 (13.7)	41 (41.0)	-	
Waist Circumference (cm) (mean±SD)	62.7±6.3	67.7±6.1	60.1±4.8	**<0.001[a]**
Waist Circumference Distribution (n(%))				
< 90th percentile	256 (86.2)	68 (68.0)	188 (95.4)	**<0.001**
≥ 90th percentile	41(13.8)	32 (32.0)	9 (4.6)	
Waist-to-Height Ratio (mean±SD)	0.45±0.5	0.49±0.06	0.43±0.03	**<0.001[a]**
Waist-to-Height Ratio Distribution (n(%))				
< 0.5	257 (86.2)	67(67.0)	190(96.0)	**<0.001[b]**
≥ 0.5	41(13.8)	33(33.0)	8(4.0)	
Meal Skipping (n(%))				
Yes	111 (37.2)	34 (34.0)	77 (38.9)	0.447[b]
No	187 (62.7)	66 (66.0)	121 (61.1)	

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Number of Meals (n(%))				
3 or fewer	232 (77.8)	78(78.0)	154 (77.8)	0.965[b]
4 or more	66 (22.2)	22(22.0)	44 (22.2)	
School Canteen (n(%))				
Available	261 (87.5)	81 (81.0)	180 (90.9)	**0.024[b]**
Not available	37 (12.4)	19 (19.0)	18 (9.1)	
Bringing a Lunchbox to School (n(%))				
Yes	111 (37.2)	30 (30.0)	82 (41.4)	0.058[b]
No	187 (62.7)	70 (70.0)	116 (58.6)	
Food/Beverage Purchased from School Canteen (n(%))				
Cake. Cookie. Pastry	120 (56.1)	40 (59.7)	80 (54.4)	0.722[b]
Chocolate. Candy. Gummy	17 (7.9)	4 (6.0)	13 (8.8)	
Sandwich. Toast. Hamburger	67 (31.3)	19 (28.4)	48 (32.7)	
Juice	10 (4.7)	4 (6.0)	6 (4.1)	

BMI: Body Mass Index, p<0.05 significant level, a: Mann Whitney U test, b: Chi Square test

Table 3 presents the distribution of selected characteristics of the children according to their mindful eating. The mindless eating score of boys was significantly higher than that of girls (p< 0.05). Although awareness scores tended to decrease as BMI percentile increased, this difference was not statistically significant. As maternal BMI increased, children's mindless eating scores tended to rise. As maternal education level increased, children's mindless eating scores significantly decreased.

Table 3. Selected characteristics of the children according to mindful eating

Variables	**Mindless Eating Score (mean±SD)**	**p**	**Awareness Score (mean±SD)**	**p**
Girl (n:149)	13.52 ± 3.35	**0.003[a]**	12.06 ± 2.50	0.982[a]
Boy (n:249)	15.05 ± 4.27		12.05 ± 2.57	
Total	14.29 ± 3.91		12.06 ± 2.52	
BMI Percentile				
<15. (n:44)	14.77 ± 4.04	0.845[c]	12.39 ± 2.95	0.443[c]
15-84.9. (n:154)	14.23 ± 3.84		12.09 ± 2.39	
85-96.9. (n:59)	14.14 ± 3.95		12.10 ± 2.47	
≥97. (n:41)	14.20 ± 4.08		11.51 ± 2.65	
Waist Circumference				
< 90th percentile (n:256)	14.44 ± 3.90	0.139[a]	12.07 ± 2.52	0.960[a]
≥ 90th percentile (n:41)	13.46 ± 3.90		12.05 ± 2.63	
Maternal BMI				
Underweight/Normal (n:160)	14.21 ± 3.77	0.937[c]	11.84 ± 2.57	0.293[c]
Overweight (n:98)	14.35 ± 4.23		12.32 ± 2.56	

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Obese (n:40)	14.43 ± 3.73		12.28 ± 2.26	
Paternal BMI				
Underweight/Normal (n:129)	14.74 ± 3.98	0.200[c]	12.03 ± 2.48	0.900[c]
Overweight (n:130)	13.88 ± 3.73		12.12 ± 2.45	
Obese (n:39)	14.10 ± 4.21		11.92 ± 2.99	
Maternal Education				
Less than high school (n:82)	15.17 ± 4.18	**0.016[a]**	11.89 ± 2.59	0.484[a]
High school or above (n:216)	13.95 ± 3.76		12.12 ± 2.51	
Paternal Education				
Less than high school (n:33)	15.18 ± 4.17	0.163[a]	11.58 ± 2.66	0.247[a]
High school or above (n:265)	14.17 ± 3.87		12.12 ± 2.51	
Sleep Duration				
Less than 8 hours (n:8)	16.62 ± 4.07	0.086[a]	10.75 ± 2.31	0.139[a]
8 hours or more (n:290)	14.22 ± 3.89		12.09 ± 2.53	
Screen Time				
Less than 2 hours (n:168)	13.73 ± 3.77	**0.005[a]**	12.11 ± 2.57	0.665[a]
2 hours or more (n:130)	15.00 ± 3.99		11.98 ± 2.49	
School Canteen				
Available (n:264)	14.15 ± 3.81	0.102[a]	12.15 ± 2.47	0.094[a]
Not available (n:37)	15.27 ± 4.49		11.41 ± 2.89	
Bringing a Lunchbox to School				
Yes (n:112)	13.60 ± 3.45	**0.018[a]**	12.45 ± 2.55	**0.039[a]**
No (n:186)	14.70 ± 4.12		11.82 ± 2.50	

BMI: Body Mass Index, p<0.05 significant level, a: Mann Whitney U test, c: Kruskal Wallis test

Table 4 presents daily energy and nutrient intakes of children according to mindless eating and awareness quartiles and obesity status. Overall, energy and most nutrient intakes did not differ significantly between obese and non-obese children (p>0.05). Similarly, no statistically significant differences were observed in dietary intake across the lowest and highest quartiles of awareness scores according to obesity status (p>0.05). However, within the lowest quartile of the Mindless Eating Score (Q1), obese and non-obese children differed significantly in niacin and pyridoxine intakes (p<0.05).

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Table 4. Daily energy and nutrient intakes of children according to mindless eating and awareness quartiles and obesity status

Energy and Nutrient Components	Total		Mindless Eating Score Q1		Mindless Eating Score Q4		Awareness Score Q1		Awareness Score Q4	
	Obese (n:100)	Non-obese (n:198)	Obese (n:100)	Non-obese (n:198)	Obese (n:100)	Non-obese (n:198)	Obese (n:100)	Non-obese (n:198)	Obese (n:100)	Non-obese (n:198)
Energy (kcal)	1275.5±373.0	1238.8±327.9	1246.8±369.4	1385.5±364.1	1292.4±347.2	1226.9±237.1	1330.6±413.8	1202.6±318.7	1348.6±391.4	1240.1±293.4
CHO (%)	43.3±10.5	42.9±10.8	42.9±10.6	42.9±9.0	43.0±10.6	43.8±12.8	42.2±11.3	43.1±12.3	41.9±9.8	44.1±11.0
Protein (%)	16.7±4.7	17.5± 4.7	15.6±4.1	16.7±3.5	17.6±5.1	17.5±5.7	16.7±4.7	16.8±4.1	16.7±5.1	17.3±5.5
Fat (%)	39.8±9.9	39.3±10.8	41.6±10.2	40.2±9.4	39.1±9.9	38.5±13.8	41.2±11.6	39.9±11.5	41.3±7.7	38.3±10.4
Fiber (g)	12.5±5.8	12.3±5.0	12.5±7.1	13.5±6.4	12.2±4.4	13.7±4.6	11.7±5.4	11.9±4.6	14.3±7.2	13.7±5.8
Vit. A (µg)	710.0± 82.3	747.6±599.8	766.4±678.2	810.9±662.3	666.7±484.3	811.5±651.8	666.8±574.1	736.7±478.0	788.4±498.7	775.3±512.9
Thiamin (mg)	0.64±0.27	0.60±0.22	0.6±0.2	0.6±0.2	0.6±0.2	0.7±0.2	0.6±0.2	0.5±0.2	0.7±0.3	0.6±0.2
Riboflavin (mg)	1.07±0.45	0.99±0.38	1.0±0.4	1.0±0.3	1.11±0.4	1.0±0.4	1.0±0.4	0.9±0.3	1.1±0.4	0.9±0.3
Niacin (mg)	19.6±9.4	20.8±9.0	16.9±7.9*	21.9±7.4*	21.1±9.0	20.0±8.7	21.0±10.5	19.5±9.9	19.5±9.4	20.0±8.6
Pyridoxine (mg)	0.98±0.46	0.98±0.44	0.9±0.4*	1.1±0.4*	1.0±0.4	0.9±0.4	0.9±0.4	0.9±0.4	1.0±0.5	1.0±0.3
Folate (µg)	171.4±71.1	178.8±90.4	175.1±91.1	190.8±72.3	173.6±69.6	177.6±74.3	162.4±74.4	157.8±76.1	202.5±117.2	193.0±79.6
B_{12} (µg)	3.59±2.59	3.98±2.44	3.1±1.4	5.7±13.1	3.5±2.2	3.2±2.1	4.7±6.5	5.4±13.1	3.1±1.5	2.8±1.4
Vitamin C (mg)	77.8±57.5	84.2±57.4	78.4±64.4	102.3±65.8	80.9±58.9	89.3±62.2	73.3±58.1	64.8±47.6	86.4±58.7	96.1±64.7
Vitamin E (mg)	9.8±5.4	9.7± 5.4	10.2±5.9	10.9±4.1	9.5±5.4	9.6±7.5	8.8±5.5	8.7±6.6	11.5±6.0	10.6±4.5
Sodium (mg)	2373.1±278.2	2298.0±247.0	2070.3±918.6	2396.1±1552.7	2472.8±1346.6	2188.3±672.8	2501.3±1409.6	1962.9±986.2	2536.6±1153.4	2783.3±1615.6
Potassium (mg)	1760.5±706.5	1784.5±628.2	1723.4±778.7	1986.3±671.9	1740.1±560.5	1845.4±623.7	1669.4±621.8	1636.8±583.9	1935.9±921.2	1872.5±555.2
Calcium (mg)	555.8± 641.7	518.7±225.5	523.5±253.4	552.1±192.0	508.2±230.3	514.0±234.7	471.0±206.3	465.3±226.3	568.6±262.1	511.5±183.1
Magnesium (mg)	183.2± 70.22	189.2±68.9	184.7±84.2	207.8±69.6	180.0±59.4	204.7±76.3	179.1±66.7	188.5±76.3	204.5±86.0	189.5±57.9
Phosphorus (mg)	791.6±284.3	788.0±250.4	766.1±296.8	817.0±249.2	840.7±259.4	812.6±243.3	788.8±274.9	742.5±256.0	820.2±320.4	805.3±188.9
Iron (mg)	6.9±2.9	6.7±2.32	6.5±3.1	6.9±2.2	6.9±2.7	7.3±2.3	6.9±3.1	6.6±2.4	7.6±3.2	7.1±2.2
Zinc(mg)	7.04±2.6	7.01±2.4	6.8±2.4	7.2±2.2	7.1±2.3	7.4±2.5	7.3±2.6	6.8±2.3	7.5±2.8	6.7±1.8

*CHO: Carbohydrate, *: $p<0.05$, variables are presented as mean ± standard deviation (X̄±SD) values. All pairwise comparisons were performed using the Mann–Whitney U test.*

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Discussion

This study aimed to evaluate obesity status in relation to mindful eating and dietary intake among primary school children in Kütahya.

According to the World Obesity Atlas, the prevalence of obesity in the 10-19 age group in Türkiye is projected to reach 17% by 2030[8,25]. National cross-sectional studies and screening programs indicate that the prevalence of overweight among children aged 7-14 ranges from 12.5% to 19.6%, while obesity rates vary between 10.5% and 28.4%[3-7]. In this study, the prevalence of overweight was 19.7%, and obesity was 13.7%. Bozkurt et al. reported that the prevalence of overweight and obesity was 45.6% among children with a mean age of 10.0 ± 0.73 years in Erzurum[26]. In 2022, the WHO reported the global obesity prevalence among children aged 5–19 as 19% in girls and 21% in boys, noting similar increases in both sexes over the past 30 years[8]. In Türkiye, this increase has been reported as 5.8-fold in girls and 24.5-fold in boys[27]. Similarly, in our study, the prevalence of obesity was significantly higher in boys (39.5%) compared to girls (27.5%). Metinoğlu found no association between sex and BMI (28). According to a review of cross-sectional studies from 21 European countries participating in the COSI study, the prevalence of severe obesity was higher in boys than in girls aged 6-9 years[28]. Although national and international studies report varying results regarding obesity prevalence by sex, overweight and obesity appear to be more common in preadolescent boys than in girls[29,30]. This may be attributed to obesogenic factors such as dietary habits, peer influence, longer screen time, and family attitudes, as well as certain genetic determinants.

According to a meta-analysis of 23 studies examining the relationship between parental and childhood obesity, children with overweight or obese parents were 1.97 times more likely to be overweight or obese compared to those with parents of a healthy weight[31]. A positive correlation between the BMI of children aged 6-10 and their parents was reported in a study conducted in Samsun[32]. Consistently, in our study, the prevalence of overweight (38.0%) and obesity (18.0%) was significantly higher among the mothers of obese children compared to those of non-obese children. Some studies have reported a positive association between childhood obesity and paternal BMI[33,34]. In this study, no significant difference was found in the BMI of fathers between obese and non-obese children. However, as paternal education level increased, the prevalence of obesity among children significantly decreased. Similarly, children of fathers with low education levels in European countries have been reported to be 2.16 times more likely to be obese[35]. In Japan, low educational attainment of both parents was found to be associated with overweight and obesity in children[36]. In this study, the decrease in childhood obesity with higher paternal education levels may be attributed to increased nutrition and health knowledge within the family, which in turn may influence healthier food choices.

Recently, mindful eating interventions have been designed and implemented to improve eating behaviors and promote healthy dietary habits among children[15,23]. According to a systematic review and meta-analysis, the ages of 10 to 12 are considered an optimal period for positive development through mindfulness interventions. Therefore, it is

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recommended that programs targeting both emotional regulation and awareness be developed for this age group[16]. For example, in a randomized controlled trial by Bennett et al., a mindful eating intervention applied to children aged 10-12 was found to have potential effects in encouraging them to try new foods[37]. Only a limited number of studies have examined whether mindful eating differs according to excess weight status in children and adolescents. A study conducted among adolescents in Türkiye reported that those with obesity had lower mindfulness[38]. Bozkurt et al. found that children who were overweight or obese had higher mindless eating scores and lower awareness scores compared to those with a normal BMI[26]. In our study, although awareness scores tended to decrease as BMI percentile increased among children, this difference was not statistically significant. This finding may be due to regional, sociocultural, and socioeconomic differences, as well as the importance families place on nutrition. Our observations indicate that mindless eating scores differed by sex; boys had significantly higher scores than girls. A study conducted in Türkiye with a similar age group also found that girls had higher mindful eating scores than boys[26].This difference may be explained by girls being more conscious about their eating habits due to concerns related to body image[39,40].

One of the primary recommendations for preventing childhood obesity is limiting screen time. Increased screen time in children and adolescents has been associated with a higher risk of obesity[41]. In our study, no significant difference was found between children's obesity status and screen time. However, when analyzed in relation to mindful eating, children with screen time of two hours or more had significantly higher mindless eating scores. In a previous study conducted in Bursa among children aged 9–12, high screen time was associated with lower levels of awareness, although it was not linked to mindful eating[13]. He et al. also stated that increased screen time in children was associated with low mindfulness[42]. Furthermore, it is known that increased screen time leads to higher snacking and disruption of hunger and satiety signals[41,42].

Parental education level is known to have a positive impact on a child's adoption of healthy eating behaviors[43]. According to Dos Santos Leal et al., maternal education level is a more decisive factor than paternal education level in increasing children's fruit and vegetable consumption and decreasing their intake of energy-dense foods[43]. In this study, children of mothers with a high school education or higher had significantly lower mindless eating scores. However, no significant differences were observed in children's awareness scores based on paternal education level. Studies examining the relationship between parental education level and mindful eating among high school students have found no significant differences in children's mindful eating based on mothers' or fathers' education levels[39,40]. In our study, given the relatively young age of the participants, it is likely that their eating behaviors are still strongly influenced by their mothers. This could explain why children with more highly educated mothers had higher mindful eating scores.

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Conclusion

According to our findings, although obesity rates were higher among boys, the overall prevalence was high across the entire population. A child's likelihood of being obese increased with maternal obesity and lower paternal education levels. Mindless eating scores were higher among boys, children whose mothers had lower education levels, and those with longer screen time. Children's dietary intake did not vary according to their mindless eating, awareness or obesity status. Integrating mindful eating practices into school-based nutrition education programs and ensuring parental involvement can help all family members develop healthy eating habits. Thus, by ensuring child–family–school collaboration, mindful eating in children can be enhanced and public health can be improved.

Limitations

Since this study was designed as a cross-sectional study, causal relationships cannot be established. Furthermore, a convenience sampling method was used. Since participation was voluntary and the sample was formed through social media and personal networks, it is unclear whether the sample fully represents the characteristics of the general population, which limits the generalizability of the findings. Another limitation of this study is that the 24-hour dietary recall may not reflect the children's routine daily dietary intake.

Conflict of Interest

There is no conflict of interest regarding the article.

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Ethical Approval

Ethical approval for the study was obtained from the Non-Interventional Clinical Research Ethics Committee of Kütahya University of Health Sciences (Decision No: 2025/06-53, Date: 06/05/2025). All participants provided informed consent, aligning with the Helsinki Declaration's principles.

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