ISSN (electrónico): 1699-5198 - ISSN (papel): 0212-1611 - CODEN NUHOEQ S.V.R. 318

ARÁN

Nutrición Hospitalaria

Trabajo Original

Pediatría

Assessment of mindfulness in addressing emotional eating and perceived stress among children aged 9-11 years

Evaluación de la atención plena (mindfulness) *para abordar la alimentación emocional y el estrés percibido en niños de 9 a 11 años*

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Abstract

Introduction: there is a paucity of studies in the literature examining the relationship between children, mindfulness and diet. In this context, this study was designed to assess emotional eating and perceived stressful situations with mindfulness in children.

Methods: this study was conducted with the participation of 349 children (128 boys, 221 girls) aged 9-11 living in the Karabük province. The study collected data on the participants' sociodemographic information, anthropometric measurements, number of main meals and snacks consumed per day, meal-skipping status, reasons for skipping meals, dietary motivations, and their scores on the Mindfulness Scale for Children (BAU-MSC), the Emotional Eating Scale for Children and Adolescents (EES-C), and the Perceived Stress Scale in Children (8-11 years) (PSS-C).

Results: 58.17 % of the participants had 2 main meals, 30.2 % had 3 or more main meals; 37.5 % consumed 1 snack, 31.5 % consumed 2 snacks. A positive, weakly statistically significant relationship was detected between age and body weight and height. A positive, weakly statistically significant relationship was detected between age and EES-C, anxiety-anger-disappointment subscales and PSS-C scores ($r = 0.161$; $r = 0.178$; $r = 0.250$; $p = 0.003$; $p = 0.001$; $p = 0.000$).

Conclusion: future studies with larger samples are needed to better understand the relationship between mindfulness and emotional eating and perceived stress situations in children.

Keywords:

Mindfulness. Obesity. Emotional eating. Children. Adolescents.

Received: 16/03/2024 • Accepted: 01/11/2024

Informed consent: all participants included in the study were informed and their consent was obtained before filling out the survey.

Acknowledgements: we thank all participants.

Authors´ contributions: HDG: literature search, screening and data data extraction, data analysis, data analysis, interpretation of results and drafting an article. PG: literature review, screening and data extraction, data analysis analysing and drafting an article.

Data availability: the data used to derive the findings in this study are available from the corresponding author upon reasonable request.

Ethical approval: ethical approval (Decision No: 177) was obtained from the Ankara Medipol University Non-Interventional Ethics Committee on December 25, 2023, and necessary permissions were obtained from the Provincial Directorate of National Education. The participation of each child and their family in the research was voluntary.

Informed consent: participants were fully informed about the research prior to its commencement and provided their consent by signing the Informed Consent Form. The study strictly adhered to the principles of the Declaration of Helsinki.

Conflicts of interest: there is no conflict of interest between the authors of the study.

Artificial intelligence: the authors declare not to have used artificial intelligence (AI) or any AI-assisted technologies in the elaboration of the article.

Doğan Güney H, Göbel P. Assessment of mindfulness in addressing emotional eating and perceived stress among children aged 9-11 years. Nutr Hosp 2025;42(1):10-18

DOI: http://dx.doi.org/10.20960/nh.05222

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Resumen

Introducción: hay escasez de estudios en la literatura que examinen la relación entre los niños, la atención plena y la dieta. En este contexto, este estudio fue diseñado para evaluar la alimentación emocional y las situaciones estresantes percibidas con la atención plena en los niños.

Métodos: este estudio se realizó con la participación de 349 niños (128 niños, 221 niñas) de entre 9 y 11 años que vivían en la provincia de Karabük (Turquía). El estudio recopiló datos sobre la información sociodemográfica de los participantes, medidas antropométricas, número de comidas principales y refrigerios consumidos por día, estado de omisión de comidas, motivos para omitir comidas, motivaciones dietéticas y sus puntuaciones en la Escala de Atención Plena para Niños (BAU-MSC), la Escala de Alimentación Emocional para Niños y Adolescentes (EES-C) y la Escala de Estrés Percibido en Niños (8-11 años) (PSS-C).

Resultados: el 58,17 % de los participantes realizaban 2 comidas principales, el 30,2 % realizaban 3 o más comidas principales; el 37,5 % consumían 1 snack, el 31,5 % consumían 2 snacks. Se detectó una relación positiva, débilmente significativa desde el punto de vista estadístico, entre la edad y el peso corporal y la altura. Se detectó una relación positiva, estadísticamente débilmente significativa, entre la edad y las subescalas de EES-C de ansiedad-ira-decepción y las puntuaciones de PSS-C ($r = 0,161$; $r = 0,178$; $r = 0,250$; $p = 0,003$; $p = 0,001$; $p = 0,000$).

Conclusión: se necesitan estudios futuros con muestras más grandes para comprender mejor la relación entre la atención plena y la alimentación emocional y las situaciones de estrés percibidas en los niños.

Palabras clave:

Mindfulness. Obesidad. Alimentación emocional. Niños. Adolescentes.

INTRODUCTION

The period of transition from childhood to adolescence is a critical stage in the life course, marked by physical, cognitive, and emotional growth and a readiness to adapt and reshape one's social environment. However, prioritizing research in this area is essential to ensure optimal developmental outcomes, as this period remains understudied regarding growth and nutrition interventions and policies (1,2). Recent studies indicate that dietary interventions alone may not lead to lasting weight management, especially given the increasing prevalence of obesity and associated health risks (3,4). Instead, psychological approaches are recommended alongside dietary interventions to prevent or mitigate obesity (4,5).

Research confirms that behavioral strategies, particularly those enhancing satiety awareness, improve eating habits (6,7). Mindfulness, in particular, is well-supported in adult studies for its positive impacts on psychological well-being, self-compassion, concentration, and mental clarity (8,9). Mindfulness in children has also shown effectiveness in enhancing mental and physical health by reducing test anxiety, improving concentration, fostering social-emotional development, and aiding in managing eating disorders (9,10).

Mindfulness-based interventions are a scientifically supported, safe, and cost-effective approach to managing stress, as chronic stress has been found to increase unconscious eating habits and energy-dense food consumption (11,12). In children, stress can manifest in emotional eating, binge eating, external eating, and mindless eating, which are often coping mechanisms. These behaviors share adaptive characteristics but, if left unaddressed, can lead to serious consequences. Thus, strategies to reduce stress in children are essential (5,8).

As adolescents begin to experience physical changes and an increased interest in diet, non-diet health approaches are gaining attention, particularly those that avoid focusing solely on weight loss (6,11). Through mindfulness, individuals can develop mindful eating practices, engaging fully in the eating experience without judgment, which research supports as promoting healthy eating habits, stress reduction, and self-compassion (7,10). Mindfulness encourages a positive relationship with food, fostering body acceptance and enhancing awareness of hunger and fullness cues. However, research on mindfulness, nutrition, and stress in children remains limited, and this study aims to examine the relationship between emotional eating and perceived stress in children, with mindfulness as a mediating factor.

METHODS

RESEARCH PLACE, TIME AND SAMPLE SELECTION

The study included 328 children. The sample was carefully selected to ensure accurate representation of the population. The survey questions collected a comprehensive range of data, including participants' sociodemographic information, anthropometric measurements, general health status, eating habits, number of main meals and snacks consumed daily, meal skipping status, reasons for skipping meals, and dietary motivations. The questionnaire also included the BAU Mindfulness Scale for Children (BAU-MSC), the Emotional Eating Scale for Children and Adolescents (EES-C), and the Perceived Stress Scale in Children (8-11 years) (PSS-C). The survey was administered in person and took approximately 15 minutes to complete.

ANTHROPOMETRIC MEASUREMENTS

Body weight was measured using a calibrated precision scale sensitive to 0.5 kg, and height was measured on the Frankfort plane with feet side by side, following the method described by Lohman et al. (13). BMI for age was evaluated according to the World Health Organization (WHO) *z*-score cut-off points, as outlined by de Onis et al. (14). Body mass index for age was evaluated using the World Health Organization cut-off points (< -3 SD, < -2 SD, > 1 SD, > 2 SD, > 3 SD) as of 2018.

MINDFULNESS SCALE FOR CHILDREN (BAU-MSC)

The items of the scale designed to create a mindfulness measure based on the fundamental elements of the concept, relying

on Kabat-Zinn's (1994) definitions of mindfulness, were inspired by various sources such as publications on mindfulness and previously cited definitions of mindfulness (15,16). The Mindfulness Components Questionnaire was developed by Mellor and colleagues (17). The BAU-MSC applies this principle and is designed as a 3-point Likert scale (1 = never, 2 = sometimes, and 3 = always). All items in the study are understandable practices for children without mindfulness or meditation experience. High scores indicate high mindfulness. The 3-point Likert scale is claimed to be developmentally appropriate and reliable for children (17). The BAU-MSC applies this principle and is designed as a 3-point Likert scale (1 = never, 2 = sometimes, and 3 = always), making all items accessible to children without prior mindfulness experience.

EMOTIONAL EATING SCALE FOR CHILDREN AND ADOLESCENTS (EES-C)

The Emotional Eating Scale for Children and Adolescents is a highly effective tool for evaluating emotional eating in children and adolescents aged 10-18 (18). The scale consists of 26 items, with the happiness item excluded from scoring. The restless mood subscale is composed of items 1, 2, 3, 4, 15, and 25, while the depressive symptoms subscale includes items 5, 6, 12, 16, 18, 19, and 26. The anxiety-anger-disappointment sub-dimension is represented by items 7, 8, 9, 10, 11, 13, 14, 17, 20, 21, 22, 23, and 24. The scale yields a minimum of 25 and a maximum of 125 points, with evidence indicating that higher scores correlate with increased emotional eating in response to negative mood (19).

PERCEIVED STRESS SCALE IN CHILDREN (8-11 YEARS) (PSS-C)

White et al. (2014) developed a 9-item scale for evaluating stress levels in children (20). Each child is asked to rate the appropriateness of each item for the past week using a 4-point Likert scale (never = 1, sometimes = 2, often = 3, always = 4). Higher scores indicate higher stress levels. The scale yields a minimum of 9 and a maximum of 36 points, with no reverse-coded items. The original scale reports an internal consistency reliability coefficient of 0.76, as measured by Cronbach's alpha, and a test-retest correlation of 0.79 (20).

ANALYSIS OF DATA

Statistical analyses were conducted using the SPSS 23.0 software package (IBM SPSS Statistics). The findings were interpreted using frequency tables and descriptive statistics. Parametric methods were used for measurement values that were normally distributed. Independent two-sample t-test was applied when there were two groups, and one-way analysis of variance (ANOVA) was applied when there were more than two groups. Homogeneity of variances was assessed using Levene's test statistic. Multiple comparison tests were conducted on data that met the homogeneity of variances condition. For comparisons of three groups, LSD tests were used, while Bonferroni tests were used for comparisons of more than three groups. Tukey tests were used for comparisons of groups with equal sample sizes. Pearson correlation analysis was employed to investigate the relationship between measurement values. The correlation coefficients can be interpreted as follows: $r = 0$ indicates no relationship, $r =$ 0.01-0.29 indicates a weak relationship, $r =$ 0.3-0.7 indicates a moderate correlation, $r =$ 0.71-0.99 indicates a high level of correlation, and $r = 1$ indicates an excellent relationship level. The analysis results were interpreted using a 95 % confidence level and a 0.05 significance level for comparison tests, and 0.05 and 0.01 significance values at 95 % and 99 % confidence levels for correlation tests.

RESULTS

Table I displays the demographic characteristics of the students and the distribution of their general health status. The data shows that out of 349 students, 128 (36.68 %) were male, 221 (63.32 %) were female, and 74.5 % were in the 6th grade. The students' average age was 10.6 ± 1.32 years, with girls at 10.7 ± 1.12 years and boys at 10.6 ± 1.21 years. The average weight was 47.1 ± 12.92 kg for girls and 44.8 ± 10.13 kg for boys, with a total of 45.6 ± 11.23 kg. The average height for all students was calculated to be 154.1 ± 10.10 cm, with girls at 154.1 ± 11.02 cm and boys at 154.1 ± 9.53 cm (Table I). BMI *z*-score lower value is 12.55 and upper value is 29.30; the lower BMI *z*-score value of boys was found to be 12.96 and the upper value was 26.26.

In all, 58.17 % of the participants had two main meals, while 30.2 % had three or more. Additionally, 37.5 % reported consuming one snack, and 31.5 % reported consuming two. In terms of meal locations, 68.77 % reported eating breakfast at home, 50.4 % reported eating lunch in the school canteen, and 69.6 % reported eating dinner at home (Table II).

Descriptive findings consisting of students' answers to the measurement tools are given (Table III).

Table IV presents the participants' scores on BAU-MSC, EES-C, and PSS-C, including their subscales, as well as the analysis results regarding gender, BMI class, family history of obesity problems, chronic disease diagnosed by a doctor, and regular medication intake. The results indicate a statistically significant difference in the scores of all sub-dimensions of EES-C based on gender (t = -3.488; 2.135; 4.773; 2.651, $p < 0.05$). Statistically significant differences were found in terms of body mass index groups and all scale scores (F = 4.045; 4.708; 4.359; 4.646; 2.866; 3.125, $p < 0.05$). A statistically significant difference was found only in terms of the availability of regular medication and the EES-C/restless mood subscale scores (t = -2.948, $p < 0.05$) (Table IV).

Table I. Distribution of individuals' demographic characteristics and general health conditions

	Girl (*n* = 221)		Boy (*n* = 128)		Total (*n* = 349)		Analysis	*p*
	$\bar{X}$ ± SS		$\bar{X}$ ± SS		$\bar{X}$ ± SS			
Age (years)	10.6 ± 1.32		10.7 ± 1.12		10.6 ± 1.21		-1.373	0.171
Body weight (kg)	47.1 ± 12.92		44.8 ± 10.13		45.6 ± 11.23		1.846	0.066
Height (cm)	154.1 ± 11.02		154.1 ± 9.53		154.12 ± 10.10		0.008	0.993
	n	%	*n*	%	*n*	%		
Mother's educational status							10.35	*0.035*
Primary school	29	22.7	40	18.1	69	19.77		
Middle school	21	16.4	33	14.9	54	15.47		
High school	36	28.1	89	40.3	125	35.82		
College or university	42	32.8	59	26.7	101	28.94		
Father's educational status							9.166	0.057
İlliterate	4	3.1	0	0.0	4	1.15		
Primary school	11th	8.6	17	7.7	28	8.02		
Middle school	25	19.5	43	19.5	68	19.48		
High school	36	28.1	81	36.7	117	33.52		
College or university	52	40.6	80	36.2	132	37.82		
Presence of obesity							21.525	*0.000*
None	94	73.4	196	88.7	290	83.09		
For the last 1 year	13	10.2	14	6.3	27	7.74		
For the last 2-3 years	17	13.3	4	1.8	21	6.02		
Since childhood	4	3.1	7	3.2	11	3.15		
Presence of obesity problem in the family							0.494	0.482
Yes	13	10.2	28	12.7	41	11.75		
No	115	89.8	193	87.3	308	88.25		
Presence of chronic disease							0.128	0.720
Yes	14	10.9	27	12.2	41	11.75		
No	114	89.1	194	87.8	308	88.25		
Regular medication use							0.156	0.693
Yes	12	9.4	18	8.1	30	8.60		
No	116	90.6	203	91.9	319	91.40		
Daily TV viewing time							17.315	*0.001*
None	28	21.9	64	29.0	92	26.36		
1-2 hours per day	85	66.4	111	50.2	196	56.16		
3-4 hours a day	6	4.7	38	17.2	44	12.61		
More than 5 hours a day	9	7.0	8	3.6	17	4.87		
Food consumption during internet/TV use							0.708	0.400
Yes	97	75.8	176	79.6	273	78.22		
No	31	24.2	45	20.4	76	21.78		
Preferred types of food							5.799	0.326
Biscuits, wafers, chocolate	40	31.3	78	35.3	118	33.81		
Cake, pastry	10	7.8	10	4.5	20	5.73		
Store-bought juices or sodas	3	2.3	4	1.8	7	2.01		
Fruit	35	27.3	72	32.6	107	30.66		
Toast, sandwich	12	9.4	10	4.5	22	6.30		
All	28	21.9	47	21.3	75	21.49		

Table II. Distribution of individuals' general eating habits

	Girl (*n* = 221)		Boy (*n* = 128)		Total (*n* = 349)		Analysis	*p*
	n	%	*n*	%	*n*	%		
Number of main meals								
1	10	7.8	30	13.6	40	11.4	3.766	0.288
2	81	63.3	122	55.2	203	58.1		
3 and above	37	28.9	69	31.2	106	30.2		
Number of snacks								
None	8	6.3	33	14.9	41	11.7		
1	43	33.6	88	39.8	131	37.5	18.705	*0.002*
2	52	40.6	58	26.2	110	31.5		
3 and above	25	19.5	42	19	67	19.1		
Who had breakfast with								
Eaten with family	89	69.5	177	80.1	266	76.2	6.874	*0.032*
Eaten with a friend/friends	13	10.2	9	4.1	22	6.3		
Eaten alone	26	20.3	35	15.8	61	17.4		
Who is lunch eaten with								
Eaten with family	19	14.8	30	13.6	49	14.0	10.339	*0.006*
Eaten with a friend/friends	80	62.5	168	76.0	248	71.0		
I eat alone	29	22.7	23	10.4	52	14.9		
Who is dinner eaten with								
Eaten with family	89	69.5	178	80.5	267	76.5	20.446	*0.000*
Eaten with a friend/friends	25	19.5	10	4.5	35	10.0		
Eaten alone	14	10.9	33	14.9	47	13.4		

Table III. Descriptive findings in measurement tools

Variable (*n* = 349)	Cover.	SD	Min.	Max.
Mindfulness Scale for Children (BAU-MSC)	26.99	3.05	15.00	33.00
Emotional Eating Scale for Children and Adolescents (EES-C)	50.74	14.28	25.00	89.00
EES-C/Anxiety-Anger-Disappointment Sub-Dimension	24.66	8.19	13.00	53.00
EES-C/Restless Mood Sub-Dimension	9.97	3.36	5.00	20.00
EES-C/Depressive Symptoms Subscale	13.78	4.74	6.00	26.00
Perceived Stress Scale in Children (8-11 years) (PSS-C)	29.38	5.54	11.00	43.00

Table V examines the relationship between participants' scores on BAU-MSC, EES-C, PSS-C, and their subscales, and the variables of age, body weight, and height. Additionally, a moderately statistically significant positive relationship was found between body weight and height ($r = 0.618$; $p = 0.000$). A weak but statistically significant positive correlation was observed between height and the anxiety-anger-disappointment sub-dimensions of the EES-C, as well as the EES-C scores ($r = 0.124$; $r = 0.152$; $r = 0.180$; $p = 0.021$; $p = 0.004$; $p = 0.001$) (Table V).

Table IV. Analysis of the scores of BAU-MSC, PBB-C, EES-C and its sub-dimensions and some demographic information

Variable		*n*	BAU-MSC Score		PSS-C Score		Emotional Eating Scale for Children and Adolescents (EES-C)							
							EES-C Score		EES-C (Anxiety-anger-disappointment subscale)		EES-C (Restless mood subscale)		EES-C (Depressive symptoms subdimension)	
			$\bar{X}$ ± SD	Min-Max	$\bar{X}$ ± SD	Min-Max	$\bar{X}$ ± SD	Min-Max	$\bar{X}$ ± SD	Min-Max	$\bar{X}$ ± SD	Min-Max	$\bar{X}$ ± SD	Min-Max
Gender	Boy	128	26.7 ± 3.38	15-33	28.7 ± 5.02	15-40	54.2 ± 15.07	25-89	25.9 ± 8.44	13-47	11.0 ± 3.39	5-20	14.6 ± 4.87	6-26
	Girl	221	27.1 ± 2.83	20-33	29.7 ± 5.80	11-43	48.6 ± 13.41	25-84	23.9 ± 7.97	13-53	9.3 ± 3.17	5-18	13.2 ± 4.59	6-26
Statistical analysis			t = -1.333		t = -1.671		t = 3.488		t = 2.135		t = 4.773		t = 2.651	
Possibility			*p* = 0.183		*p* = 0.096		*p* = 0.001		*p* = 0.034		*p* = 0.000		*p* = 0.009	
BMI-*z* Score	-3	8	28.7 ± 1.75	26-30	22.7 ± 7.65	11-29	34.0 ± 10.34	25-48	16.7 ± 4.43	13-23	7.0 ± 2.27	5-10	9.0 ± 3.30	6-13
	-2	19	28.6 ± 2.36	25-32	27.0 ± 5.60	14-34	49.3 ± 6.92	40-61	24.1 ± 5.26	19-36	8.8 ± 2.38	6-13	14.6 ± 5.61	8-23
	0	137	27.3 ± 3.11	20-33	30.1 ± 4.50	16-39	52.6 ± 13.59	25-84	25.3 ± 7.26	13-43	10.4 ± 3.40	5-20	14.3 ± 4.57	6-26
	1	61	26.4 ± ±3.24	15-31	30.4 ± 4.31	19-38	53.5 ± 17.03	25-89	27.5 ± 10.90	13-53	10.2 ± 3.48	5-17	13.3 ± ±5.16	6-26
	2	85	26.8 ± 2.48	22-30	28.4 ± 6.77	15-43	49.7 ± 14.91	25-80	23.6 ± ±8.18	13-43	9.9 ± 3.52	5-17	14.1 ± 4.55	6-21
	3	39	25.7 ± 3.49	20-33	29.4 ± 5.85	18-40	45.9 ± 10.16	31-73	21.7 ± 5.86	13-41	9.1 ± 2.78	6-17	12.3 ± 4.15	6-21
Statistical analysis			F = 4.045		F = 4.708		F = 4.359		F = 4.646		F = 2.866		F = 3.125	
Possibility			*p* = 0.001 (-2;3) (0;3)		*p* = 0.000 (-3;0.1.3)		*p* = 0.001 (-3;0.1.2)		*p* = 0.000 (-3;0.1)		*p* = 0.015		*p* = 0.009 (-3;0)	
Obesity status in the family	Yes	41	26.1 ± 2.66	20-33	29.2 ± 5.73	18-40	47.5 ± 14.27	26-76	22.9 ± 7.54	13-39	9.3 ± 2.93	5-17	12.8 ± 4.88	6-21
	No	308	27.1 ± 3.08	15-33	29.4 ± 5.52	11-43	51.1 ± 14.25	25-89	24.8 ± 8.26	13-53	10.0 ± 3.41	5-20	13.9 ± 4.71	6-26
Statistical analysis			t = -1.891		t = -0.202		t = -1.530		t = -1.421		t = -1.285		t = -1.302	
Possibility			*p* = 0.059		*p* = 0.840		*p* = 0.127		*p* = 0.156		*p* = 0.199		*p* = 0.194	
Chronic disease condition	Yes	41	27.0 ± 3.70	20-33	30.2 ± 4.17	23-38	50.1 ± 16.27	25-89	24.3 ± 8.91	13-43	9.1 ± 3.33	5-15	14.2 ± 4.73	6-22
	No	308	26.9 ± 2.96	15-33	29.2 ± 5.69	11-43	50.8 ± 14.02	25-89	24.7 ± 8.11	13-53	10.0 ± 3.35	5-20	13.7 ± 4.74	6-26
Statistical analysis			t = -0.022		t = 1.118		t = -0.305		t = -0.282		t = -1.735		t = 0.699	
Possibility			*p* = 0.983		*p* = 0.264		*p* = 0.761		*p* = 0.778		*p* = 0.084		*p* = 0.485	
Regular medication use	Yes	30	27.0 ± 3.26	20-30	28.6 ± 5.39	18-37	48.0 ± 12.81	26-68	23.7±7.73	14-36	8.2 ± 2.50	5-13	13.5 ± 4.67	6-22
	No	319	26.9 ± 3.03	15-33	29.4 ± 5.56	11-43	50.9 ± 14.40	25-89	24.7 ± 8.24	13-53	10.1 ± 3.39	5-20	13.8 ± 4.75	6-26
Statistical analysis			t = 0.022		t = -0.810		t = -1.071		t = -0.645		t = -2.945		t = -0.301	
Possibility			*p* = 0.983		*p* = 0.418		*p* = 0.285		*p* = 0.519	*p* = 0.003			*p* = 0.764	

*$p < 0.05$. $\bar{X}$: mean; SD: standard deviation. *Parametric methods were used for measurement values that comply with normal distribution. In accordance with parametric methods, "Independent Sample-t" test (t-table value) is used to compare the measurement values of two independent groups; "ANOVA" test (F-table value) method was used to compare three or more independent groups. LSD and Bonferroni correction were applied for pairwise comparisons of variables with significant differences for three or more groups.*

Table V. The relationship between the scores of BAU-MSC, PSS-C, EES-C and its sub-dimensions and the variables of age, body weight and height

Correlation (n = 349)		Body weight (kg)	Height length (cm)	BAU-MSC	EES-C	EES-C (Anxiety-anger-disappointment)	EES-C (Restless emotional state)	EES-C (Depressive symptoms)	PSS-C
Age (year)	*r*	0.201	0.378	-0.150	0.161	0.178	0.103	0.093	0.250
	p	*0.000*	*0.000*	*0.005*	*0.003*	*0.001*	0.055	0.081	*0.000*
Body weight (kg)	*r*	1	0.618	-0.090	0.007	0.011	0.021	-0.022	0.131
	p		*0.000*	0.093	0.894	0.842	0.692	0.677	*0.014*
Height length (cm)	*r*	0.618	1	0.087	0.124	0.152	0.083	0.047	0.180
	p	*0.000*		0.105	*0.021*	*0.004*	0.124	0.384	*0.001*

DISCUSSION

This study offers comprehensive insights into the factors influencing emotional eating, mindfulness, and the impact of media usage on eating behaviors among children and adolescents. Emotional eating has been well-documented as a strategy to cope with stress, with high EES-C scores often indicating increased food intake as a response to emotional distress (18). Numerous studies have found that emotional eating is more prevalent among females, potentially due to greater emotional sensitivity and societal pressures related to body image and eating habits (21,22). However, our findings show that boys scored higher across all EES-C sub-dimensions, challenging traditional understandings and suggesting that age and other sociodemographic factors may play a significant role. Geliebter & Aversa (2003) have noted similar age-related variances in emotional eating patterns, highlighting the complex interplay between developmental stage and eating behavior (23).

Additionally, the relationship between BMI and emotional eating remains intricate. In previous studies, emotional eating scores often correlate positively with higher BMI values (19,24), suggesting that individuals prone to emotional eating may consume more calorie-dense foods, leading to weight gain over time. However, in this study, children with normal BMI-*z* scores demonstrated higher emotional eating tendencies than their obese peers. This deviation could be attributed to psychological factors that influence emotional eating independently of BMI or body composition, such as social support and coping strategies, which have been identified as potential mediators (25). Bryant et al. (2007) also argue that external influences, including family dynamics and stress management resources, can shape eating behaviors in ways that are not always reflected in BMI (26).

Mindfulness as a tool for emotional regulation has gained considerable attention, particularly for its application in managing emotional eating. The high BAU-MSC scores observed in this study suggest that children who practice mindfulness may have greater self-awareness and control over their emotional responses, reducing their reliance on food as a coping mechanism. Mindfulness-based interventions, such as those discussed by Kristeller & Wolever (2010) and Katterman et al. (2014), have shown significant promise in reducing binge eating and emotional eating in both adolescents and adults, with benefits extending to improved emotional resilience and self-regulation (27,28). Kumar et al. (2017) found that adolescents participating in a mindful eating program experienced reductions in BMI and emotional eating after structured sessions, supporting the view that mindfulness can serve as a protective factor against emotional dysregulation (29).

The integration of mindfulness into school curriculums provides a promising avenue for promoting healthier emotional and eating behaviors. Embedding mindfulness practices in classroom settings, as demonstrated by Bockmann et al. (2016), can enhance executive functioning, attention, and emotional regulation, which are crucial for developing resilience to stressors (30). The results from this study align with the findings of Kabat-Zinn (1994), who highlighted that mindfulness practice enhances the ability to navigate emotional experiences without resorting to maladaptive coping strategies (15). Given that mindfulness programs can be adapted for different age groups and educational settings, expanding these interventions to more schools could be beneficial in fostering healthier lifestyle choices and psychological well-being in children.

Media and technology use is another critical factor influencing eating behaviors, with increasing screen time being linked to higher consumption of calorie-dense snacks (31,32). The findings in table II reflect that a large proportion of children frequently consume packaged snacks such as biscuits and chocolate while engaged in screen-based activities. Media exposure, particularly advertising, has been shown to influence children's preferences for unhealthy foods, contributing to unhealthy snacking habits and, potentially, long-term health risks like obesity (33). Robinson et al. (2017) emphasize that the combination of media exposure and snacking disrupts regular eating patterns and could interfere with the development of mindful eating habits, particularly among younger children who may have limited awareness of advertising influence (32).

The limitations of this study, including its cross-sectional design and relatively small sample size, must be acknowledged. As

this study captures a snapshot of emotional eating, mindfulness, and media usage at a single point in time, it does not allow for causal inferences. Expanding future research to include longitudinal methods would provide a more in-depth understanding of how these behaviors evolve over time. Larger sample sizes and diverse demographic groups would also improve generalizability, as indicated by Twenge & Nolen-Hoeksema (2002), who advocate for comprehensive samples in behavioral studies (34). Additionally, incorporating diagnostic assessments of psychological health could deepen insights into the psychological drivers behind emotional eating and stress coping mechanisms in children.

These findings underscore the importance of a multifaceted approach to addressing emotional eating and its associated risk factors. The incorporation of mindfulness-based interventions, coupled with awareness around media usage and healthier snack alternatives, could form the basis of effective public health strategies aimed at reducing emotional eating and promoting overall well-being among young populations. Further research will be invaluable in refining these strategies and understanding their long-term impact on children's mental and physical health.

CONCLUSIONS

Mindfulness-based studies will undoubtedly make significant contributions to the literature in the field of child and adolescent nutrition. It is crucial to emphasize the importance of research with larger sample groups. Integrating mindfulness-based eating interventions into the school curriculum is an effective way to promote healthy eating habits and support children's cognitive and emotional development. Limiting media and technology use and encouraging healthy habits can help prevent obesity and emotional eating behaviours. Parents and educators must support children by informing them about this issue. Providing psychological support and counselling services to children and adolescents for the management of emotional states such as stress, anxiety and depression is also crucial. This will reduce emotional eating behaviours and increase their overall psychological well-being. These recommendations will contribute to promoting healthy eating habits among children and adolescents and developing strategies to manage emotional eating behaviours.

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