Acta Alimentaria 53 (2024) 2, 316–326
DOI: 10.1556/066.2024.00077

AKADÉMIAI KIADÓ

Intuitive eating, diet quality, and nutritional status of vulnerable children living separated from their families: A pilot study

Z. Semiz[1], S. Kabali[2*] and Y. Ertaş Öztürk[2]

[1] Bafra Social Service Centre, 55400, Samsun, Türkiye

[2] Department of Nutrition and Dietetics, Faculty of Health Sciences, Ondokuz Mayıs University, 55200, Samsun, Türkiye

ORIGINAL RESEARCH PAPER

Received: March 31, 2024 • Accepted: April 22, 2024
Published online: May 16, 2024

ABSTRACT

Nutritional problems can be seen in children living separated from their families. This cross-sectional pilot study aimed to evaluate intuitive eating, diet quality, and nutritional status of children living separated from their families. A total of 55 adolescent girls aged 12–18 years participated in the study. Anthropometric measurements, biochemical data, and 24-h dietary recall data were collected. The Intuitive Eating Scale-2 (IES-2) and the Turkish version of the Healthy Lifestyle-Diet (HLD-TR) index were used. Participants were divided into two groups according to their scores on the diet quality index using the 50th percentile. Group 1 consisted of participants with a score of 25 points or less, and Group 2 consisted of participants with a score above 25 points. Waist circumference (72.0 (66–83), 65.0 (60–77)) was significantly higher in Group 1 ($P < 0.05$). IES–2 score (3.05 (2.85–3.40), 3.30 (3.12–3.90)) and two sub–factors; reliance in hunger and satiety cues (2.80 (1.80–3.40), 4.00 (2.60–4.60)) and body–food choice congruence (2.50 (2.00–3.50), 3.50 (3.00–4.50)) were higher in Group 2 ($P < 0.05$). After adjustment for body mass index, age, and energy intake, there was a significant positive correlation between IES-2 and HLD-TR scores ($P = 0.029$). In conclusion, it may be advantageous to resort to strategies that promote intuitive eating to reduce obesity and associated problems in this vulnerable group.

KEYWORDS

diet quality, intuitive eating, children, nutritional status, vulnerable, orphan

* Corresponding author. Tel.: +362 312 19 19. E-mail: sevtap.kkurtaran@omu.edu.tr

1. INTRODUCTION

Children and adolescents who lost their parents for multiple reasons or whose parents are unable to provide care for them due to severe illnesses are known as “orphans and vulnerable children” (OVC). In Türkiye, according to official records, 362.686 children are orphaned or separated from their families and are protected by state institutions (UNICEF, 2021). Children living separated from their families are susceptible to neglect and societal disregard, which can result in health issues related to nutrition, physiology, and psychology (Zidron et al., 2009). In addition, they may have a higher susceptibility to malnutrition (Watts et al., 2007). Chronic undernutrition in childhood can result in slowed cognitive development and delayed developmental milestones (Bhattarai et al., 2018). Inadequate food consumption directly causes malnutrition, but indirectly leads to increased household food insecurity, weakened maternal and childcare systems, and increased health and environmental expenditures (Feleke et al., 2021).

Research has indicated that orphans and children living separated from family members, who are vulnerable to malnutrition, may experience alterations in the diet for a variety of causes. A study carried out in Nepal found that 80.6% of orphaned children suffered from malnutrition, 13.8% were classified as underweight, and 6.9% were overweight. The child’s nutritional health was found to be influenced by factors such as the caregiver’s age, gender, length of stay in the orphanage, and degree of education (Acharya et al., 2020). Panpanich and Brabin (1999) reported that orphaned children were more likely to be malnourished than non-orphans, regardless of the age and education of the caregiver.

Nutritional problems such as insatiability and anorexia may occur in adolescence. Food avoidance or overeating may arise from concerns about weight gain, diminished self-assurance, health issues, and psychological factors (Kaplan Seidenfeld et al., 2004). Psychological stress, especially in children living separated from their families, can cause nutritional problems (Abbasalizad Farhangi et al., 2018). A study examining the feeding behaviours of children who were separated from their parents and those who were not separated revealed that the separated children had a higher prevalence of eating disorders. The children’s inclination to overeat was hypothesised to be a result of their habitual insufficient food intake prior to their arrival at the orphanage (Fisher et al., 1997). Although studies have been conducted to evaluate the food consumption status of these children (Bello and Pillay, 2019), there are a limited number of studies examining their nutritional behaviours (Fisher et al., 1997). This study aimed to evaluate intuitive eating behaviours, diet quality, and nutritional status of children living separated from their families.

2. MATERIALS AND METHODS

2.1. Study design and participants

This cross-sectional pilot study was conducted between December 2020 and May 2021 on 55 adolescent girls aged 12–18 years in Samsun 19 Mayıs Children’s Home Site. The necessary permissions were obtained from the Ministry of Family, Labor and Social Services. The study was conducted in accordance with the principles of the Declaration of Helsinki and approved by the Clinical Research Ethics Committee of Ondokuz Mayıs University (Approval number:

2020/727, date: 31.12.2020). Living separated from the family and being between the ages of 12–18 years were determined as the inclusion criteria of the study.

2.2. Data collection

The data was gathered by the administration of a questionnaire in a face-to-face setting. The survey included questions about demographic factors such as age, education level, number of meals consumed, and whether or not meals were skipped. It also collected general health information, measurements of body weight, height, and waist circumference, biochemical data, scores from the Intuitive Eating Scale-2, and responses to the Turkish version of the Healthy Lifestyle-Diet Index. Additionally, participants were asked to complete a 24-h food consumption recall form.

2.3. Anthropometric measurements

The height and body weight of the children were taken based on their declarations. Using these data, body mass index (BMI) = body weight (kg)/square of height (m^2) was calculated. BMI z-score values by age were calculated using the WHO AnthroPlus program (Geneva, Switzerland), taking into account the WHO growth reference data for 5–19 years. Accordingly, BMI groups were classified as severe thinness (<-2 SD), thinness (≥-2 SD–< -1 SD), normal (≥-1 SD–$< +1$ SD), overweight ($\geq+1$ SD–$< +2$ SD) and obesity ($\geq+2$ SD) (WHO, 2023). Waist circumference measurements of the children were performed using an inflexible tape. The data obtained were evaluated according to the waist circumference percentile values specific to Turkish children (Hatipoglu et al., 2008).

2.4. Evaluation of biochemical parameters

Measurements were taken for triglyceride, total cholesterol, LDL-cholesterol (LDL-C), HDL-cholesterol, fasting blood glucose, insulin, haemoglobin A1C (HbA1c), albumin, and C reactive protein (CRP) levels. The researchers conducted systolic and diastolic blood pressure measurements on children using the appropriate technique.

2.5. Assessment of intuitive eating

Intuitive Eating Scale (IES)-2 was used to measure children's intuitive eating behaviour levels. This scale was developed by Tylka and Kroon Van Diest (2013), and its Turkish adaptation, validity, and reliability study was conducted by Bakıner (2017) and Baş et al. (2017). The five-point Likert scale (1 = strongly disagree, 5 = strongly agree) consists of 23 items and 4 sub-factors. These sub-factors are Factor 1: unconditional permission to eat, Factor 2: eating for physical rather than emotional reasons, Factor 3: reliance on hunger and satiety cues, and Factor 4: body-food choice congruence. The higher the mean score obtained from the factors, the higher the level of intuitive eating behaviour.

2.6. Assessment of diet quality

The Healthy Lifestyle-Diet (HLD) index originally developed by Manios et al. (2010) and adapted to our culture (Ertaş Öztürk et al., 2018) was used to determine the diet quality of children. The HLD-TR index used in this study includes 11 components: eight components for consumption of food groups and three components for TV watching, computer use, and physical activity. A five-point scoring method (0–4 points) is used in the evaluation of the index. For components 9, 10 and 11, which include food types, scoring was done in two steps. First, the food type was analysed and individual scores were assigned for each food. Second, all scores were totalled and then re-scored: 0 points (score: 0), 2 points (score: 1), 4 points (score: 2), 6–8 points (score: 3), 10–12 points (score: 4). The total score ranges from 0 to 56 and the higher the score, the higher the degree of adherence to a healthy lifestyle.

2.7. Assessment of energy and nutrient intake

To determine the daily energy and nutrient intake of children, 24-h dietary recall was obtained and evaluated using the Nutrition Information System (BeBiS 9.0). Dietary vitamin and mineral intakes were compared with Dietary Reference Intake (DRI) levels. Nutrient Adequacy Ratio (NAR) was used to calculate the Mean Adequacy Ratio (MAR) (Kocaadam Bozkurt et al., 2019). NAR scores were calculated by comparing the daily intake of nutrients with DRI levels classified according to age and sex (Meyers et al., 2006). In this study, NAR scores were calculated as percentages for calcium, iron, magnesium, potassium, phosphorus, folate, vitamin B_{12}, vitamin C, riboflavin, and niacin (Formula-1). MAR score was determined by averaging the NAR scores (Formula-2).

$$\text{NAR (\%)} = \text{Daily intake of a nutrient/ Dietary Reference Intake Value} \times 100 \quad \text{Formula-1}$$

$$\text{MAR (\%)} = \Sigma \text{ NAR (\%) / Number of nutrients} \quad \text{Formula-2}$$

2.8. Statistical assessment

Children were divided into two groups (based on the 50th percentile value) according to their scores on the HLD-TR index. Group 1 consisted of children with ≤25 points and Group 2 consisted of children with >25 points. The data were analysed using SPSS 26.0 software (Statistical Package for the Social Sciences, IBM Corp., Armonk, NY, USA). The conformity of the variables to normal distribution was evaluated using Kolmogorov-Smirnov/Shapiro-Wilk tests. Arithmetic mean ($\bar{X}$), standard deviation (±SD), number (n), and percentage (%) values were used in the presentation of descriptive statistics. Non-normally distributed data were presented as the median and interquartile range (1 and 3). The Independent Samples *t*-test was used to compare two normally distributed independent variables, while the Mann-Whitney U test was used for non-normally distributed variables. Linear regression analysis was used to estimate the determinants of the diet quality. Statistical significance level was accepted as $P < 0.05$.

3. RESULTS AND DISCUSSION

Adolescents frequently consume energy-dense foods, convenience foods, sugar-sweetened beverages, and snacks. According to a study, 43% of adolescent females and 16.5% of adolescent males exhibit emotional eating behaviour, which refers to eating in response to negative feelings (Jääskeläinen et al., 2014). Physical separation from family and psychological issues can contribute to the emergence of adverse feelings (Singh and Suvidha, 2016). Consequently, the act of separating children from their families can potentially lead to the development of harmful eating habits.

In this study, dietary habits, diet quality, anthropometric measurements, and biochemical findings of girls living separated from their families were evaluated. The general characteristics of the children are shown in Table 1. Twenty-one children aged 12–15 years (37.5%) and 35 children aged 16–18 years (62.5%) participated in the study. According to BMI for age z-score, 8.9% of the children were underweight, 53.6% were normal, and 35.7% overweight or obese. In addition, 41.1% of the children had a waist circumference of 90th percentile and above.

In this study, the diet quality of children aged 12–18 years living separated from their families was evaluated by using the HLD-TR index. The children were divided into two groups (Group 1 ≤ 25 points and Group 2 > 25 points) according to their HLD-TR index scores. Table 2 shows the age, anthropometric measurements, biochemical parameters, and scale scores of the children according to the HLD-TR index. There was no statistically significant difference between the groups in terms of age, body weight, height, BMI, triglyceride, cholesterol, fasting insulin, HbA1c, and blood pressure. The waist circumference and percentile median values of Group 1 were higher than Group 2 ($P = 0.035$ and $P = 0.045$, respectively). This suggests that children who have a lower-quality diet may be more prone to obesity. The mean fasting blood glucose values of both groups were within the reference ranges and were higher in Group 2 ($P = 0.002$). Albumin and CRP levels of the children were within the reference range and the median albumin value of Group 2 was higher $P = 0.034$). Children living separated from their families are at risk for malnutrition due to inadequate and unbalanced nutrition (Chung, 1991). In a study by Teferi and Teshome (2021), anthropometric parameters of malnourished orphan children were evaluated. It was found that 34.8% of the children were stunted, 4.4% were extremely underweight, and 12.3% were underweight. Feleke et al. (2021) found that the prevalence of stunting, overweight, and underweight in children under five years of age living

Table 1. Characteristics of the children

Variables	*n*	%
Age (years)		
12–15	21	37.5
16–18	35	62.5
BMI classification		
Severe thinness (<–2 SD)	1	1.8
Thinness (≥–2 SD – <–1 SD)	4	7.1
Normal (≥–1 SD – < 1 SD)	30	53.6
Overweight (≥1 SD – < 2 SD)	9	16.1
Obese (≥2 SD)	11	19.6
Waist circumference (percentile)		
3rd	2	3.6
10th	8	14.3
25th	3	5.4
50th	8	14.3
75th	9	16.1
90th	1	1.8
95th	3	5.4
97th	19	33.9

BMI: Body mass index; SD: Standard deviation.

Table 2. Evaluation of age, anthropometric measurements, biochemical findings, and scale scores of children according to HLD-TR index scores

Variables	Group 1 (≤25 points) Mean ± SD/Median (Q1–Q3)	Group 2 (>25 points) Mean ± SD/Median (Q1–Q3)	Test value	*P*
Age (years)[a]	15.74 ± 1.70	15.72 ± 1.62	−0.165	0.687
Body weight (kg)[a]	64.17 ± 16.96	59.97 ± 16.21	0.277	0.601
Height (cm)[a]	161.0 (157.0–167.0)	162.50 (160.0–164.75)	−0.640	0.522
WC (cm)[b]	72.0 (66–83)	65.0 (60–77)	−2.108	**0.035**
WC (percentile)[a]	90.0 (50.0–95.0)	50.0 (10.0–95.0)	−2.009	**0.045**
BMI z-score (kg m^{-2})[a]	0.94 ± 1.31	0.42 ± 1.30	0.371	0.545
TG (mg dL^{-1})[a]	77.51 ± 40.77	79.74 ± 48.64	0.095	0.760
TC (mg dL^{-1})[a]	140.22 ± 32.52	146.76 ± 24.44	1.093	0.301
LDL-C (mg dL^{-1})[a]	80.02 ± 29.80	75.09 ± 19.39	1.348	0.251
HDL-C (mg dL^{-1})[b]	48 (42.6–55.6)	53.10 (44.07–62.5)	−1.505	0.132
FBG (mg dL^{-1})[a]	98.00 ± 4.60	101.57 ± 11.45	11.039	**0.002**
FI (mIU dL^{-1})[a]	20.53 ± 9.79	16.81 ± 4.65	2.242	0.141
HbA1c (%)[a]	5.07 ± 0.30	4.97 ± 0.19	1.143	0.302
Albumin (g dL^{-1})[a]	43.40 (40.80–45.50)	44.50 (43.80–48.05)	−2.123	**0.034**
CRP (mg L^{-1})[a]	0.91 (0.60–2.28)	0.60 (0.60–2.20)	−0.337	0.736
SBP (mmHg)[b]	110.0 (110.0–120.0)	115.0 (110.0–120.0)	−0.810	0.418
DBP (mmHg)[b]	60.0 (60.0–70.0)	70.0 (60.0–70.0)	−0.758	0.448

[a]: Mann-Whitney U test; [b]: Independent sample *t* test; Q1–Q3: 1st quartile – 3rd quartile; SD: Standard deviation; WC: Waist circumference; BMI: Body mass index; TG: Triglyceride; TC: Total cholesterol; LDL-C: Low density lipoprotein-cholesterol; HDL-C: High density lipoprotein-cholesterol; FBG: Fasting blood glucose; FI: Fasting insulin; CRP: C-reactive protein; SBP: Systolic blood pressure; DBP: Diastolic blood pressure; bold numbers: significant difference at $P < 0.05$.

separated from their families due to food insecurity, diarrhoea, and inadequate nutrient intake was found to be 12.2%, 37.8% and 21.7%, respectively. In this study, when children were evaluated in terms of malnutrition according to BMI z-scores according to age, 1.8% of the children were underweight, 16.1% were overweight, and 19.6% were obese. At the same time, 41.1% of the children had a waist circumference of 90th percentile and above. The children participating in the study having a low prevalence of underweight and a high rate of overweight/obesity may be explained by excessive calorie and fat intake (Table 3). There has been a rise in the prevalence of childhood obesity in developing and developed countries. Poor diet quality appears to be one of the dietary factors contributing to obesity.

Table 3 shows the daily energy and nutrient intake of children according to HLD-TR index scores. According to the DRI values, the percentages of energy from macronutrients, energy, protein, pulp, calcium, and iron intakes were similar between the groups ($P > 0.05$). The children's daily energy and fat intake exceeded the recommended intake levels set by the DRI. The median value of fat requirement fulfilment of the groups was high and was determined as 140% and 140.3%, respectively. In addition, no statistically significant difference was found between the groups in terms of MAR value ($P > 0.05$). Similarly, Seremet Kürklü et al. (2022) reported that orphaned children had higher energy, fat and carbohydrate intakes compared to

Table 3. Daily energy and nutrient intakes of children according to HLD-TR index scores (%)

Variables	Group 1 (≤25 points) DRI (%) Median (Q1–Q3)	Group 2 (>25 points) DRI (%) Median (Q1–Q3)	Test value[a]	*P*
Energy (kcal)	119 (107.26–148.53)	113 (88.43–141.65)	−0.905	0.365
Protein (g kg^{-1})	138 (110.24–195.15)	139 (113.18–216.05)	−1.330	0.944
Protein (%E)	93.33 (78.33–115.00)	103 (88.33–120.00)	−0.070	0.184
Fat (%E)	140 (129.16–155.00)	143 (127.50–153.33)	−0.201	0.841
Carbohydrate (%E)	80.00 (74.28–89.52)	80.00 (64.76–89.52)	−0.610	0.542
Fibre (g)	106 (83.59–126.73)	106 (88.10–152.07)	−0.844	0.399
Calcium (mg day^{-1})	44.53 (36.40–66.59)	48.94 (43.07–64.76)	−0.557	0.577
Iron (mg day^{-1})	94.92 (78.00–100.00)	92.19 (77.75–100.00)	0.000	1.000
MAR (%)	86.56 (82.02–93.41)	87.35 (83.07–92.86)	−0.366	0.715

[a]: Mann-Whitney U test; DRI: Dietary Reference Intakes; E: Energy; MAR: Mean Adequacy Ratio

children living with their families. On the contrary, daily energy, fat, and carbohydrate intakes of orphan children in Ghana were found to be lower than RDA standards (Sadik, 2010). The variations in the study findings can be attributed to the differing care conditions provided to the children.

The comparison of intuitive eating scale scores of children according to the HLD-TR index is shown in Table 4. The intuitive eating score, Factor 3 (reliance on hunger and satiety cues), and Factor 4 (body-food choice congruence) scores of Group 2 were statistically higher ($P = 0.016$, $P = 0.004$, and $P = 0.021$, respectively).

The relationship between the HLD-TR index and the intuitive eating score is presented in Table 5 with the regression model. According to this, the intuitive eating score is a determinant of the HLD-TR index score ($P = 0.029$).

Table 4. Evaluation of intuitive eating scale scores according to HLD-TR index scores

Variables	Group 1 (≤25 points) Median (Q1–Q3)	Group 2 (>25 points) Median (Q1–Q3)	Test value[a]	*P*
Intuitive eating scale	3.05 (2.85–3.40)	3.30 (3.12–3.90)	−2.408	**0.016**
Unconditional permission to eat (Factor 1)	3.40 (3.00–3.80)	3.20 (2.20–3.70)	−0.463	0.643
Eating for physical rather than emotional reasons (Factor 2)	3.00 (2.50–3.37)	3.12 (2.68–3.50)	−1.058	0.290
Reliance on hunger and satiety cues (Factor 3)	2.80 (1.80–3.40)	4.00 (2.60–4.60)	−2.874	**0.004**
Body-food choice congruence (Factor 4)	2.50 (2.00–3.50)	3.50 (3.00–4.50)	−2.299	**0.021**

[a]: Independent sample *t* test; Q1–Q3: 1st quartile – 3rd quartile; bold numbers: significant difference at $P < 0.05$.

Table 5. Linear regression model for HLD-TR index scores

Independent variable	HLD-TR index score (dependent variable)							
	β	SD	STD β	*P*	R	R^2	F	*P*
Intuitive eating scale score	0.312	0.138	0.318	**0.029**	0.340	0.116	1.604	0.188

Adjusted for: body mass index, age, energy intake. HLD-TR: Turkish version of the Healthy Lifestyle-Diet; SD: Standard deviation; STD β: Standardised beta; bold numbers: significant difference at $P < 0.05$.

Research examining the nutritional value of the diet in overweight children found that the HLD-TR index score was low (Ertaş Öztürk et al., 2018; Bozbulut et al., 2020). However, there are limited a number of studies evaluating the diet quality and diversity of children living separated from their families. In this study, the MAR percentage was calculated in addition to the HLD-TR index. Although the MAR value calculated using various micronutrients was below 100%, it was found to be above 80%. About 73.1% of orphaned children living in Ethiopia had low Dietary diversity scores (Sewnet et al., 2021). However, in the study conducted by Ali et al. (2018), it was found that children who were separated from their families had higher DSS compared to children living with their families.

The outcomes of research conducted on separated children may differ based on specific conditions. Adolescents, particularly girls, may experience changes in their mental state that might impact their dietary patterns and food consumption (Joseph et al., 2023). Negative emotions such as depression and anxiety can lead to unhealthy eating habits during this period (Zeiler et al., 2021). Conversely, adolescents may engage in intuitive eating behaviour as a result of their desire to achieve an attractive physical appearance, gain approval from others, and be socially accepted (Andrew et al., 2015). Atalay et al. (2021) found that intuitive eating score was positively associated with diet quality in young adults. Similarly, Quansah et al. (2022) revealed that diet quality was among the determinants of intuitive eating behaviour with a regression model. While previous research has examined the connection between intuitive eating and food quality in adolescents and adults, no study has specifically focused on children who live separated from their families. This study revealed that the score of intuitive eating was a significant factor in determining diet quality. At the same time, it was found that the intuitive eating sub-factors such as reliance on hunger and satiety cues and body-food choice congruence scores of Group 2 were statistically higher. Thus, it may be concluded that children who possess greater intuitive feeding behaviour demonstrate a higher level of diet quality.

4. CONCLUSIONS

In conclusion, this study indicated that children who live separated from their families consume excessive amounts of calories and fat, regardless of the quality of their diet. Additionally, a significant prevalence of obesity was seen. Furthermore, children with inadequate diet quality had elevated WC and BMI levels. The study revealed that intuitive eating behaviour had a positive impact on the diet quality of children. Furthermore, there was a strong correlation between diet quality and intuitive eating scores. It may be crucial to provide psychological support to children who are living separated from their families, to help them develop healthy eating habits and ensure they have easy access to nutritious food. It might be beneficial to schedule training to promote intuitive eating behaviour.

REFERENCES

Abbasalizad Farhangi, M., Dehghan, P., and Jahangiry, L. (2018). Mental health problems in relation to eating behavior patterns, nutrient intakes and health related quality of life among Iranian female adolescents. *PloS One*, 13(4): e0195669.

Acharya, S.R., Adhikari, S., Moon, D.H., Pahari, S., and Shin, Y.C. (2020). Malnutrition and associated factors with nutritional status among orphan children: an evidence-based study from Nepal. *International Journal of Child Health and Nutrition*, 9(3): 125–132.

Ali, Z., Abu, N., Ankamah, I.A., Gyinde, E.A., Seidu, A.S., and Abizari, A.-R. (2018). Nutritional status and dietary diversity of orphan and non–orphan children under five years: a comparative study in the Brong Ahafo region of Ghana. *BMC Nutrition*, 4(1): 32.

Andrew, R., Tiggemann, M., and Clark, L. (2015). Predictors of intuitive eating in adolescent girls. *Journal of Adolescent Health*, 56(2): 209–214.

Atalay, S., Baş, M., Eren, B., Karaca, E., and Baş, D. (2021). Intuitive eating, diet quality, body mass index and abnormal eating: a cross-sectional study in young Turkish women. *Progress in Nutrition*, 22(4): e2020074.

Bakıner, E. (2017). *Turkish adaptation of the intuitive eating scale–2*, MSc. Thesis. İstanbul Bilgi Üniversitesi, p. 17.

Baş, M., Karaca, K.E., Saglam, D., Arıtıcı, G., Cengiz, E., Köksal, S., and Buyukkaragoz, A.H. (2017). Turkish version of the Intuitive Eating Scale-2: validity and reliability among university students. *Appetite*, 114: 391–397.

Bello, T.K. and Pillay, J. (2019). An evidence-based nutrition education programme for orphans and vulnerable children: protocol on the development of nutrition education intervention for orphans in Soweto, South Africa using mixed methods research. *BMC Public Health*, 19: 306.

Bhattarai, S., Subedi, S., and Acharya, S.R. (2018). Factors associated with early menarche among adolescents girls: a study from Nepal. *SM Journal of Community Medicine*, 4(1): 1028.

Bozbulut, R., Ertaş-Öztürk, Y., Döğer, E., Bideci, A., and Köksal, E. (2020). Increased obesity awareness and adherence to healthy lifestyle-diet reduce metabolic syndrome risk in overweight children. *Journal of the American College of Nutrition*, 39(5): 432–437.

Chung, H.-K. (1991). Evaluation of nutrition status on the basis of orphan home children's anthropometry. *Journal of the Korean Society of Food Culture*, 6(4): 413–419.

Ertaş Öztürk, Y., Bozbulut, R., Döğer, E., Bideci, A., and Köksal, E. (2018). The relationship between diet quality and insulin resistance in obese children: adaptation of the Healthy Lifestyle-Diet Index in Turkey. *Journal of Pediatric Endocrinology and Metabolism*, 31(4): 391–398.

Feleke, S., Egata, G., Mesfin, F., Yilak, G., and Molla, A. (2021). Undernutrition and associated factors in orphan children aged 6–59 months in Gambella Southwest, Ethiopia: a community-based cross-sectional study. *BMJ Open*, 11(7): e045892.

Fisher, L., Ames, E.W., Chisholm, K., and Savoie, L. (1997). Problems reported by parents of Romanian orphans adopted to British Columbia. *International Journal of Behavioral Development*, 20(1): 67–82.

Hatipoglu, N., Ozturk, A., Mazicioglu, M.M., Kurtoglu, S., Seyhan, S., and Lokoglu, F. (2008). Waist circumference percentiles for 7-to 17-year-old Turkish children and adolescents. *European Journal of Pediatrics*, 167(4): 383–389.

Jääskeläinen, A., Nevanperä, N., Remes, J., Rahkonen, F., Järvelin, M.-R., and Laitinen, J. (2014). Stress-related eating, obesity and associated behavioural traits in adolescents: a prospective population-based cohort study. *BMC Public Health*, 14(1): 321.

Joseph, P.L., Gonçalves, C., and Fleary, S.A. (2023). Psychosocial correlates in patterns of adolescent emotional eating and dietary consumption. *PloS One*, 18(5): e0285446.

Kaplan Seidenfeld, M.E., Sosin, E., and Rickert, V.I. (2004). Nutrition and eating disorders in adolescents. *Mount Sinai Journal of Medicine*, 71(3): 155–161.

Kocaadam Bozkurt, B., Mortaş, H., Köksal, E., and Bilici, S. (2019). Frequency of eating out of home: its association with dietary adequacy and sustainable nutrition. *1st International Congress on Sustainable Life*, 2019. 15–16 March, Ankara.

Manios, Y., Kourlaba, G., Grammatikaki, E., Koubitski, A., Siatitsa, P., Vandorou, A., and Moschonis, G. (2010). Development of a lifestyle–diet quality index for primary schoolchildren and its relation to insulin resistance: the Healthy Lifestyle–Diet Index. *European Journal of Clinical Nutrition*, 64(12): 1399–1406.

Meyers, L.D., Hellwig, J.P., and Otten, J.J. (2006). *Dietary reference intakes: the essential guide to nutrient requirements*. National Academies Press, Washington.

Panpanich, R., Brabin, B., Gonani, A., and Graham, S. (1999). Are orphans at increased risk of malnutrition in Malawi? *Annals of Tropical Paediatrics*, 19(3): 279–285.

Quansah, D.Y., Schenk, S., Gilbert, L., Arhab, A., Gross, J., Marques-Vidal, P.-M., and Puder, J.J. (2022). Intuitive eating behavior, diet quality and metabolic health in the postpartum in women with gestational diabetes. *Nutrients*, 14(20): 4272.

Sadik, A. (2010). Orphanage children in Ghana: are their dietary needs met? *Pakistan Journal of Nutrition*, 9(9): 844–852.

Seremet Kürklü, N., Tel Adıgüzel, K., Ede, G., and Samur, G. (2022). Poor nutritional status and growth retardation are associated with living in the orphanage: an observational cross-sectional study. *Progress in Nutrition*, 24(2): e2022038.

Sewnet, S.S., Derseh, H.A., Desyibelew, H.D., and Fentahun, N. (2021). Undernutrition and associated factors among under-five orphan children in Addis Ababa, Ethiopia, 2020: a cross-sectional study. *Journal of Nutrition and Metabolism*, 2021(9): 6728497.

Singh, A. and Suvidha, D. (2016). Well-being of orphans: a review on their mental health status. *International Journal of Scientific Research in Science and Technology*, 2(5): 180–184.

Teferi, H. and Teshome, T. (2021). Magnitude and associated factors of undernutrition among children aged 6–59 months in Ethiopian orphanage centres. *Pediatric Health, Medicine and Therapeutics*, 12: 141–150.

Tylka, T.L. and Kroon Van Diest, A.M. (2013). The Intuitive Eating Scale–2: item refinement and psychometric evaluation with college women and men. *Journal of Counseling Psychology*, 60(1): 137–153.

UNICEF (2021). *Turkey coorperation programme 2021–2025*. Available at: https://www.unicef.org/turkiye/media/15806/file/UNICEF.pdf (Accessed 12 December 2023).

Watts, H., Gregson, S., Saito, S., Lopman, B., Beasley, M., and Monasch, R. (2007). Poorer health and nutritional outcomes in orphans and vulnerable young children not explained by greater exposure to extreme poverty in Zimbabwe. *Tropical Medicine and International Health*, 12(5): 584–593.

WHO (2023). World Health Organization. BMI-for-age (5–19 years). Available at: https://www.who.int/tools/growth-reference-data-for-5to19-years/indicators/bmi-for-age (Accessed 11 December 2023).

Zeiler, M., Philipp, J., Truttmann, S., Waldherr, K., Wagner, G., and Karwautz, A. (2021). Psychopathological symptoms and well-being in overweight and underweight adolescents: a network analysis. *Nutrients*, 13(11): 4096. Retrieved from https://www.mdpi.com/2072-6643/13/11/4096.

Zidron, A.M., Juma, E., and Ice, G.H. (2009). Does being an orphan decrease the nutritional status of Luo children? *American Journal of Human Biology: The Official Journal of the Human Biology Association*, 21(6): 844–851.