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ADOLESCENT' NUTRITIONAL STATUS ABOUT PARENTAL FEEDING PRACTICE AND MACRONUTRIENT INTAKE

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ABSTRACT

The nutritional status of adolescents remains a surpassing challenge for parents, society, and the healthcare sector. Adolescents' nutritional status can be affected by a variety of comprehensive factors, such as parental feeding practice and the daily intake of macro-nutrients. This study aimed to analyze the correlation between parental feeding practice and the daily intake of macro-nutrients among adolescents. This study is an analytical observational study with a cross-sectional design. The sample was collected from about 120 respondents using the stratified random sampling technique. Anthropometric measurements were collected using digital weight scales and microtoise. Parental feeding practice was assessed using the Adolescent Perceptions of Parents' Feeding Practice questionnaire, characteristic data and pocket money and the daily intake of macro-nutrients used the Semi Quantitative Food Frequency Questionnaire (SQ-FFQ). The data were collected and analyzed using the Chi-Square (p-value <0.05), followed by a multivariate logistic regression test (p-value <0.05). Around 51.7% of adolescents with malnutrition. The factors associated with the nutritional status of adolescents are parental feeding practice (p-value=0.017; OR=2.98), pocket money (p-value=0.118; OR=1.96), energy intake (p-value=0.246; OR=1.41), protein intake (p-value=0.087; OR=1.79), fat intake (0.975; OR=1.01), and carbohydrate intake (1.003; OR=0.41). Parental feeding practice, intake of energy and macronutrients, especially carbohydrates is related to the nutritional status of adolescents. There is no relationship between pocket money, protein intake and fat intake with nutritional status of adolescents. Based on multivariate analysis, it is reported that parental feeding practice and carbohydrates intake has a strong relationship with nutritional status of adolescents.

Kata Kunci:

Pola Asuh Makan;
Uang Saku;
Asupan Gizi; Remaja

ABSTRAK

Masalah status gizi pada remaja masih menjadi tantangan yang belum tuntas bagi orang tua, masyarakat maupun tenaga kesehatan sampai saat ini. Status gizi pada remaja dapat disebabkan karena multifaktorial termasuk didalamnya hubungan pola asuh makan dari orang tua dan asupan zat gizi makro sehari-hari. Tujuan penelitian ini adalah untuk menganalisis hubungan pola asuh makan dan asupan zat gizi makro dengan status gizi pada remaja. Penelitian ini merupakan penelitian observasional analitik dengan desain *cross-sectional*. Jumlah sampel didapatkan sebanyak 120 responden dengan teknik *stratified random sampling*. Pengambilan data dilakukan dengan menggunakan timbangan digital berat badan dan pengukuran tinggi badan dengan *microtoise*. Data karakteristik dan uang saku didapatkan dengan menggunakan kuesioner karakteristik responden, pola asuh makan dengan kuesioner *Adolescent Perceptions of Parents' Feeding Practices* dan asupan zat gizi makro dengan menggunakan kuesioner *Semi Quantitative Food Frequency Questionnaire* (SQ-FFQ). Analisis statistik menggunakan uji *Chi-Square* (p-value <0.05) dan dilanjutkan dengan uji multivariat menggunakan uji regresi logistik (p-value <0.05). Sebanyak 51,7% remaja dengan status gizi malnutrisi. Faktor-faktor yang berkaitan dengan status gizi remaja adalah pola asuh makan (p-value=0,017;OR=2,98), uang saku (p-value=0,118;OR=1,96), asupan energi (p-value=0,246;OR=1,41), asupan protein (p-value=0,087;OR=1,79), asupan lemak (p-value=0,975;OR=1,01) dan asupan karbohidrat (p-value=0,003;OR=0,41). Ditemukan hubungan antara pola asuh makan, asupan energi dan asupan karbohidrat dengan status gizi pada remaja. Sedangkan uang saku, asupan protein dan asupan lemak tidak berhubungan dengan status gizi pada remaja. Hasil analisis multivariat menunjukkan pola asuh makan dan asupan karbohidrat memiliki hubungan sangat kuat dengan status gizi pada remaja.

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INTRODUCTION

Adolescence is the peak period of rapid growth and development (growth spurt) (Widnatusifah *et al.*, 2020) requently accompanied by increased physical activity, resulting in a greater demand for nutrients. This group's rapid growth and development can leave them sensitive to nutritional issues, including undernutrition and overnutrition (Rah et al., 2021). Early adolescent age (13-15) years is a significant period of physical transformation, marked by a negative phase of poor behavioral inclinations, including eating behavior (Winpenny et al., 2018). During this stage of adolescence, people begin to search for their identities, sensitive, but still confined and dependent on parents; therefore, this group demands special attention to diet and health (Al-Jawaldeh et al., 2020). The current concern with nutrition in adolescents is triple-burden malnutrition (Sellia Juwita et al., 2022). Adolescent nutrition issues will harm the country's economic development and impede progress toward development goals (Unicef, 2018). As a result, nutrition issues in adolescent groups must be addressed in order to reduce the risk of developing non-communicable diseases (NCDs), such as type 2 diabetes, cardiovascular disease (hypertension, dyslipidemia, stroke, coronary heart disease), and cancer in adulthood, which, if it happens, can reduce productivity and a decent livelihood in later life (Fauziyyah et al., 2021).

Based on IOTF (International Obesity Task Force) criteria, the prevalence of overnutrition in adolescents aged 10–19 years is 15,4% and is highest in several Southeast Asian regional countries. WHO reported that adolescents aged 12–15 years in Indonesia, in addition to experiencing a prevalence of undernutrition ≥10, also experienced an increase in obesity rates (double-burden disease) (Yang et al., 2019). The results of the Riskesdas, (2018) showed that the prevalence of nutritional status according to BMI for age of adolescents aged 13–15 years in Indonesia was 1,9 very thin, 6,8 thin, 11,2 overweight, and 4,8 obese. Meanwhile, Central Java Province was 1,8 very thin, 6,6 thin, 10,1 overweight, and 4,5 obese. The prevalence of nutritional status among adolescents aged 13–15 years in Surakarta City was 1,76 very thin, 6,52 thin, 11.65 overweight, and 4,31 obese. According to the screening results conducted by the Surakarta City Health Office in 2022, the prevalence of nutritional status of adolescents aged 13–15 years was 0,67 very thin, 8,79 thin, 8,37 overweight, and 2,65 obese. This shows that nutritional problems in adolescents aged 13–15 in Surakarta City still need to be considered, both problems of undernutrition and overnutrition (Dinkes Surakarta, 2022). Most of the causes of nutritional problems in adolescents are due to poor eating behavior of adolescents, such as irregular eating habits, consumption habits of different types, frequency of eating unbalanced amounts of food and dieting not according to recommendations (Margiyanti, 2021).

Widiastuti and Widyaningsih (2023) study found that increased body weight was connected with excess energy in the Surakarta City adolescent population. This incidence occurred due to inadequate food consumption among adolescents in Surakarta City (Jokomarsono et al., 2022; Kinasih, 2021). Poor eating attitudes and behaviors, such as food intake patterns unaffected by teenagers' nutritional adequacy rates, can directly impact their nutritional health (Arista et al., 2021). According to the findings of Setyawan *et al* (2019) on adolescents groups in Surakarta City, unhealthy eating habits in adolescents, such as eating out, are less healthy due to a lack of nutritious food at home. According to the Ministry of Health's recommendations for the "Isi Piringku", the portion of vegetables should be equivalent to the portion of staple food, which has been linked to poor diet quality and increased obesity. This demonstrates that parents' role as providers and controllers of eating in children merits attention.

Parental feeding practice is the monitoring of parents about feeding their children (Monroe-Lord et al., 2022). Research on adolescent groups that parental feeding practice are significantly associated with adolescent nutritional status (Litchford et al., 2020; Q. Wang et al., 2022). Parents who model children eating healthy foods will have children who eat healthy foods (Yee et al., 2017). Healthy food efforts are in the form of increased consumption of vegetables and fruit compared to sugar-sweetened foods and drinks (Boots et al., 2015). Parents control the consumption of food that enters the body and help keep adolescents' weight in a normal (Kipp et al., 2021; Ruzicka et al., 2021). Previously, there have been many studies on eating parenting with toddlers and preschool-age children, but the subject of

adolescents has yet to be widely explored, especially in Indonesia (Damayanti et al., 2021). Eating arrangements from parents can influence preferences, eating behavior, and food habits in adolescents (Chew et al., 2020).

Macronutrient intake is one strategy for ensuring adequate adolescent food intake (Moore Heslin & McNulty, 2023). Research on junior high school students showed that inadequate food consumption was connected with adolescent nutritional status ($p < 0.01$). Adolescents prefer snack foods, which can lead to a loss of desire for nutritious main meals during home and school activities (Putu et al., 2020). Adolescents must meet their dietary requirements to grow and develop optimally (Hakimi et al., 2023). Furthermore, malnutrition in adolescents might result from dietary intake that is not balanced with physical activity (Erny and Handari, 2019). The imbalance between energy intake and expenditure, such as physical activity, can lead the body to develop nutritional disorders, including obesity and malnutrition (Rahayu et al., 2023).

From the description above, the researcher is interested in conducting a study on the nutritional status of adolescents in junior high schools in Surakarta City, the third largest city in the southern part of Java Island by population. Previous studies have reported factors related to intake that can affect nutritional status in adolescents, while this study focuses not only on intake but also on parental feeding practice factors. This study aimed to analyze the relationship between parental feeding practice and macronutrient intake and nutritional status in adolescents.

METHODS

Type of Research

The research used was analytic observational with a cross-sectional design. This study passed the ethical test with No: 65/UNS27.06.11/KEP/EC/24 issued by the ethics committee of the Faculty of Medicine, Sebelas Maret University.

Location and Time of Research

This study was conducted in several public junior high schools (SMPN) in Surakarta City, namely SMPN 10, SMPN 17, SMPN 21, and SMPN 26. The selection of SMPN locations was obtained using the purposive sampling method, considering the results of screening data conducted by the Surakarta City Health Office. This study was conducted in May–June 2024.

Population and Samples

The population in this study were all adolescents aged 13-15 years who were students at SMPN 10, SMPN 17, SMPN 21, and SMPN 26 Surakarta City, with a total of 2574 people (Kemendikbud, 2023). The sample determination in the study was carried out using a simple random sampling technique, selecting four junior high schools in Surakarta City and determining the sample size using the Slovin formula (Sugiyono, 2017). With α=0.1, the sample size was 97 people. To anticipate loss to follow-up, dropout was added so that the sample size in this study was 120 people.

$$n = \frac{N}{1 + N(e^2)}$$

The sample criteria that will be used in this study are as follows:

1) Inclusion Criteria
   a) Adolescents registered as students in two junior high schools from SMPN 10, SMPN 17, SMPN 21, and SMPN 26.
   b) Adolescents aged 13-15 years
   c) Willing to be a respondent
   d) Live with parents
2) Exclusion Criteria
   a) On a special diet for weight gain/loss
   b) In a specific treatment/treatment period, taking hormonal contraceptives and drugs that stimulate weight gain/loss.
   c) Having a history of eating disorders such as bulimia, anorexia, and binge eating.

d) Having a history of tuberculosis (TB), HIV/AIDS, diabetes mellitus, heart disease, and cancer.

Sampling Technique

The sampling technique was done by proportionate stratified random sampling in each selected school, which became the research location to obtain a comparable proportion of samples from each stratum (school) (Sugiyono, 2017). The calculation of the number of students to be sampled is the following calculation:

SMPN 10 $\frac{722}{2574}$x 120 = 34 people

SMPN 17 $\frac{647}{2574}$x 120 = 30 people

SMPN 21 $\frac{580}{2574}$x 120 = 27 people

SMPN 26 $\frac{625}{2574}$x 120 = 29 people

Data Collection

Anthropometric data was collected using digital weighing scales (OMRON) with an accuracy of 0,1 kg and height measurements using Microtoice with an accuracy of 0,1 cm. The questionnaire was a questionnaire of respondent characteristics and the amount of pocket money. The pocket money category was obtained based on the mean amount of respondents' daily pocket money (Ayuningsih & Nugroho, 2021). The Adolescent Perceptions of Parents' Feeding Practices questionnaire assesses adolescents' perceptions of parental interaction in feeding children and maternal habits in fulfilling meals, which include parental encouragement to eat healthily, negotiation between children and parents, low pressure given by parents, and monitoring of unhealthy foods. Questionnaire scoring consisted of a four-point Likert scale consisting of 1 = "never," 2 = "sometimes," 3 = "often," and 4 = "always." The results will be categorized as low = (0-50.0), moderate = (50.1-75.0), and high = (>75.1). Cronbach's α = 0.725 (Soraya, 2021). The Quantitative Food Frequency Questionnaire (SQ-FFQ) asks about the frequency of food consumption and portion size over a certain period, including foods that are often consumed as well as portion size in a period and calculated and then compared with nutritional adequacy figures: deficient: <80%, normal: 80-120%, over: >120% (AKG, 2019). Categories of nutritional status based on Body Mass Index (BMI for age): Normal: -2 SD to +1 SD; malnutrition: <-3 SD to <-2 SD; +1 SD to >+2 SD (Indonesian Ministry of Health, 2020).

Data Processing and Analysis

This study used the SPSS version 26 program for data processing and analysis, with frequency distribution, the Chi-Square test, and multiple logistic regression with a 95% confidence level.

RESULTS

Most adolescents (53.3%) were males, while 46.7% were females. The father received the majority of his previous education in high school or similar (59.2%). Out of 120 respondents, most had pocket money under Rp.11,000 (61.7%) and more than Rp.11,000 (38.3%). Regarding the research variables analyzed, parental feeding practice connected to eating arrangements in adolescents into two categories: moderate (71.7%) and high (15.8%). Adolescent macronutrient consumption includes deficient energy (41.7%) and over (30.8%), over protein (50.0%) and normal (28.3%), over fat (51.7%) and normal (35.8%), and over carbohydrates (50.0%) and normal (26.7%). Most respondents in this survey were teenagers aged 13 to 15, with malnutrition (51.7%) and normal (48.3%).

Based on Table 1, the results of filling out the questionnaire that 120 respondents have filled in.

Table 1. Frequency Distribution of Respondent Characteristics (n=120)

Respondent Characteristics	n	Persen (%)
Gender		
Male	64	53,3
Female	56	46,7
Father Education		
SD/Equivalent	11	9,2
SMP/Equivalent	23	19,2
SMA/Equivalent	71	59,2
College	15	12,5
Mother Education		
Not in School	6	5,0
SMP/Equivalent	30	25,0
SMA/Equivalent	72	60,0
College	12	10,0
Pocket Money		
<Rp.11.000	74	61,7
>Rp.11.000	46	38,3
Parental Feeding Practice		
Low	15	12,5
Moderate	86	71,7
High	19	15,8
Energy Intake		
Deficient	33	27,5
Normal	50	41,7
Over	37	30,8
Protein Intake		
Deficient	26	21,7
Normal	34	28,3
Over	60	50,0
Fat Intake		
Deficient	15	12,5
Normal	43	35,8
Over	62	51,7
Carbohydrate Intake		
Deficient	28	23,3
Normal	32	26,7
Over	60	50,0
Nutritional Status		
Normal	58	48,3
Malnutrition	62	51,7

Source: Primary Data, 2024

Based on table 2. showed the bivariate analysis with Pearson Chi-Square, variables that have a p-value <0.05 were food parenting, energy intake, and carbohydrate intake with adolescent nutritional status.

Table 2. Relationship between Parental Feeding Practice, Pocket Money and Macronutrient Intake with Adolescent Nutritional Status

Variables	Nutritional Status Based on Z-Score						*p-value*
	Male		Female		Total		
	Normal	Malnutrition	Normal	Malnutrition	Normal	Malnutrition	
Parental Feeding Practice							0,001*
Low	5	3	5	2	10	5	
Moderate	23	23	23	16	46	40	
High	0	9	2	8	2	17	
Pocket Money							0,304
<11.000	21	19	18	16	39	35	
>11.000	7	17	12	10	19	27	
Energy Intake							
Deficient	13	8	9	3	22	11	0,045*
Normal	12	15	8	15	20	30	
Over	3	13	13	8	16	21	
Protein Intake							0,152
Deficient	8	6	8	4	16	10	
Normal	9	10	9	6	18	16	
Over	28	36	13	16	24	36	
Fat Intake							0,254
Deficient	5	3	6	2	11	5	
Normal	9	15	8	10	17	25	
Over	28	36	16	14	30	32	
Carbohydrate Inrake							0,013*
Deficient	6	12	3	7	9	19	
Normal	6	8	6	12	12	20	
Over	28	36	21	7	37	23	

Table 3 showed that based on the Hosmer and Lameshow Test modeling feasibility test, the logistic regression test has met the requirements, and the model is feasible or appropriate, as evidenced by the significance value of the Hosmer and Lameshow Test > 0.05. This was also proven by the Omnibus Test value <0.05, meaning that these variables together or simultaneously affect adolescents' nutritional status. The odds ratio (OR) value of the food parenting variable is 2.98 (95% CI: 1.21-7.29), indicating that low food parenting increases the risk of malnutrition by 2.98 times for adolescent nutritional status. Furthermore, the OR value of the carbohydrate intake variable is 0.41 (95% CI: 0.22-0.73) and indicates that sufficient (good) carbohydrate intake is a protective factor for nutritional status in adolescents. In addition, the Nagelkerke R square value is 0.275, which means that each independent variable can explain the dependent variable (adolescent nutritional status) by 27.7%. In comparison, the remaining 72.3% is explained by other factors not examined in this study.

Table 3. Multivariate Analysis of the Relationship between Parental Feeding Practice, Pocket Money and Macronutrient Intake with Adolescent Nutrition Status

Variables	p-value	OR (CI 95%)	Lower	Upper
Parental Feeding Practice	0,017*	2,98	1,21	7,29
Pocket Money	0,118	1,96	0,84	4,60
Energy Intake	0,246	1,41	0,78	2,56
Protein Intake	0,087	1,79	0,91	3,49
Fat Intake	0,975	1,01	0,53	1,90
Carbohydrate Inrake	0,003*	0,41	0,22	0,73
Omnibus Test		0,000		
Nagelkerke R Square		0,277		
Hosmer and Lameshow Test		0,389		

DISCUSSION

Relationship between Parental Feeding Practice and Nutritional Status in Adolescents

Food parenting is a pattern of feeding care that describes parent-child interactions during meal situations (Yumni & Wijayanti, 2017). Parenting is significantly related to children's food intake and is one of the critical factors affecting nutritional status in children (Mazza et al., 2022). Maintaining the quality and quantity of food and controlling the intake that enters the body helps keep the child's weight normal (Kembaren, 2021).

Parental eating parenting of adolescents is a regulatory method parents apply to adolescents regarding feeding (Hazzard et al., 2020). This aligns with research Kipp *et al.*, (2021) that eating parenting affects adolescent nutritional status. Adolescents pressured to eat by their parents tend to experience inadequate nutritional status (p = 0.03) (p=0,03) (Bahreynian et al., 2019). Meanwhile, providing parental control of eating can help encourage healthier eating behavior and control adolescent weight (Stromberg et al., 2019).

This contrasts with the results of a previous study that showed no significant relationship between dietary parenting and adolescent nutritional status in a group of African-American adolescents (Ardakani et al., 2023). This result also aligns with other studies that report no significant relationship between dietary parenting and the incidence of overweight and obesity in children and adolescents (Beckers et al., 2021; Monroe-Lord et al., 2022). However, it should be noted that the role of parents will always be related to adolescent feeding, serving as role models that ultimately shape behaviors, generate habits, and ultimately contribute to their nutritional status (J. Wang et al., 2023).

The group of adolescents in the United States reported that they like to eat fruits from parents with a diet that is diligent in consuming vegetables and fruits, thus encouraging children to eat them (Fleary dan Ettienne., 2019). This is the same as adolescent boys who like to eat junk food high in sugar and salt and have parents who apply the same eating patterns. This can affect the level of unhealthy food consumption of children, which can have an impact on the incidence of overweight / obesity and an increased risk of experiencing non-communicable diseases (Soraya, 2021). A good diet must be established to meet optimal nutritional needs in adolescents and support rapid growth and development. An appropriate diet will prevent adequate intake and lead to either overnutrition or undernutrition (Purtiantini, 2024).

The availability of socioeconomic resources (income, education, employment status) is essential in parents' decisions to practice dietary parenting. Parents who are socioeconomically at an average level tend to have less control over eating behavior and less implementation of eating parenting in the family (Loth et al., 2013). The influence of parental eating behavior is related to the presence and involvement of parents in adolescents' lives and daily activities (Berge et al., 2015). Parental supervision during meals at home varies depending on parental occupation, parental status, and socioeconomic status. In addition, parental presence and involvement are an opportunity to modify the availability of food and beverages at home, encouraging positive behaviors that engage adolescents towards meal time spent alone at home after school and the frequency of family meals on weekdays, as well as direct parental participation when adolescents eat (Ray dan Roos, 2012).

Factors that can influence parents in the management of eating parenting include stress/tiredness from working and not having time to provide healthy food at home so that parents will choose convenient foods or fast food (Jang et al., 2019). It should be noted that the role of parents will always be related to adolescent feeding, becoming a role model that ultimately shapes behavior, produces habits, and will ultimately contribute to the nutritional status of adolescents (J. Wang et al., 2023).

Relationship between Pocket Money and Nutritional Status in Adolescents

The results of the statistical analysis showed that there was no significant relationship between pocket money and nutritional status in adolescents. The results of this study align with the research of Hakimi *et al* (2023) which had a p-value of 0.574 due to pocket money intended to buy food and for fare and transportation to school, buying credit or quota. In line with this study, research on junior high school students in Samarinda also stated no relationship between pocket money and adolescent nutritional status (Ayuningsih & Nugroho, 2021). However, another study revealed that the amount of pocket money for adolescents was at risk for overnutrition (Arisdanni & Buanasita, 2018). This is the impact of social trends that result in high pocket money received by adolescents and increase the risk of 40–90% of the incidence of overnutrition (Li et al., 2017). The same results were also found in adolescents in Jakarta City, a metropolitan city with pocket money tending to be more than other cities that are not metropolitan. Income for a student is pocket money; considerable pocket money can provide freedom for children to consume snacks, even though the parents' goal in giving pocket money is partly to save. However, a relatively large allowance is used for snacks (Rahman et al., 2021).

The pocket money received by the respondents in this study was mainly <Rp.11,000, and according to the researcher's observations, the pocket money was not only used for snacks but also for the cost of going to or from school, buying school equipment, and the rest for savings, so the possibility of money being used to buy food both inside and outside the school was still limited. This is in line with Cahyaning, Rizky,2019) which states that pocket money does not affect the nutritional status of adolescents because this group tends to buy snacks according to their purchasing power.

The amount of pocket money adolescents receive determines the purchasing power of food while they are outside the home. The lower the pocket money received, the lower the purchasing power of snacks, and vice versa. The need for a lot of pocket money can reduce the frequency of snacks and show results that do not affect the nutritional status of adolescents (Salsabilla & Sulistyowati, 2021).

Relationship between Macronutrient Intake and Nutritional Status in Adolescents

Proportionally, adolescents with malnutrition nutritional status have sufficient energy intake (25.8%), more protein intake (31.0%), more fat intake (32.0%), and more carbohydrate intake (31.0%). This is in line with the research of Rachmayani *et al.*, (2018) showed a significant relationship between energy intake and adolescent nutritional status. Energy intake is essential for adolescents to run basal metabolism, perform activities, support growth, and regulate body temperature. The speed of physical growth in the early adolescent period is the second most crucial period after infancy, requiring adequate energy intake in adolescents (Mulia et al., 2021).

According to Almatsier, (2011) adolescents need adequate nutritional intake to meet their body's needs; if the intake is insufficient, the body will experience a decrease in energy yield and nutrient deficiencies. Glycogen reserves in the body will be used to produce energy; if this happens for a long time, it will cause the body to become thinner, and there is a decrease in immunity and nutrients absorbed by the body, resulting in an increased risk of disease. Conversely, being overweight results from body fat formation due to excess energy If glucose undergoes glycolysis and enters the Krebs cycle, adenosine triphosphate (ATP) will be formed. However, if glucose is not processed to produce energy, excess glucose will be stored as glycogen during glycogenesis. Lipogenesis converts glycogen that fills cells into fat (Samodra & Musfira, 2021). This allows energy to be stored as fat, eventually leading to weight gain (Dewi Rahmawati & Rakhma, 2024).

In addition, protein and fat intake showed no association with nutritional status in adolescents. Although not statistically significant, the results of logistic regression analysis showed that the lower the protein intake (OR = 1.75) and fat (OR = 1.02) showed the higher incidence of malnutrition in adolescents. The results of this study are in line with the research of Heratama *et al.*, (2021) that there is no association between protein and fat intake with nutritional status of adolescent age 16-17 years.

Unfulfilled of carbohydrate and energy intake has a greater chance of affecting nutritional status (Setiyaningrum, 2021).

Based on the interview results, although respondents consumed vegetable protein (tofu and tempeh) frequently, animal protein still needed to be varied, and the frequency of consumption was rare (Herawati et al., 2023). Respondents do not like to consume fish because, on average, they do not like the fishy smell. Often, habits and ethnic origin influence animal consumption, the Javanese prefer chicken to the Banjar and Bugis, who prefer fish (Kamaruddin et al., 2022). Consumption of more plant protein than animal protein among adolescents is associated with lower body fat percentage than higher animal protein intake (Lin et al., 2015). In addition, a review of antinutrients in plant-based proteins mentioned that consumption of plant-based foods can interfere with the digestive system and absorption of nutrients in food, which can be detrimental to health. Some antinutrients have a positive effect when consumed in small amounts (Popova dan Mihaylova, 2019).

Differences in fat intake and adolescent nutritional status can be caused by the diversity of types and portions of food consumed (Afifah & Hardiansyah, 2024). It can be seen that from the results of the SQ-FFQ interview, most respondents reported excessive fat consumption. Respondents often consume high-fat food ingredients like fried chicken, chicken eggs, fried tempeh and tofu, and other high-fat fried snacks. This shows that the intake of respondents needs to match the needs. Fat intake exceeding the need for a long time can cause nutritional problems (Lestari, 2020). Conversely, some respondents with good nutritional status but insufficient fat intake contribute to changes in nutritional status towards less if their fat intake is not considered (Nisa et al., 2021). Especially in adolescents, technological advances and changes in lifestyle and physical activity create food trends that negatively affect adolescent nutritional status (WHO, 2024).

The results of this study indicate that carbohydrate intake has a significant relationship with nutritional status (p-value = 0.004). This aligns with the research results that a relationship exists between carbohydrate intake and nutritional status in adolescents (Khoerunisa & Istianah, 2021). Excessive carbohydrate intake with frequent consumption of noodles, fried foods, high-sugar snacks, and carbonated drinks (Suha & Rosyada, 2022). Carbohydrates consumed in excess will be stored in the form of fat; if not immediately used for energy changes and lack of physical activity, body fat stores will continue to increase, resulting in increased body weight and obesity (Penggalih et al., 2024). The tendency of adolescent groups to consume high-energy, high-carbohydrate foods is often influenced by the increasing number of new types of snacks in circulation, environmental influences, social life, and poor eating habits outside of school without parental control (Aulia & Sari, 2024).

Increased nutritional fulfillment in adolescent groups, changes in eating habits, and environmental changes make adolescent groups vulnerable to malnutrition (Norris et al., 2022). In addition to macronutrient intake, adolescents also need micronutrient intake such as iron, calcium, zinc, selenium, Vitamin A, Vitamin C, Vitamin D, Vitamin B6, and other types of vitamin minerals to optimize cognitive growth and development and physical, psychological, and emotional changes (Best & Ban, 2021; Larsen & Luna, 2018).

Simultaneous Relationship of Parental Feeding Practice, Pocket Money and Macronutrient Intake with Nutritional Status in Adolescents

Rodenburg *et al.*, (2014) found that eating parenting is linked to self-control. When a child has limited self-control, the purchase and provision of lousy food by their parents was related with less health concerns. This is demonstrated by the provision of food by parents to children, demonstrating that children's low vegetable and fruit intake results from unhealthy food provision. The findings of this investigation were also consistent with Vereecken *et al.*, (2019) that children consume less fruit when their parents impose stringent food restrictions. Furthermore, psychological aspects were linked to teenagers' eating attitudes and eating behavior since parents model eating parenting at home, giving adolescents experience with what they will consume. This event will alter adolescents' attitudes toward food choices, as healthy eating habits might affect nutritional status (Soraya, 2021).

Furthermore, energy, protein, and fat intake showed a p-value> 0.05. This finding was in line with the research of Fakri and Jananda (2021) that there was no significant relationship between energy and protein intake and the nutritional status of adolescents; it was found that the majority of students with protein intake (>80% AKG) and the possibility of a non-optimal protein absorption process. This is in

line with the research of Shalimar *et al*., (2024) which states that there was no significant relationship between fat and protein intake and adolescent nutritional status. This could be due to other factors, such as physical activity and psychological factors, that often change in adolescent groups. In addition, other factors that are more influential on the nutritional status of adolescents, such as the level of nutritional knowledge, should be identified. Adolescents tend not to know that sweets must be limited to avoid obesity; they understand that reducing fatty foods such as "fried foods" is sufficient as a preventive measure for obesity (Anggraini, 2018).

In addition, the Nagelkerke R square value of 0.277 was found, which means that the independent variables (food parenting, pocket money, and macronutrient intake) can explain the dependent variable (adolescent nutritional status) by 27.7%. In comparison, the remaining 72.3% is explained by other factors outside of this study.

Based on this study, 51.7% of adolescents studied had malnutrition (undernutrition, overweight, and obesity), so it can be said that adolescents 13–15 years old in Surakarta City experience double burden diseases. Undernutrition can make adolescents more susceptible to infectious diseases, less able to concentrate, quickly tired, and significantly affect their performance as students at school (Supariasa, 2012). Conversely, adolescents with overweight and obese nutritional status increase their risk of metabolic and cardiovascular diseases in adulthood (Kemenkes, 2018).

CONCLUSIONS AND RECOMMENDATIONS

Parental Feeding Practice, energy intake, and carbohydrate intake all have a significant impact on adolescents nutritional health. When analyse simultaneously, parental feeding practice and carbohydrate intake have the best probability of influencing nutritional status in adolescents. Meanwhile, there is no substantial relationship between pocket money, protein, or fat intake. Additional research is required to determine causation and broaden the scope of the subject field.

It is envisaged that the relevant health offices will be able to implement targeted programs to promote healthy eating habits among adolescents. The interventions provided can take the form of ongoing education through regular visits to schools and the dissemination of knowledge through readily available media. Schools must monitor nutritional status, work with appropriate health service offices, and provide healthy canteens that serve balanced, nutritious meals to adolescents. Parents, both father and mother, have control over the provision of food and serve as ideal role models for teenagers, resulting in healthy eating habits.

REFERENCES

Afifah, N. N., & Hardiansyah, A. (2024). Asupan lemak, asupan serat, persepsi body image dan status gizi siswa SMA Kesatrian 1 Semarang. *Nutrition Scientific Journal*, *3*(1), 8–18. https://doi.org/10.37058/NSJ.V3I1.6426

Al-Jawaldeh, A., Taktouk, M., & Nasreddine, L. (2020). Food Consumption Patterns and Nutrient Intakes of Children and Adolescents in the Eastern Mediterranean Region: A Call for Policy Action. *Nutrients*, *12*(11), 3345. https://doi.org/10.3390/nu12113345

Almatsier, S. (2011). *Prinsip Dasar Ilmu Gizi*. PT Gramedia Pustaka Utama. https://perpus.poltekkesjkt2.ac.id/index.php?p=show_detail&id=1384&keywords=

Anggraini, O. (2018). Tidak ada korelasi antara asupan karbohidrat sederhana, lemak jenuh, dan tingkat aktivitas fisik dengan status gizi pada remaja dengan kegemukan dan obesitas. *AcTion: Aceh Nutrition Journal*, *3*(1), 1. https://doi.org/10.30867/action.v3i1.89

Ardakani, A., Monroe-Lord, L., Wakefield, D., & Castor, C. (2023). Parenting Styles, Food Parenting Practices, Family Meals, and Weight Status of African American Families. *International Journal of Environmental Research and Public Health*, *20*(2), 1382. https://doi.org/10.3390/ijerph20021382

Arisdanni, H., & Buanasita, A. (2018). Hubungan Peran Teman, Peran Orang Tua,Besaran Uang Saku dan Persepsi Terhadap Jajanan Dengan Kejadian Gizi Lebih Pada Anak Sekolah (Studi di SD Negeri Ploso 1/172 Kecamatan Tambaksari Surabaya Tahun 2017). *Amerta Nutrition*, *2*(2), 189. https://doi.org/10.20473/amnt.v2i2.2018.189-196

Arista, C. N., Gifari, N., Nuzrina, R., Sitoayu, L., & Purwara, L. (2021). Perilaku Makan, Kebiasaan Sarapan, Pengetahuan Gizi Dan Status Gizi Pada Remaja Sma Di Jakarta. *Jurnal Pangan*

Kesehatan Dan Gizi Universitas Binawan, *2*(1), 1–15. https://doi.org/10.54771/jakagi.v2i1.206

Aulia, R., & Sari, D. I. (2024). Perbandingan Asupan Karbohidrat pada Remaja Obesitas dan Non Obesitas di Indonesia. *Jurnal Penelitian Pendidikan, Psikologi Dan Kesehatan (J-P3K)*, *5*(1), 309–317. https://doi.org/10.51849/j-p3k.v5i1.304

Ayuningsih, S., & Nugroho, P. S. (2021). Korelasi frekuensi makan dan jumlah uang saku terhadap gizi kurang pada remaja di SMPN 8 Samarinda. *Borneo Student Research*, *2*(2), 1123–1130.

Bahreynian, M., Mozafarian, N., Motlagh, M. E., Qorbani, M., Heshmat, R., & Kelishadi, R. (2019). Association between parental feeding practices and later body mass index in children and adolescents: The Weight disorder survey of the CASPIAN-IV Study. *Mediterranean Journal of Nutrition and Metabolism*, *12*(1), 119–130. https://doi.org/10.3233/MNM-180242

Beckers, D., Karssen, L. T., Vink, J. M., Burk, W. J., & Larsen, J. K. (2021). Food parenting practices and children's weight outcomes: A systematic review of prospective studies. *Appetite*, *158*, 105010. https://doi.org/10.1016/j.appet.2020.105010

Berge, J. M., Meyer, C. S., Loth, K., MacLehose, R., & Neumark-Sztainer, D. (2015). Parent/Adolescent Weight Status Concordance and Parent Feeding Practices. *Pediatrics*, *136*(3), e591–e598. https://doi.org/10.1542/peds.2015-0326

Best, O., & Ban, S. (2021). Adolescence: physical changes and neurological development. *British Journal of Nursing*, *30*(5), 272–275. https://doi.org/10.12968/bjon.2021.30.5.272

Boots, S. B., Tiggemann, M., Corsini, N., & Mattiske, J. (2015). Managing young children's snack food intake. The role of parenting style and feeding strategies. *Appetite*, *92*, 94–101. https://doi.org/10.1016/j.appet.2015.05.012

Cahyaning, Rizky, A. (2019). Hubungan Pola Konsumsi , Aktivitas Fisik dan Jumlah Uang Saku dengan Status Gizi pada Siswa SMP Negeri di Kota Malang Tahun 2019. *Sport Science and Health*, *1*(1), 22–27.

Chew, W. L., Satvinder, K., Tung, S. E. H., Teoh, A. N., & Ng, C. M. (2020). Retrospective child feeding practices and obesity risk among young adults. *Malaysian Journal of Medicine and Health Sciences*, *16*(3), 106–112. https://medic.upm.edu.my/upload/dokumen/2020090810203417_MJMHS_0562.pdf

Cossio-Bolaños, M. A., Vidal-Espinoza, R., Minango-Negrete, J., Olivares, P. R., Urzua-Alul, L., de Campos, L. F. C. C., Fuentes-López, J., Sanchez-Macedo, L., Diaz-Bonilla, E., Torres-Galvis, C., & Gomez-Campos, R. (2021). Estimation of Pubertal Growth Spurt Parameters in Children and Adolescents Living at Moderate Altitude in Colombia. *Frontiers in Endocrinology*, *12*, 718292. https://doi.org/10.3389/FENDO.2021.718292/BIBTEX

Damayanti, A. A., Dewi, Y. L. R., & Kusnandar. (2021). Hubungan Pola Asuh Makan Dan Dukungan Teman Sebaya Dengan Perilaku. *Prosiding Simposium Kesehatan Nasional*.

Dewi Rahmawati, N. I., & Rakhma, L. R. (2024). The Association Between Energy Adequacy Level And Physical Activity With Nutri-tional Status In Adolescents At Walisongo High School, Ketanggungan. *Eduvest - Journal of Universal Studies*, *4*(7), 5612–5629. https://doi.org/10.59188/eduvest.v4i7.1211

Dinkes Surakarta. (2022). *Pemeriksaan Berkala Usia Anak Sekolah Remaja Tahun 2022*.

Erny, E., & Tri handari, S. R. (2019). Hubungan Antara Aktivitas Fisik dan Konsumsi Zat Besi dengan Status Gizi pada Remaja Putri di SMP Yayasan Pendidikan Islam Bintaro Jakarta Selatan Tahun 2017. *Jurnal Kedokteran Dan Kesehatan*, *15*(1), 56. https://doi.org/10.24853/jkk.15.1.56-62

Fakri, S., & Jananda, I. (2021). Hubungan Asupan Energi Dan Protein Dengan Status Gizi Santri Di Pesantren Nurul Falah Meulaboh Tahun 2019. *Jurnal Syntax Fusion*, *1*(07), 194–203. https://doi.org/10.54543/fusion.v1i07.36

Fauziyyah, A. N., Mustakim, M., & Sofiany, I. R. (2021). Pola Makan dan Kebiasaan Olahraga Remaja. *Jurnal Penelitian Dan Pengembangan Kesehatan Masyarakat Indonesia*, *2*(2), 115–122. https://doi.org/10.15294/jppkmi.v2i2.51971

Fleary, S. A., & Ettienne, R. (2019). The relationship between food parenting practices, parental diet and their adolescents' diet. *Appetite*, *135*(January), 79–85. https://doi.org/10.1016/j.appet.2019.01.008

Hakimi, A. N. Q., Sholichah, F., & Hayati, N. (2023). Hubungan Uang Saku dan Pola Konsumsi Makanan Terhadap Status Gizi Siswa SMPN 16 Semarang. *Jurnal Ilmiah Gizi Dan Kesehatan*

(JIGK), *4*(02), 32–36. https://jurnal.umus.ac.id/index.php/JIGK/article/view/1047

Hazzard, V. M., Loth, K. A., Berge, J. M., Larson, N. I., Fulkerson, J. A., & Neumark-Sztainer, D. (2020). Does exposure to controlling parental feeding practices during adolescence predict disordered eating behaviors 8 years later in emerging adulthood? *Pediatric Obesity*, *15*(10). https://doi.org/10.1111/ijpo.12709

Heratama, N. R., Kusnandar, K., & Suminah, S. (2021). Vegetable and Fruits Consumption, Physical Activity, and Nutritional Status of Adolescents. *Al-Sihah: The Public Health Science Journal*, *13*(2), 187. https://doi.org/10.24252/al-sihah.v13i2.23588

Herawati, V., Rizqi, E. R., & Afrinis, N. (2023). Hubungan Asupan Energi Protein dan Pengetahuan Tentang Gizi Seimbang dengan Status Gizi Remaja di Posyandu Remaja Desa Pangkalan Jambi Kecamatan Bukit Batu. *Jurnal Kesehatan Tambusai*, *4*(1), 65–77. https://doi.org/10.31004/JKT.V4I1.12105

Jang, M., Brandon, D., & Vorderstrasse, A. (2019). Relationships Among Parental Psychological Distress, Parental Feeding Practices, Child Diet, and Child Body Mass Index. *Nursing Research*, *68*(4), 296–306. https://doi.org/10.1097/NNR.0000000000000344

Jokomarsono, E. P., Probandari, A., & Wiboworini, B. (2022). The Relationship between Frequency of High-Sugar, Salt and Fat Food Consumption and the BMI in Adolescents. *Internation Summit of Science Acceleration*, 13–20. https://proceedings.ums.ac.id/index.php/iseth/article/view/2638

Kamaruddin, I., Anwar, F., Kustiyah, L., & Riyadi, H. (2022). The Difference in Nutritional Intake and Physical Activity to Nutritional Status in Adolescents. *International Journal of Sciences: Basic and Applied Research (IJSBAR)*, *62*(2), 1–17. https://www.gssrr.org/index.php/JournalOfBasicAndApplied/article/view/13989

Kembaren, G. I. (2021). *Hubungan Pola Asuh Makan dan Aktivitas Fisik, dengan Status Gizi Anak Balita pada Kelompok Ibu Bekerja dan Ibu Tidak Bekerja*. Institut Pertanian Bogor.

Kemenkes. (2018). *Kenali Masalah Gizi yang Ancam Remaja Indonesia – Sehat Negeriku*.

Khoerunisa, D., & Istianah, I. (2021). Hubungan Asupan Zat Gizi Makro Dan Aktivitas Fisik Dengan Status Gizi Pada Remaja. *Jurnal Pangan Kesehatan Dan Gizi Universitas Binawan*, *2*(1), 51–61. https://doi.org/10.54771/jakagi.v2i1.236

Kinasih, P. (2021). Hubungan Pengetahuan Gizi dengan Frekuensi Konsumsi Fast Food pada Mahasiswa Program Studi Ilmu Gizi Fakultas Ilmu Kesehatan Universitas Muhammadiyah Surakarta pada Masa Pandemi Covid-19. [Universitas Muhammadiyah Surakarta]. In *Universitas Muhammadiyah Surakarta*. https://eprints.ums.ac.id/96581/1/NASKAH PUBLIKASI_PRANANINGRUM KINASIH.pdf

Kipp, C., Wilson, D. K., Sweeney, A. M., Zarrett, N., & Van Horn, M. L. (2021). Effects of Parenting and Perceived Stress on BMI in African American Adolescents. *Journal of Pediatric Psychology*, *46*(8), 980–990. https://doi.org/10.1093/jpepsy/jsab025

Larsen, B., & Luna, B. (2018). Adolescence as a neurobiological critical period for the development of higher-order cognition. *Neuroscience & Biobehavioral Reviews*, *94*, 179–195. https://doi.org/10.1016/j.neubiorev.2018.09.005

Lestari, P. (2020). Hubungan Pengetahuan Gizi, Asupan Makanan dengan Status Gizi Siswi Mts Darul Ulum. *Sport and Nutrition Journal*, *2*(2), 73–80. https://doi.org/10.15294/spnj.v2i2.39761

Li, M., Xue, H., Jia, P., Zhao, Y., Wang, Z., Xu, F., & Wang, Y. (2017). Pocket money, eating behaviors, and weight status among Chinese children: The Childhood Obesity Study in China mega-cities. *Preventive Medicine*, *100*, 208–215. https://doi.org/10.1016/j.ypmed.2017.04.031

Lin, Y., Mouratidou, T., Vereecken, C., Kersting, M., Bolca, S., de Moraes, A. C. F., Cuenca-García, M., Moreno, L. A., González-Gross, M., Valtueña, J., Labayen, I., Grammatikaki, E., Hallstrom, L., Leclercq, C., Ferrari, M., Gottrand, F., Beghin, L., Manios, Y., Ottevaere, C., … Huybrechts, I. (2015). Dietary animal and plant protein intakes and their associations with obesity and cardio-metabolic indicators in European adolescents: the HELENA cross-sectional study. *Nutrition Journal*, *14*(1), 10. https://doi.org/10.1186/1475-2891-14-10

Litchford, A., Savoie Roskos, M. R., & Wengreen, H. (2020). Influence of fathers on the feeding practices and behaviors of children: A systematic review. *Appetite*, *147*(December 2019), 104558. https://doi.org/10.1016/j.appet.2019.104558

Loth, K. A., MacLehose, R., Fulkerson, J., Crow, S., & Neumark-Sztainer, D. (2013). Eat this, not that!

Parental demographic correlates of foodrelated parenting practices. *NIH Public Access*, *60*(1), 140–147. https://doi.org/10.1016/j.appet.2012.09.019.Eat

Margiyanti, N. J. (2021). Analisis Tingkat Pengetahuan, Body Image dan Pola Makan terhadap Status Gizi Remaja Putri. *Jurnal Akademika Baiturrahim Jambi*, *10*(1), 231. https://doi.org/10.36565/jab.v10i1.341

Mazza, M., Morseth, M., & Torheim, L. E. (2022). Association between parental feeding practices and children's dietary intake: a cross-sectional study in the Gardermoen Region, Norway. *Food & Nutrition Research*, *66*, 66. https://doi.org/10.29219/FNR.V66.8050

Monroe-Lord, L., Anderson, A., Jones, B. L., Richards, R., Reicks, M., Gunther, C., Banna, J., Topham, G. L., Lora, K. R., Wong, S. S., Ballejos, M., Hopkins, L., & Ardakani, A. (2022). Relationship between Family Racial/Ethnic Backgrounds, Parenting Practices and Styles, and Adolescent Eating Behaviors. *International Journal of Environmental Research and Public Health*, *19*(12), 7388. https://doi.org/10.3390/ijerph19127388

Moore Heslin, A., & McNulty, B. (2023). Adolescent nutrition and health: characteristics, risk factors and opportunities of an overlooked life stage. *Proceedings of the Nutrition Society*, *82*(2), 142–156. https://doi.org/10.1017/S0029665123002689

Mulia, D. A., Amar, M. I., Sufyan, D. L., & Simanungkalit, S. F. (2021). Hubungan Asupan Energi dan Protein, Kualitas Tidur, dan Aktivitas Fisik Terhadap Prestasi Belajar di SMK Tunas Grafika Informatika 2020. *Ghidza: Jurnal Gizi Dan Kesehatan*, *5*(2), 197–210. https://doi.org/10.22487/ghidza.v5i2.216

Nisa, N., Arifin, D. Z., & Herutomo, T. (2021). Hubungan Asupan Energi Dan Lemak Dengan Status Gizi Imt/U Pada Santriwati Kelas 4, 5 Dan 6 Salafiyah Di Pondok Pesantren Pagelaran Iii Gardusayang, Cisalak, Kab. Subang Tahun 2020. *Journal of Holistic and Health Sciences*, *5*(2), 92–97. https://doi.org/10.51873/jhhs.v5i2.128

Norris, S. A., Frongillo, E. A., Black, M. M., Dong, Y., Fall, C., Lampl, M., Liese, A. D., Naguib, M., Prentice, A., Rochat, T., Stephensen, C. B., Tinago, C. B., Ward, K. A., Wrottesley, S. V., & Patton, G. C. (2022). Nutrition in adolescent growth and development. *The Lancet*, *399*(10320), 172–184. https://doi.org/10.1016/S0140-6736(21)01590-7

Penggalih, M. H. S. T., Isnanta, R., Rahadian, B., Margono, M., Sujadi, D., Wicaksari, S. A., Reswati, V. D. Y., Indriyani, S., & Niamilah, I. (2024). Hubungan antara Asupan Zat Gizi dan Pertumbuhan Tinggi Badan pada Atlet Remaja di Indonesia: A Cross Sectional Study. *Amerta Nutrition*, *8*(1), 40–48. https://doi.org/10.20473/amnt.v8i1.2024.40-48

Popova, A., & Mihaylova, D. (2019). Antinutrients in Plant-based Foods: A Review. *The Open Biotechnology Journal*, *13*(1), 68–76. https://doi.org/10.2174/1874070701913010068

Purtiantini. (2024). *Direktorat Jenderal Pelayanan Kesehatan*. Kementerian Kesehatan RI.

Rachmayani, S. A., Kuswari, M., & Melani, V. (2018). Hubungan Asupan Zat Gizi dan Status Gizi Remaja Putri di SMK Ciawi Bogor. *Indonesian Journal of Human Nutrition*, *5*(2), 125–130. https://doi.org/10.21776/ub.ijhn.2018.005.02.6

Rah, J. H., Melse-Boonstra, A., Agustina, R., van Zutphen, K. G., & Kraemer, K. (2021). The Triple Burden of Malnutrition Among Adolescents in Indonesia. *Food and Nutrition Bulletin*, *42*(1_suppl), S4–S8. https://doi.org/10.1177/03795721211007114

Rahayu, H. K., Hindarta, N. A., Wijaya, D. P., Cahyaningrum, H., Kurniawan, M. E. T., Salsabila, & Faiza, T. A. (2023). *Gizi dan Kesehatan Remaja*. Zahira Media Publisher. https://reposister.almaata.ac.id/id/eprint/88/1/Gizi dan Kesehatan Remaja.pdf

Rahman, J., Fatmawati, I., Syah, M. N. H., & Sufyan, D. L. (2021). Hubungan peer group support, uang saku dan pola konsumsi pangan dengan status gizi lebih pada remaja. *AcTion: Aceh Nutrition Journal*, *6*(1), 65. https://doi.org/10.30867/action.v6i1.391

Ray, C., & Roos, E. (2012). Family characteristics predicting favourable changes in 10 and 11-year-old children's lifestyle-related health behaviours during an 18-month follow-up. *Appetite*, *58*(1), 326–332. https://doi.org/10.1016/j.appet.2011.10.009

Riskesdas. (2018). Hasil Utama Riset Kesehatan Dasar. *Laporan Riskesdas Nasional 2018*, 120.

Rodenburg, G., Kremers, S. P. J., Oenema, A., & Van De Mheen, D. (2014). Associations of parental feeding styles with child snacking behaviour and weight in the context of general parenting. *Public Health Nutrition*, *17*(5), 960–969. https://doi.org/10.1017/S1368980013000712

Ruzicka, E. B., Darling, K. E., & Sato, A. F. (2021). Controlling child feeding practices and child weight: A systematic review and meta-analysis. *Obesity Reviews*, *22*(3), 1–10. https://doi.org/10.1111/obr.13135

Salsabilla, N., & Sulistyowati, M. (2021). The Analisis Faktor Perilaku Konsumsi Remaja Terhadap Makanan Cepat Saji (Studi Aplikasi Social Cognitive Theory). *Preventif : Jurnal Kesehatan Masyarakat*, *12*(2), 239. https://doi.org/10.22487/preventif.v12i2.196

Samodra, Y. T. J., & Musfira, N. (2021). Hasil Latihan Intensitas 75% Kemampuan Repetisi Maksimal terhadap Berat Badan. *Jurnal Pendidikan Kesehatan Rekreasi*, *7*(2), 248–263. https://doi.org/10.5281/ZENODO.4895768

Sellia Juwita, Sara Herlina, Siti Qomariah, & Wiwi Sartika. (2022). Hubungan Pengetahuan Remaja Terhadap Kejadian Gizi Lebih Pada Remaja Di Kota Pekanbaru. *Al-Insyirah Midwifery: Jurnal Ilmu Kebidanan (Journal of Midwifery Sciences)*, *11*(1), 13–18. https://doi.org/10.35328/kebidanan.v11i1.2116

Setiyaningrum, Z. (2021). Asupan Zat Gizi dan Status Gizi Remaja Putri di Pondok Pesantren Firdaus. *Jurnal Ilmiah Gizi Dan Kesehatan (JIGK)*, *3*(01), 1–8. https://doi.org/10.46772/jigk.v3i01.559

Setyawan, F., Panunggal, B., Nuryanto, Syauqy, A., & Rahadiyanti, A. (2019). Hubungan Pengetahuan dan Sikap Gizi dengan Perilaku Makan Dari Luar Rumah pada Remaja di Kota Surakarta. *Journal of Nutrition College*, *8*(4), 187–195. https://ejournal3.undip.ac.id/index.php/jnc/article/view/25832

Shalimar, S., Picauly, I., Nur, L., & Masyarakat, K. (2024). Pengaruh Tingkat Konsumsi Zat Gizi Makro, Pengetahuan tentang Gizi dan Body Image terhadap IMT Remaja Putri di MAN 2 Manggarai. *SEHATMAS: Jurnal Ilmiah Kesehatan Masyarakat*, *3*(1), 82–91. https://doi.org/10.55123/SEHATMAS.V3I1.2555

Soraya, S. (2021). *Pengaruh Gaya Pengasuhan, Kontrol Diri, Pola Asuh Makan Terhadap Pengetahuan, Sikap Makan, Dan Perilaku Makan Remaja* [Institut Pertanian Bogor]. https://repository.ipb.ac.id/handle/123456789/109197

Stromberg, S. E., Wheeler, P. B., Chardon, M. L., & Janicke, D. M. (2019). Parent perceptions of restrictive feeding on the relationship between youth BMI z-score and weight control behavior use in African American youth: A mediational study. *Eating Behaviors*, *33*, 67–72. https://doi.org/10.1016/j.eatbeh.2019.03.006

Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. CV. Alfabeta.

Suha, G. R., & Rosyada, A. (2022). Faktor-faktor yang berhubungan dengan kejadian obesitas pada remaja umur 13–15 tahun di Indonesia (analisis lanjut data Riskesdas 2018). *Ilmu Gizi Indonesia*, *6*(1), 43. https://doi.org/10.35842/ilgi.v6i1.339

Supariasa. (2012). *Penilaian Status Gizi*. EGC.

Unicef. (2018). *UNICEF Programme Guidance for the Second Decade: Programming With and for Adolescents*. United Nations Children's Fund. https://www.unicef.org/media/57336/file

Vereecken, C., Legiest, E., De Bourdeaudhuij, I., & Maes, L. (2019). Associations between general parenting styles and specific food-related parenting practices and children's food consumption. *American Journal of Health Promotion : AJHP*, *23*(4), 233–240. https://doi.org/10.4278/AJHP.07061355

Wang, J., Wang, G., Zhang, L., Zhang, W., & Zhang, L. (2023). How Do Parental Feeding Knowledge and Practices Affect Chinese Children's Weight Status? Findings from Multiple Waves of CHNS. *Journal of Child and Family Studies*, *32*(10), 3009–3025. https://doi.org/10.1007/s10826-023-02684-z

Wang, Q., Cui, S., Barnhart, W. R., Liu, Y., Yu, Y., Cui, T., & He, J. (2022). Relationships between retrospective parental feeding practices and Chinese university students' current appetitive traits, weight status, and satisfaction with food-related life. *Appetite*, *175*(February), 106061. https://doi.org/10.1016/j.appet.2022.106061

WHO. (2024). *Obesity and overweight*. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight

Widiastuti, A. O., & Widyaningsih, E. N. (2023). Gambaran Asupan Zat Gizi Makro dan Status Gizi Remaja SMA di Kota Surakarta. *Jurnal Kesehatan Indonesia*, *13*(2), 109. https://doi.org/10.33657/jurkessia.v13i2.773

Widnatusifah, E., Battung, S., Bahar, B., Jafar, N., & Amalia, M. (2020). Gambaran Asupan Zat Gizi Dan Status Gizi Remaja Pengungsian Petobo Kota Palu. *Jurnal Gizi Masyarakat Indonesia: The Journal of Indonesian Community Nutrition*, *9*(1), 17–29. https://doi.org/10.30597/jgmi.v9i1.10155

Winpenny, E. M., van Sluijs, E. M. F., White, M., Klepp, K. I., Wold, B., & Lien, N. (2018). Changes in diet through adolescence and early adulthood: longitudinal trajectories and association with key life transitions. *The International Journal of Behavioral Nutrition and Physical Activity*, *15*(1), 86. https://doi.org/10.1186/S12966-018-0719-8/TABLES/2

Yang, L., Bovet, P., Ma, C., Zhao, M., Liang, Y., & Xi, B. (2019). Prevalence of underweight and overweight among young adolescents aged 12–15 years in 58 low-income and middle-income countries. *Pediatric Obesity*, *14*(3). https://doi.org/10.1111/ijpo.12468

Yee, A. Z. H., Lwin, M. O., & Ho, S. S. (2017). The influence of parental practices on child promotive and preventive food consumption behaviors: a systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity*, *14*(1), 47. https://doi.org/10.1186/s12966-017-0501-3

Yumni, D. Z., & Wijayanti, H. S. (2017). Perbedaan Pola Asuh Pemberian Makan dan Perilaku Makan Antara Balita Obesitas dan Balita Tidak Obesitas di Kota Semarang. *Journal of Nutrition College*, *6*(1), 43–51.