

THE RELATIONSHIP BETWEEN EMOTIONAL EATING, MEAL SKIPPING AND UNHEALTHY FOOD CONSUMPTION PATTERN IN ADOLESCENT GIRLS

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ABSTRACT

Introduction: Psychological problems can lead to emotional eating and meal skipping, which may impact unhealthy food consumption patterns. This study aimed to assess the interrelationship between emotional eating, meal skipping, and unhealthy food consumption pattern in adolescent girls. **Method:** This cross-sectional study included 122 samples of adolescent girls aged 13-15 years. The study was carried out in Tangerang, in June 2021. The data of emotional eating were measured by Emotional Eater Questionnaire (EEQ), meal skipping collected by self-reported questionnaire of daily eating frequency, and unhealthy food consumption patterns measured by Food Frequency Questionnaires (FFQ). **Result:** The results showed majority of emotional eater subjects more often consumed fatty foods (76.6%). It's also found that adolescents skipping breakfast were high in consumed sweet foods (66.0%), while those skipping lunch (63.6%) and dinner (54.5%) were found higher to consume fatty foods than others. In addition, multivariate regression analyses showed that simultaneously between the variables, only emotional eating variables had a significant relationship with unhealthy food consumption patterns (p-value = 0.002), while meal skipping variables were not significantly related. **Conclusion:** It can be concluded that emotional eating can affect unhealthy food consumption patterns among adolescent girls, while meal skipping did not show any meaningful effect.

Keywords: adolescent, female, eating behavior, emotions, meals

INTRODUCTION

Adolescence has been proven as a second window of opportunity in affecting developmental pathways (including cognitive growth and development), establishing future habits, improving some poor childhood experiences (United Nations Children's Fund, 2021). Especially for adolescent girls, who would enter motherhood, not only for their health, the nutritional status will be important for the health of their offspring (WHO, 2014). When an adolescent girl is malnourished, it can impact the cycle of malnutrition for the next generation (SPRING and Save the Children, 2018).

Currently, almost the entire population in the world is facing the COVID-19 outbreak. Prior study has revealed that the prevalence of adolescents with psychological health problems was

high during these pandemics (Zhou et al., 2020). Other studies reported anxiety and depression were found higher in emotional eaters, which could impact on higher fat intake, fast food intake, more frequent consumption of sugary foods, and also reported were to eat fewer meals per day or skip meals (Di Renzo et al., 2020). It can be seen that psychological problems can lead to emotional eating and meal skipping, which may impact unhealthy food consumption patterns.

Emotional eating is defined as a tendency to abnormal eating because of a reaction to negative emotions, such as stress, anxiety, and depression (Van Strien and Ouwens, 2007). People who are under negative emotions can become prone to overeating or even undereating (Alalwan et al., 2019). Adolescents were more likely to consume unhealthy food frequently when in high emotional eating and adolescent girls

Cite this as: Zahrah, N.I., Fanani, M & Ardyanto, T.D.(2023). The Relationship Between Emotional Eating, Meal Skipping And Unhealthy Food Consumption Pattern In Adolescent Girls, 18(1), 47-58. <https://doi.org/10.20473/ijph.v18i1.2023.47-58>

©2023 IJPH. Open access under CC BY NC-SA. License doi: 10.20473/ijph.v18i1.2023.47-58 Received 11 October 2021, received in revised form 27 February 2022, Accepted 1 March 2022, Published online: April 2023. Publisher by Universitas Airlangga

were reported more frequent than boys (Bui et al., 2021). The majority of emotional eaters are found in overweight adolescents and reported eating more sweet snacks and drinks (Rachmawati, Anantanyu and Kusnandar, 2019). In contrast, a previous study has shown that neither high emotional eaters or low emotional eaters have differences in food intake (Van Strien et al., 2013).

Meal skipping has been frequently reported as a habit among adolescents. Skipping dinner can cause $\geq 10\%$ weight gain and overweight/obesity (Yamamoto et al., 2021). People who skip breakfast have also been found to be more overweight/obese than never-skippers (Wadolowska et al., 2019). Furthermore, skipping meals at school can impact less physical activity and energy (Wang et al., 2017). According to the healthy eating index (HEI), in comparison to skipping breakfast, consumption of seafood/plant proteins and vegetables in skipping dinner was reduced significantly (Zeballos and Todd, 2020). Meal skippers reported having a low consumption of fruits and vegetables, but a high consumption of added sugar, sodium, fat, and alcoholic beverages. (Rodrigues et al., 2017).

Increased consumption of unhealthy foods in adolescence will have an impact on nutritional problems. Globally, 20.4% (8.4% girls and 12.4% boys) children and adolescents were underweight (thinness), prevalence of adolescents with obesity in 1975 which increased from $<1\%$ to more than 5% in girls and almost 8% in boys in 2016. Based on Indonesian Basic Health Research (*Riskesdas*) surveys, it shows increasing prevalence of overweight and obesity which was originally 10% in 2013 to 16% in 2018. Moreover, Indonesia is still dealing with anemia among adolescents aged 15-24 years; the survey revealed that the prevalence of iron deficiencies anemia was increased from 8.4% in 2013 to 32% in 2018 (Basic Health Research, 2018).

Nutrition during adolescence is needed to support physical and cognitive

growth and development, provide adequate energy stores for pregnancy, and prevent the onset of nutrition-related diseases in adulthood (WHO, 2006). Adolescent girls are related to a major contribution to pregnancy and birth safety when they become mothers in the future. Adolescent girls who marry at a young age have anemia and underweight problems and can be at risk of giving low birth weight babies (Bappenas, 2012). Therefore, eating behavior and healthy eating patterns need to be implemented in order to meet nutritional needs and avoid nutritional problems in adolescents.

Different from previous study that examined the association of emotional eating and meal skipping on unhealthy food consumption patterns involving adolescent girl and boy subjects (Bui et al., 2021; Yamamoto et al., 2021), this study only focuses on adolescent girls. Moreover, based on existing evidence, we hypothesize that emotional eaters tended to be meal skippers and have contributed to unhealthy food consumption patterns. Therefore, this study aimed to assess the interrelationship between emotional eating, meal skipping, and unhealthy food consumption pattern in adolescent girls.

METHODS

This observational analytic study used a cross-sectional design conducted in Tangerang City, in June 2021. There are 122 subjects involved in this current study. All subjects were adolescent girls aged 13-15 who lived with parents, were capable of communicating online, and were in a healthy condition during the study. Subjects excluded from the study were adolescents on medication that consumed anti-depressants, mood stabilizers, anti-anxiety, stimulants for appetite or weight gain/loss, smoke, drink alcoholic beverages, adolescents on diets and have a disease that can affect food consumption patterns, such as heart, cancer, and diabetes. All subjects involved have received an explanation

about the study and have agreed to participate in the study using informed consent.

Since the present study was conducted in a COVID-19 outbreak, the data were collected online. Variable of emotional eating was measured with Emotional Eating Questionnaire (EEQ) (Garaulet et al., 2012). This questionnaire has been used and validated on Indonesian adolescent subjects in previous studies (Rachmawati, Anantanyu and Kusnandar, 2019). The EEQ includes 10 items with a four-point Likert score (1 for “never”, 2 for “sometimes”, 3 for “often”, and 4 for “always”). The total score will be categorized into “non-emotional eater” for 0-5, “low emotional eater” for 6-10, “emotional eater” for 11-20, and “very emotional eater” for 21-30 (Garaulet et al., 2012). Meal skipping data were collected by asking how many ate three regular meals (breakfast, lunch, and dinner) per day in the past week. The subjects will be divided into two groups; those who had three regular meal intakes during 6-7 days in the past week will be categorized as Regular Meal Consumer (RM), and those who had under 6-7 days in a week will be categorized as Meal Skipper (MS) group (Kim et al., 2012). While unhealthy food refers to foods that significantly increase the risk of disease, it does not immediately pose a risk of harm; the component that attributes risk are food substances themselves (e.g., fat, sugar, or salt). Unhealthy food groups consist of certain kinds of fast food, sugary drinks, and processed foods high in sodium, sugar, and fat (Barnhill et al., 2014). Unhealthy food consumption patterns were calculated by Food Frequency Questionnaires (FFQ) which include a total of 28 item questions of types of sweets food (5 items), sweets beverage (7 items), salty food (4 items), fatty food (4 items), and fast food (8 items) (Sirajuddin, Surmita and Astuti, 2018). The unhealthy food types were developed from The Questionnaire of Indonesian Basic Health Research in 2018, and the types of food in this questionnaire

were obtained from surveys related to foods that are often consumed among adolescents. Subjects who never consumed a type of food will be scored 1, score 2 for 1-3 times a month, score 3 for 1-2 times a week, score 4 for 3-4 times a week, score 5 for daily, and score 6 for more than twice a day. Each individual scoring result will compared with the mean of population and categorized into “often” if the score < mean or “not often” if the score \geq mean (Sirajuddin, Surmita and Astuti, 2018).

The current study used the Chi-square test to analyze the characteristics of subjects and the interrelationship of emotional eating, meal skipping, and unhealthy food consumption pattern was analyzed by binary logistic regression. SPSS V.23 was performed for all statistical analyses. All subjects were explained about the objective and management of the study. The Ethics Committee of Faculty Medicine, Sebelas Maret University in Surakarta approved this study No.40/UN27.06.6.1/KEP/EC/2021.

RESULT

A total of 122 adolescent girls aged 13-15 years were included in this study. Table 1 shows that among 122 subjects, 43 (35.2%) were aged 13 years, 64 (52.5%) were aged 14 years, and 15 (12.3%) were aged 15 years. The majority (58.2%) of the subjects' mother's education was middle, others were high (13.9%) and low education (27.9%). According to The Tangerang City Regional Minimum Wage in 2021 which was 4.262.015.37 IDR per month, 54.9% of parents had an income above it and 45.1% were below it. Based on eating behavior, the majority of adolescent girls were emotional eaters (38.5%), others were low-emotional eaters (37.7%), non-emotional eaters (19.7%), and very-emotional eaters (4.1%). Moreover, most adolescent girls were breakfast skippers (41.0%), while others were lunch skippers (27.0%) and dinner skippers (27.0%).

Table 1. Distribution of Subjects' Characteristics

Category	N = 122	
	n	%
Age (years)		
13	43	35.2
14	64	52.5
15	15	12.3
Mother Education		
Low	34	27.9
Middle	71	58.2
High	17	13.9
Parent Income*		
< Regional Minimum Wage	55	45.1
≥ Regional Minimum Wage	67	54.9
Emotional Eating		
Non-Emotional Eater	24	19.7
Low-Emotional Eater	46	37.7
Emotional Eater	47	38.5
Very Emotional Eater	5	4.1
Breakfast		
Regular Meal Consumer	72	59.0
Meal Skipper	50	41.0
Lunch		
Regular Meal Consumer	89	73.0
Meal Skipper	33	27.0
Dinner		
Regular Meal Consumer	89	73.0
Meal Skipper	33	27.0

Note : (*) The Tangerang City Regional Minimum Wage in 2021 was 4.262.015.37 IDR per month

The difference between emotional eating and meal skipping based on types of unhealthy food is shown in Table 2. Table 2 shows that adolescent girls who are emotional eaters were reported to more often consume fatty food (76.6%), than consume sweet food (61.7%), salty food (59.6%), and fast food (59.6%). In addition, the Chi-square test indicated that emotional eating and unhealthy food consumption patterns statistically were significantly different, with a p-value 0.016 (< 0.05).

Examining meal skipping, Table 2 shows that adolescent girls who were breakfast skippers were found more often to consume sweet food (66.0%), compared

with salty food (56.0%), fatty food (58.0%), and fast food (56.0%). Moreover, adolescent girls who were lunch skippers were reported more often to consume fatty food (63.6%), than sweet food (54.5%), salty food (54.4%), and fast food (60.6%). While, adolescent girls who were dinner skippers were found more often to consume fatty food (54.5%), compared with sweet food (42.4%), salty food (51.5%), and fast food (39.4%). However, the Chi-square test indicated that meal skipping, including breakfast (p-value = 0.581), lunch (p-value = 0.684), dinner skipping (p-value = 0.415) and unhealthy food consumption patterns, statistically were not significant different.

Table 2. Difference of Emotional Eating and Meal Skipping Based on Types of Unhealthy Food

	Unhealthy Food Consumption Pattern								P
	Sweets Food		Salty Food		Fatty Food		Fast Food		
	Seldom	Often	Seldom	Often	Seldom	Often	Seldom	Often	
Emotional Eating									
Non-EE	17 (70.8)	7 (29.2)	16 (66.7)	8 (33.3)	11 (45.8)	13 (54.2)	16 (66.7)	8 (33.3)	0.016*
Low-EE	21 (45.7)	25 (54.3)	24 (52.2)	22 (47.8)	22 (47.8)	24 (52.2)	23 (50.0)	23 (50.0)	
EE	18 (38.3)	29 (61.7)	19 (40.4)	28 (59.6)	11 (23.4)	36 (76.6)	19 (40.4)	28 (59.6)	
Very -EE	1 (20.0)	4 (80.0)	1 (20.0)	4 (80.0)	2 (40.0)	3 (60.0)	2 (40.0)	3 (60.0)	
Breakfast									
RM	40 (55.6)	32 (44.4)	38 (52.8)	34 (47.2)	25 (34.7)	47 (65.3)	38 (52.8)	34 (47.2)	0.581
MS	17 (34.0)	33 (66.0)	22 (44.0)	28 (56.0)	21 (42.0)	29 (58.0)	22 (44.0)	28 (56.0)	
Lunch									
RM	42 (47.2)	47 (52.8)	45 (50.6)	44 (49.4)	34 (38.2)	55 (61.8)	47 (52.8)	42 (47.2)	0.684
MS	15 (45.5)	18 (54.5)	15 (45.5)	18 (54.4)	12 (36.4)	21 (63.6)	13 (39.4)	20 (60.6)	
Dinner									
RM	38 (42.7)	51 (57.3)	44 (49.4)	45 (50.6)	31 (34.8)	58 (65.2)	40 (44.9)	49 (55.1)	0.415
MS	19 (57.6)	14 (42.4)	16 (48.5)	17 (51.5)	15 (45.5)	18 (54.5)	20 (60.6)	13 (39.4)	

Note: Non-EE: Non Emotional Eater, Low-EE: Low Emotional Eater, EE: Emotional Eater, Very-EE: Very Emotional Eater, RM: Regular Meal Consumer, MS: Meal Skipper, (*) Chi-square test with significant p-value < 0.05

The logistic regressions for multivariate analysis are presented in Table 3. It shows that adolescent girls who are emotional eaters were statistically significant with unhealthy food consumption patterns, with a p-value 0.005 (< 0.05), which indicated that emotional eating contributed to affecting unhealthy food consumption patterns. Moreover, the value of Odds Ratio (OR) adjusted by education level of mother and father, and average income level of both parents was 4.79 (95% CI: 1.60-14.38); it means that adolescent girls who were emotional eaters

had risk 4.79 times of consuming unhealthy foods, compared to those who were not emotional eaters.

However, the meal skipping variables, including breakfast skipping (p-value = 0.461), lunch skipping (p-value = 0.721), and dinner skipping (p-value = 0.189) were not statistically significant with unhealthy food consumption patterns, both in univariate analysis or in multivariate analysis involving control variables. It indicated that meal skipping, including breakfast, lunch, and dinner skipping, did not significantly contribute to affecting unhealthy food consumption patterns.

Table 3 Relationship between Emotional Eating, Meal Skipping, and Unhealthy Food Consumption Pattern

	Unhealthy Food Consumption Pattern								
	Frequency		Crude OR			Adjusted OR**			
	Seldom n (%)	Often n (%)	OR	95%CI	P value	OR	95% CI	P value	
Emotional Eating									
Non-EE	17 (70.8)	7 (29.2)	Ref.			Ref.			0.018*
Low-EE	26 (56.5)	20 (43.5)	1.85	0.64-5.39	0.257	1.90	0.64-5.55	0.247	
EE	17 (36.2)	30 (63.8)	4.43	1.51-12.99	0.007*	4.79	1.60-14.38	0.005*	
Very -EE	1 (20.0)	4 (80.0)	7.90	0.71-88.13	0.093	9.22	0.79-107.97	0.077	
Breakfast									

	Unhealthy Food Consumption Pattern							
	Frequency		Crude OR			Adjusted OR**		
	Seldom n (%)	Often n (%)	OR	95%CI	P value	OR	95% CI	P value
RM	38 (52.8)	34 (47.2)	Ref.			Ref.		
MS	23 (46.0)	27 (54.0)	1.35	0.61-2.98	0.445	1.35	0.61-3.00	0.461
Lunch								
RM	46 (51.7)	43 (48.3)	Ref.			Ref.		
MS	15 (45.5)	18 (54.5)	1.25	0.51-3.09	0.627	1.19	0.46-3.07	0.721
Dinner								
RM	42 (47.2)	47 (52.8)	Ref.			Ref.		
MS	19 (57.6)	14 (42.4)	0.57	0.24-1.38	0.214	0.55	0.22-1.35	0.189

Note: Non-EE: Non Emotional Eater, Low-EE: Low Emotional Eater, EE: Emotional Eater, Very-EE: Very Emotional Eater, RM: Regular Meal Consumer, MS: Meal Skipper, Ref: Reference, (*)Logistic Regression test with significant p-value < 0.05, **OR adjusted by education level of mother and father, and average income level of both parents.

DISCUSSION

This current study found that the prevalence of emotional eating among adolescent girl subjects was 42.6%. It means almost half of the total subjects were emotional eaters, even very emotional eaters. Several previous studies have shown evidence that adolescent girls tend to be more emotional eaters than boys (Rachmawati et al. 2019, Bui et al. 2021). One of the influencing factors is stress: adolescent girls tended to eat to release stress compared with boys (Choi, 2020). The psychological factors, including perceived stress, worries, and tension/anxiety were correlated with emotional eating among adolescent girls, while in boys it was affected only by confused mood (Nguyen-Rodriguez, Unger and Spruijt-Metz, 2010). Other than that, adolescent difficulties in emotional regulation may lead to be emotional eaters (Evers, Stok and de Ridder, 2010). Individuals who experienced high-stress levels had a lower ability on eating regulation and it was also found that higher emotional eating correlates to higher eating dysregulation (Tan and Chow, 2014). Moreover, this study showed that statistically emotional eating and unhealthy food consumption patterns were significantly different. Adolescent girls who are emotional eaters were found to

more often consume fatty food, and sweet food than those who not were non- or low-emotional eaters. Similar results of previous study found that frequent consumption of fast foods, high-fat snacks, dessert foods, sugar-sweetened beverages (SSBs), and processed meat products was associated with high emotional eating among adolescents (Bui et al., 2021). Emotional eaters were reported affected to higher frequent snacking of sweet food, which caused weight gain and contributed to overweight (Rachmawati, Anantanyu and Kusnandar, 2019). Different results from other studies indicated that neither high emotional eaters or low emotional eaters have differences in food consumption. This study explained that emotional eaters were frequently to be found eating more after sad than joy mood condition, whereas those with low-emotional eating were eating the same amount after sad and joy mood condition (Van Strien et al., 2013). Another study explained that emotional eaters not only tended to overeat, but also tended to undereating as a response to negative emotional states, such as anger, stress, and anxiety. A person can show a different response in a negative emotional state. A person in a negative emotional state such as boredom produces a response of increase in appetite, whereas a state of sadness will

produce a decreased appetite response (Bongers et al., 2013).

Since the study was conducted during the COVID-19 pandemic, stress was one of the main predictors of emotional eating (Al-Musharaf, 2020). The linking process of stress to emotional eating has been studied. When people were under stress, mainly chronic stress, balance energy intake and homeostatic needs could be dysregulated by decreasing (e.g., leptin, insulin) and increasing appetite-inducing hormones (e.g., ghrelin), then the condition could lead to overeating on comfort food (high sugar and fat) to fulfill physiological requirements (Dallman, 2010). The meal skipping in this current study consisted of skipping breakfast, lunch, and dinner. The proportion of breakfast-skippers among adolescent girl subjects was 41.0%, while lunch and dinner skippers were 27.0%. It showed that nearly half of adolescent girl subjects were breakfast skippers. These results were supported by a previous study in which the prevalence of meal skipping based on gender was found higher among adolescent girls than boys (Bui et al., 2021). Although our study did not assess the reasons for meal skipping, other studies have revealed that perceived lack of time was reported as the most influential factor to meal skipping (Pendergast et al., 2016). Meal skipping or irregular three main meals consumption may impact poor health and nutrition, such as weight gain, which can lead to metabolic syndrome (Rodrigues et al., 2017). A recent study revealed that people who skip breakfast have been found to be overweight/obese more than never-skippers (Wadolowska et al., 2019). On the other side, a retrospective cohort study reported that males or females who are dinner skippers have a closer association with weight gain and overweight/obesity than breakfast skippers. Energy intake between people who had dinner regularly and who skipped dinner has differences. Dinner skippers were related to having a higher irregularity of energy intake at dinner than those who had dinner regularly

(Yamamoto et al., 2021). Related to previous studies, the effect of genotype related to obesity on BMI adolescents could be modified by meal frequency consumption. The regular five-meal-a-day pattern has been proven to attenuate the effects of the alleles risk on genetic sensitivity to increased BMI (Jääskeläinen et al., 2013). Low diet quality can be another factor that is potentially linked with skipping dinner and weight gain. According to the components of the Healthy Eating Index (HEI), dinner skippers have decreased more in vegetables and plant proteins/seafood than breakfast-skippers, so it can lead to weight gain (Zeballos and Todd, 2020). Unfortunately, our study did not measure nutritional status. This is due to research conducted during the COVID-19 pandemic.

Our present results of different meal skipping in unhealthy food consumption found that adolescents skipping breakfast were high in consuming sweet food, while those skipping lunch and dinner were found to higher consume fatty foods than others. Similar to a prior study, in comparison with adolescents who were breakfast consumers, those breakfast skippers were found to be high in consuming added sugar (Deshmukh-Taskar et al., 2010). Another study revealed that people who rarely eat breakfast/skip breakfast have been shown to consume more cookies, cake, and meat at dinner, compared to those who regularly have breakfast (Min et al., 2011). However, the Chi-square test revealed that meal skipping with unhealthy food consumption patterns has no meaningful differences.

Our findings from regression analyses indicated that emotional eating variables were significantly associated with unhealthy food consumption patterns, while meal skipping variables, which consists of breakfast, lunch, and dinner skipping, were not statistically significant associated with unhealthy food consumption patterns. Which means there is no simultaneous relationship between emotional eating variables and meal skipping variables with

unhealthy food consumption patterns or it can be said that, simultaneously, emotional eating can affect unhealthy food consumption patterns among adolescent girls, while meal skipping has not shown any meaningful effect. In addition, the Odds Ratio value of emotional eaters was 4.79 (95% CI: 1.60-14.38), and showed an increase after being controlled by education level of the father and mother, as well as the average income level of both parents. The OR indicated that adolescent girls who were emotional eaters had risk 4.79 times of consuming unhealthy foods, compared to those who were not emotional eaters.

Examining the interrelationship of emotional eating and meal skipping, from a previous study we know that negative emotions, including stress, anxiety, and depression, were initially related to emotional eating (Alalwan et al., 2019). Furthermore, other studies have assessed that mental health problems risk, such as stress, depressive mood, and suicidal ideation, was found to be increased in adolescents who skipped breakfast and skipped meals more than once per day (Lee, Han and Kim, 2017). Therefore, the involvement of negative emotions (e.g., depressive, stress, and anxiety) for those emotional eaters may cause a tendency to skip meals. It can cause preferring to consume unhealthy foods. The interrelationship between emotional eating, meal skipping, and unhealthy food consumption was reinforced by a recent study which states that the habits of eating to relieve stress in the high-stress group were reported higher than the low-stress group, as well as a higher frequency of meal skipping (breakfast, lunch, and dinner), eating unhealthy foods, such as fast food or ready prepared meals, snacks (e.g., cakes, soft drinks, and candies), and overeating (Choi, 2020). One thing that needs to be considered in overcoming emotional eating is managing stress. Considering that people tend to eat to release stress, education on stress management should be provided. Moreover, the availability of healthy food

choices in the canteen, along with nutritional information, can be an effort to reduce unhealthy food consumption patterns (Choi, 2020).

Apart from the eating behavior variables studied in this research, there are other factors that can influence unhealthy food consumption patterns. Several studies have examined other factors that influence unhealthy food consumption patterns, including binge drinking, eating together with other activities, smoking, and a sedentary activity (Bui et al., 2021). Another study documented that, according to the Theory of Planned Behavior (TPB), the most potent predictors of fast-food consumptions were subjective norms followed by perceived behavioral control (Rouhani-Tonekaboni, Seyedi-Andi and Haghi, 2018). Families' income levels, father's education levels indicated more tendencies toward frequency consumption of junk food (Mirhadyan et al., 2020).

Based on the results, the majority of adolescent girls reported frequent unhealthy food consumption that can increase the risk of health problems. In line with the results, the Indonesia basic health research (Riskesmas) showed that the adolescent age group tended to have a higher risk food consumption pattern, compared to other age groups. Compared to 2013, consumption of risky foods among the Indonesian population aged 10-14 years in 2018 was increased. Moreover, unhealthy food consumption patterns can be reflected in the lack of consumption of vegetables and fruit. There were 96.8% of the population aged 10-14 years that consumed vegetables and fruits less than the recommended portion per day (Basic Health Research, 2018).

The increasing of unhealthy food consumption patterns in adolescents can impact being overweight to obesity in adulthood (>18 years). Obesity in females was found higher than in males. In 2016, about 13% (11% male and 15% female) of the world's adult population was obese (WHO, 2020). While the prevalence of

obesity in Indonesian adults (> 18 years) was also shown to be higher in women than men. Moreover, there is increasing of obesity prevalence in adults (>18 years) from 22.9% (12.9% female and 10.0% male) in 2013 to 43.8% (29.3% female and 14.5% male) in 2018 (Basic Health Research, 2018).

Healthy food consumption pattern in adolescents needs to be implemented to meet the nutritional needs, as an effort to prevent nutritional problems in adulthood. Nutrition during adolescence should be adequate for physical and cognitive growth and development. Especially for adolescent girls, adequate nutrition provides energy stores for pregnancy, and give protection to the nutrition-related diseases in adulthood (WHO, 2006). Adolescent girls were associated with a major contribution to health during pregnancy to childbirth. Adolescent girls who married at a young aged, having anemic and underweight nutritional status will lead to having babies with low birth weight (LBW) (<2500 gram) (Ministry of National Development Planning, 2013).

A healthy diet can provide protection from malnutrition and non-communicable diseases related to diet. The WHO has recommended healthy dietary practices/healthy diet. A healthy diet must consist of balancing calories in and out, eating a minimum five portions or 400 g of fruits and vegetables in a day, consuming fats less than 30% of total energy and limiting food containing saturated fats, avoiding trans fats from industrially-produced, consume salt less than 5 g per day, and reduced intake of sugars to less than 10% of total energy intake (WHO, 2019). Moreover, balanced nutrition guidelines also have been implemented in Indonesia. There were four pillars of recommendation to balance between nutrients that come in and out, including eating a variety of foods, having a clean and healthy lifestyle behavior, doing physical activity regularly, and regularly n observing

body weight to keep a normal weight (Ministry of Health RI, 2014).

There are several methodological limitations in this study, including the design of the current study was cross-sectional, which can't analyze the causality between variables. The study data were collected online, which may influence false answers. This study used self-report questionnaires which may lead to the subjectivity of respondents. This study was only focused on adolescent girls and can't see the differences based on gender. Furthermore, the research of the relationship between these three variables is still limited and to find out more about the causal pathway of the interrelationship between emotional eating, meal skipping, and unhealthy food consumption pattern, future longitudinal studies are needed. It will be useful for making targeted interventions.

CONCLUSIONS

Individuals who are emotional eaters were found more often to consume fatty foods than other types of unhealthy food. Emotional eating can affect unhealthy food consumption patterns among adolescent girls, while meal skipping did not show any meaningful effect. However, to prevent possible negative health outcomes, continuing education is still important to do.

Our suggestion is that schools can make a special time for providing education related to nutrition and healthy eating behavior by regularly presenting an expert in nutrition (nutritionists).

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