

The analysis of factors to predict eating behavior among adolescent girls: a community-based study in Indonesia

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ABSTRAK

Latar Belakang: Perilaku makan remaja putri seringkali tidak mementingkan kandungan gizi makanan, lebih banyak mengonsumsi makanan cepat saji, sehingga menimbulkan perubahan perilaku makan mengarah ke perilaku makan yang tidak sehat. Dampak yang ditimbulkan akibat dari memiliki perilaku makan yang tidak sehat adalah timbulnya obesitas dan kekurangan. Perilaku makan remaja dipengaruhi oleh faktor predisposisi, pendukung dan penguat.

Tujuan: Penelitian ini bertujuan untuk menganalisis faktor-faktor yang berhubungan dengan perilaku makan remaja putri berbasis komunitas di Indonesia.

Metode: Penelitian ini menggunakan metode kuantitatif dengan pendekatan cross-sectional. Sampel terdiri atas 210 remaja putri berusia 15-18 tahun di kota Bandar Lampung, Indonesia. Data diambil pada bulan Juli sampai Oktober 2022. Sampel diambil menggunakan metode Multistage Random Sampling dan dianalisis menggunakan uji Chi Square dan regresi logistik.

Hasil: Sebanyak 75 orang remaja putri (35,7%) berperilaku makan tidak baik, 164 orang (78,1%) memiliki pengetahuan gizi yang kurang, 6 orang (2,9%) mengalami menarche cepat, 98 orang (46,7%) malnutrisi, 99 orang (47,1%) memiliki eating disorder, 74 orang (35,2%) memiliki kepribadian berisiko, 109 orang (51,9%) tidak puas dengan citra tubuhnya, 100 orang (47,6%) memiliki uang saku rendah, 109 orang (51,9%) terpengaruh media sosial, 98 orang (46,7%) terpengaruh tokoh idola, 136 orang (64,8%) terpengaruh keluarga, 111 orang (52,9%) terpengaruh guru, dan 76 orang (36,2%) terpengaruh teman sebaya. Secara statistik, faktor-faktor yang berhubungan dengan perilaku makan remaja putri adalah pengetahuan ($p=0,016$), status gizi ($p=0,000$), eating disorder ($p=0,008$), kepribadian ($p=0,002$), citra tubuh ($p=0,006$), uang saku ($p=0,11$), media sosial ($p=0,000$), tokoh idola ($p=0,03$), keluarga ($p=0,037$), guru ($p=0,048$) dan teman ($p=0,000$), sedangkan menarche tidak berhubungan ($p=0,241$). Faktor yang paling berasosiasi dalam memprediksi perilaku makan remaja putri adalah status gizi, eating disorder, kepribadian, citra tubuh, media sosial, tokoh idola, guru dan teman sebaya.

Kesimpulan: Prevalensi perilaku makan tidak baik sebesar 35,7% dan faktor yang paling berasosiasi dalam memprediksi perilaku makan remaja putri adalah status gizi, eating disorder, kepribadian, citra tubuh, media sosial, tokoh idola, guru dan teman sebaya.

KATA KUNCI: perilaku makan; remaja putri; faktor yang berasosiasi

ABSTRACT

Background: The eating behavior of adolescent girls is often not concerned with the nutritional content of food, consuming more fast food, causing changes in eating behavior leading to unhealthy eating behavior. The impact of unhealthy eating behavior is the emergence of obesity and underweight. Adolescent eating behavior is influenced by predisposing, supporting and reinforcing factors.

Objectives: This study aims to analyze the factors associated with the eating behavior of community-based adolescent girls in Indonesia.

Methods: This study uses a quantitative method with a cross-sectional approach. The sample consisted of 210 adolescent girls aged 15-18 years in Bandar Lampung City, Indonesia. Data were taken from July to October 2022. The sample was taken using the multistage random sampling method and analyzed using the chi-square test and logistic

regression.

Results: As many as 75 adolescent girls (35.7%) have unhealthy eating behavior, 164 people (78.1%) have poor nutritional knowledge, 6 people (2.9%) experience early menarche, 98 people (46.7%) were malnourished, 99 people (47.1%) had eating disorder, 74 people (35.2%) had a risky personality, 109 people (51.9%) were dissatisfied with their body image, 100 people (47.6%) had low allowance, 109 people (51.9%) influenced by social media, 98 people (46.7%) influenced by idols, 136 people (64.8%) influenced by family, 111 people (52.9%) influenced by teachers, and 76 people (36.2%) were influenced by their peers. Statistically, the factors related to the eating behavior of adolescent girls were knowledge ($p=0.016$), nutritional status ($p=0.000$), eating disorder ($p=0.008$), personality ($p=0.002$), body image ($p=0.006$), allowance ($p=0.11$), social media ($p=0.000$), idol figures ($p=0.03$), family ($p=0.037$), teachers ($p=0.048$) and peers ($p=0.000$), while menarche was not related ($p=0.241$). The most associated factors in predicting the eating behavior of adolescent girls are nutritional status, eating disorders, personality, body image, social media, idol figures, teachers and peers.

Conclusion: The prevalence of unhealthy eating behavior in adolescent girls is 35.7% and the most associated factors in predicting the eating behavior of adolescent girls are nutritional status, eating disorders, personality, body image, social media, idol figures, teachers and peers.

KEYWORDS: eating behaviour; adolescent girls; associated factors

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INTRODUCTION

Nutritional problems in adolescents are still common in Indonesia, both undernutrition and overnutrition(1). The results of the Indonesian Basic Health Research in 2018 showed that the prevalence of adolescent girls whose nutritional status was thin nationally was 8.7% while the prevalence of obesity in adolescents was 16%(2).

Adolescence is a transition from childhood to adulthood. This period is the most important time in life. During this period, growth and biological changes occur, including sexual maturation, and an increase in weight and height. Changes in body shape and size can cause adolescents to have body image and eating disorders(3). The process of rapid growth and development occurs in

adolescence so that energy and nutrients are needed by the body in large quantities. Nutritional problems are very vulnerable to occur in adolescents due to the wrong lifestyle because some young women have the desire to have their body as desired, namely to be slim and tall(4) This has resulted in adolescent girls making changes to unhealthy eating behavior to achieve the desired body shape so that it has a negative impact, one of which is the imbalance of nutritional intake into the body with the recommended nutritional adequacy(5)

Adolescents are used to choosing what food they like and not depending on their parents (6). The lack of knowledge of adolescents about healthy eating behavior also causes adolescents to tend to have bad

eating behavior. In addition, adolescents, especially young women, are quick to react even aggressively to disturbances or external impulses that affect them(7).

Good/healthy eating behavior is a daily eating behavior that follows the nutritional needs of each individual for a healthy and productive life. For every person to achieve nutritional balance, they must consume at least one type of food from each food group, namely carbohydrates, animal and vegetable protein, vegetables, fruit and milk or what we often call the four healthy five perfect diet(8).

Bad/unhealthy eating behavior is the habit of consuming food that does not provide all the essential nutrients such as carbohydrates, fats and proteins needed in the body's metabolism. Unhealthy eating behaviors such as eating irregularly in terms of time or type of food, weight loss diets, binge eating, and eating habits at night can damage the health and psychological well-being of individuals (9)

The eating behavior of adolescents, especially girls/ young women, based on Lawrence Green's theory is influenced by 3 factors, namely predisposing, supporting and driving factors. Predisposing factors consist of knowledge, puberty, age, nutritional status, personality, and body image. Enabling factors consist of socioeconomic status, the influence of social media and idol figures. The reinforcing factors consist of the influence of family, educators (school teachers) and peers. Several studies show several reasons why dieting in adolescents. Research conducted regarding body dissatisfaction and dietary behavior in female adolescent girls as many as 204 students who went on a diet,

aged 15-19 years in Pekanbaru, found that several factors that could trigger dietary behavior, among others, health values (health belief), personality, the influence of family relationships, family socioeconomic status, and body dissatisfaction (10)

Acceptance by peers and avoiding bullying are also motivations for obese adolescents in doing a weight loss diet (11) In addition, social media platforms also influence weight loss behavior (12) Idols also influence weight loss diets (3). In Indonesia itself, idol figures who have a large enough influence are Korean artists. South Korean drama artists are famous for having small bodies and they take care of their bodies well, this is a strong reason for young Korean drama lovers to go on a weight loss diet (13)

Teachers in schools are one of the factors that influence adolescent eating behavior. A study conducted by Parker et al. found that respondents had moderately unhealthy personal dietary habits, and respondents who had the least healthy diets were more likely to engage in classroom practices that could adversely affect their students' dietary patterns. In terms of adolescent knowledge about diet, several studies found no significant relationship between knowledge and dietary behavior (14) This means that someone with high knowledge will carry out healthy dietary behavior, while someone with low knowledge will have an unhealthy diet (15,16,17)

The research on the relationship between body image and dietary behavior also states that dietary behavior has a relationship with body image, when a person has a negative body image from others, then he or she will perform dieting behavior, and

vice versa(18) But unfortunately, dietary behavior carried out by adolescents has a relationship with poor nutritional status because adolescents often limit food consumption with consumption patterns that are not in accordance with the rules of nutrition science (19).

Physical changes during puberty can affect body image because this is a time of increasing self-awareness. The body image that appears tends to be negative so adolescents often experience body dissatisfaction or dissatisfaction with body shape (20). However, research conducted regarding body dissatisfaction and dietary behavior in 204 adolescent girls in Pekanbaru found a negative relationship between body dissatisfaction and dietary behavior in adolescent girls, which means that female adolescent dissatisfaction with body shape is not always accompanied by high dietary behavior(10). Age is also one of the factors that influence weight loss diets because middle-aged adolescents aged 15-17 years begin to pay attention to physical growth and have a body image that tends to be wrong (21).

MATERIALS AND METHODS

This study was observational analytical research with a cross-sectional design. This study aims to analyze the factors to predict the eating behavior of community-based adolescent girls in Indonesia. This study was done from May until July 2022, located at Senior High School in Bandar Lampung City. The sample size was 210 adolescent girls counted using independent analytical categoric sampling formula. The

sample was taken using Multistage Random Sampling. The inclusion criteria included adolescent girls aged 16-18 years old with approval from themselves and their teachers.

The independent variables in this study were predisposing factors (knowledge, puberty, age, nutritional status, personality, body image), enabling factors (socioeconomic status, social media, idol figures), and reinforcing factors (family, school teachers, peers). The dependent variable in this study was eating behavior.

Knowledge was categorized as poor and good knowledge based on the questionnaire. Puberty was categorized as having experienced early and normal puberty which was assessed by a questionnaire. Nutritional status is categorized into undernutrition (malnutrition), good nutrition and overnutrition based on body mass index. Personality is categorized as risky and not at risk based on the big five inventory questionnaire. Body image is categorized as satisfied and dissatisfied based on the body shape questionnaire.

Socio-economic status was categorized as low and adequate allowance/pocket money based on the average allowance/ pocket money of teenagers. Social media was categorized as having an influence and not based on a questionnaire. Idol figures were categorized as having influence and not based on the questionnaire. Families were categorized as having influence and not based on a questionnaire. School teachers were categorized as having influence and not based on the questionnaire. Peers were categorized as having influence and not

based on the questionnaire. Eating behavior was categorized into healthy and unhealthy eating behavior based on the semi-quantitative food questionnaire (SQFFQ) which included the amount and type of food according to the principle of balanced nutrition. All the questionnaires used had been tested for validity and reliability.

The data were processed and analyzed using univariate, bivariate using chi-square and multivariate using logistic regression to make a predictive model of eating behavior in adolescent girls. This research obtained ethical clearance from the research ethics committee of the medical faculty of the University of Lampung with the ethical approval number 1427/UN26.18/PP.05.02.00/2022.

RESULTS AND DISCUSSIONS

The univariate analysis provides an overview of the characteristics of all the variables studied, namely the eating behavior

of adolescent girls and the factors that influence it. The results showed that most of the research subjects had healthy eating behavior as many as 135 people (64.3%), sufficient allowance for as many as 110 people (52.4%), not having eating disorders as many as 111 people (52.9%), poor knowledge of balanced nutrition as many as 164 people (78.1%), normal personality as many as 136 people (64.8%), dissatisfied body image as many as 109 people (51.9%), influenced by mass media as many as 109 people (51, 9%), not influenced by idol figures as many as 112 people (53.3%), influenced by family as many as 136 people (64.8%), influenced by teachers as many as 111 people (52.9%), not influenced by peers as many as 134 people (63.8%), have normal nutritional status as many as 112 people (53.3%) and have normal menarche as many as 204 people (97.1%). Characteristics of subjects are presented in **Table 1**.

Table 1. The characteristics of subjects

Variable	Frequency (n)	Percentage (%)
Eating Behavior		
Unhealthy	75	35.7
Healthy	135	64.3
Allowance		
Low	100	47.6
Sufficient	110	52.4
Eating Disorder		
Yes	99	47.1
No	111	52.9
Knowledge		
Poor	164	78.1
Good	46	21.9
Personality		
Risky	74	35.2
Normal	136	64.8
Body Image		
Dissatisfied	109	51.9
Satisfied	101	48.1

Social Media Influence		
Yes	109	51.9
No	101	48.1
Influence of Idols		
Yes	98	46.7
No	112	53.3
Family Influence		
Yes	136	64.8
No	74	35.2
Teacher's Influence		
Yes	111	52.9
No	99	47.1
Peer Influence		
Yes	76	36.2
No	134	63.8
Nutritional status		
Malnutrition	98	46.7
Normal	112	53.3
Menarche		
Early	6	2.9
Normal	204	97.1

The prevalence of unhealthy eating behavior in adolescent girls was quite large, namely 35.7%. An unhealthy diet is a habit of eating foods that do not provide the essential nutrients needed in the body's metabolism (9). Essential substances that are not met will affect the process of energy metabolism. Energy is a substance needed by living things to sustain life, support growth, and perform physical activity obtained from the metabolism of carbohydrates, proteins, and fats. To meet energy needs, it is necessary to enter sufficient food substances into the body.

Insufficient energy intake can occur if the body consumes energy through food that is less than the energy expended. Meanwhile, more energy intake can occur if the body consumes energy through food that is more than the energy expended. Both of these are caused by unhealthy dietary behavior (22). Unhealthy dietary behavior in adolescents can have an impact on physical growth.

Nutritional deficiencies, especially iron and calcium, often occur in adolescents with unhealthy dietary behavior. Reduced energy intake during growth may also be associated with growth retardation. Adolescent girls who eat irregularly but do not lose weight will have an impact on the menstrual cycle is irregular and can be included in secondary amenorrhea. There is a long-term risk of osteopenia and osteoporosis in adolescent girls who follow an unhealthy diet. Anemia in adolescent girls is also often experienced due to poor eating habits and monthly menstrual cycles (23)

The bivariate analysis resulted in the influence of predisposing, enabling and reinforcing factors (based on Lawrence Green's theory) on the eating behavior of adolescent girls. The results showed that young women who had a low allowance had unhealthy eating behaviour as many as 45 people (45%), higher than adolescent girls who had enough allowance as many as 30

people (27.3%). The results of statistical tests showed that low allowance affected the unhealthy eating behavior of adolescent girls ($p = 0.011$). Allowance is a risk factor for bad eating behavior in adolescent girls with $OR = 2.1$ (95% CI: 1.22-3.88), which means girls with low allowance have a 2.1 times higher risk for unhealthy eating behavior better than adolescent girls with sufficient allowance.

The results of this study indicate that on average adolescent girls got a low allowance with a range of less than Rp. 15,000 per day, but we found that the income of fathers and mothers was mostly in the regional minimum wage. Father's occupation and family income had a significant effect on adolescent dietary behavior. Meanwhile, the mother's job status and family size did not affect adolescent dietary behavior. This is presumably because the availability of a mother's time in determining adolescent dietary behavior was not determined by the amount of mother's time, but rather by its quality. However, if the mother's time is of waiting for quality but is not supported by the father's income as the head of the family, it will not contribute to family eating behavior. Giving allowance/ pocket money to adolescent girls can be a trigger in buying fast food because the greater the allowance earned, the more likely it is to buy or consume fast food because the price of fast food tends to be high. Fast food is often chosen by teenagers because it is simpler than bringing food from home or cooking it yourself (24)

The results showed that 45 people (35.4%) of adolescent girls who had eating disorders would have unhealthy eating behavior, which was higher than that of 30

(27%). The results of statistical tests showed that eating disorders affected the unhealthy eating behavior of adolescent girls ($p=0.008$). Eating disorder is a risk factor for unhealthy eating behavior in adolescent girls with $OR = 2.2$ (95% CI: 1.26-4.00), which means that adolescent girls who have eating disorders have a 2.2 times higher risk for unhealthy eating behavior better than adolescent girls who do not have eating disorders.

The results showed that adolescent girls who had poor knowledge would have unhealthy eating behavior as many as 66 people (40.2%) larger than girls who had good knowledge as many as 9 people (19.6%). The results of statistical tests showed that knowledge had a significant effect on the eating behavior of adolescent girls ($p = 0.016$). Knowledge is a risk factor for unhealthy eating behavior in adolescent girls with $OR = 2.7$ (95% CI: 1.25-6.11), which means girls who have poor knowledge have a 2.7 times higher risk for unhealthy eating behavior compared to girls who have good knowledge.

Respondents lack knowledge because they generally do not know and do not understand well about a healthy diet, lack seeking information in mass media or electronic media, and have never been given health education about a healthy diet. While good knowledge is obtained from the respondent's memory of previously studied material about a healthy diet (25).

The results showed that 37 people (50%) of adolescent girls who had risky personalities would have unhealthy eating behavior, which was greater than 27.9% of girls who had normal personalities. The

results of statistical tests showed that risky personalities affect the unhealthy eating behavior of adolescent girls ($p = 0.002$). Personality is a risk factor for unhealthy eating behavior in adolescent girls with OR = 2.5 (95% CI: 1.43-4.65), which means that adolescent girls who had risky personalities had a 2.5 times higher risk for unhealthy eating behavior compared to adolescent girls who had normal personalities.

Personality is a character within an individual that is relatively permanent and persists, which influences the individual's adjustment to the environment. Personality is a consistent indicator of prominent health outcomes related to dietary behavior. For example, individuals who tend self-control and discipline tend to be at lower risk of unhealthy eating behavior (26).

Personality variables in this study were grouped into agreeableness, neuroticism, conscientiousness, openness and extraversion. Extraversion and neuroticism are grouped into risky personality categories (disorders) and openness, conscientiousness, and agreeableness are grouped into non-risky personalities.²⁶ Neuroticism is a personality that tends to have negative emotions. Adolescent girls have a slightly higher tendency to experience mood and emotional instability than boys. In addition, adolescent girls have fairly good social skills and have friends which is interpreted in an extraversion personality (27).

Adolescent girls who have good social skills tend to get bad influences from the surrounding environment. The emotional instability of adolescent girls can also be one of the factors of error in the selection of

dietary behavior in adolescent girls. The results showed that the adolescent girls who had a dissatisfied body image would have healthy eating behavior as many as 49 people (45%) greater than the adolescent girls who had a satisfied body image as many as 26 people (25,7%). The results of statistical tests showed that dissatisfied body image affected the unhealthy eating behavior of adolescent girls ($p = 0.006$). Body image is a risk factor for unhealthy eating behavior in adolescent girls with OR = 2.3 (95% CI: 1.31-4.22), which means that adolescent girls who have a dissatisfied body image have a 2.3 times higher risk for unhealthy eating behavior than adolescent girls who have a satisfied body image.

Body image is a view of a person's physical appearance which is divided into positive body image or satisfied with himself and negative body image or dissatisfied with himself (28). Adolescents who are dissatisfied with their body image will experience eating disorders and are obsessed with losing weight (29). Adolescents who have not achieved the ideal body shape will always try to achieve it. The more positive the body image, the healthier the diet behavior and the more negative the body image, the more bad eating behavior will occur (30). Changes in perception or assessment of body shape also occur because the information obtained about the ideal body shape does not match the current body shape (10). The results showed that 53 adolescent girls (48.6%) who were affected by social media had unhealthy eating behavior, which was greater than that of 22 adolescent girls (21.8%) who were not

affected by social media. The results of statistical tests showed that social media affected the unhealthy eating behavior of adolescent girls ($p = 0.000$). Social media was a risk factor for unhealthy eating behavior in adolescent girls with $OR = 3.3$ ($CI: 1.85-6.21$), which means that adolescent girls who are affected by social media have a 3.3 times higher risk for unhealthy eating behavior better than adolescent girls who are not affected by social media.

Social media includes information on healthy diet behavior and unhealthy diet. Messages displayed through social media often affect the consumption of food, especially vegetables. Adolescent girls who are exposed to information through social media will tend to choose to eat vegetables because they know vegetables. Exposure to information through social media will encourage adolescent girls to consider reasons for health, mood, ease of access, sensory appeal, natural ingredients in food, price, weight control, familiarity, and reasons for ethical problems (31).

The results showed that 43 people (43.9%) who were influenced by idols had unhealthy eating behavior, which was greater than 32 adolescent girls (28.6%) who were not affected by idols. The results of statistical tests showed that idol figures influence the unhealthy eating behavior of adolescent girls ($p = 0.03$).

Idol figures are a risk factor for unhealthy eating behavior in adolescent girls with $OR = 1.9$ ($95\% CI: 1.1-3.46$), which means that adolescent girls who are affected by idols have a 3.3 times higher risk for unhealthy eating behavior better than adolescent girls

who are not influenced by idol figures.

The influence of idol figures can reach the worship of the idol figure which is characterized by admiration and excessive attachment to certain idols. Admiration is in the form of a person's being inseparable from things related to idols and having a strong desire to be able to emulate idols. The attachment is in the form of a relationship with his idol so he wants to be as close as possible and follow whatever his idol does, including diet behavior (32).

The results showed that 56 adolescent girls (41.2%) were affected by eating habits in their families, which was greater than 19 adolescent girls (25.7%) who were not affected by eating habits. The results of statistical tests showed that eating habits in the family affected the unhealthy eating behavior of adolescent girls ($p = 0.037$). Eating habits in the family were a risk factor for unhealthy eating behavior in adolescent girls with $OR = 2$ ($95\% CI: 1.08-3.78$), which means that adolescents girls who were affected by unhealthy eating habits in their families have a 2 times higher risk for unhealthy eating behavior compared to adolescent girls who were not affected by eating habits in the family that were not good.

The pattern of unhealthy food consumption behavior can be changed with the influence of a supportive family environment. In the family, there is a socialization process, a personality formation process, and a parenting process. The socialization process is the process of acquiring knowledge, skills, and social relationships in this case parents as important agents of socialization. The

parenting process in a family is categorized based on the level of warmth and discipline control that can affect children in eating healthy foods. In addition, communication in the family plays a very important role as a tool to transfer the values held in the family (31).

The results showed that 47 people (42.3%) who were influenced by teachers had unhealthy eating behavior, which was greater than 28 girls (28.3%) who were not influenced by teachers. The results of statistical tests showed that the teacher affected the unhealthy eating behavior of adolescent girls ($p = 0.048$). The teacher's bad eating habits were a risk factor for unhealthy eating behavior in adolescent girls with $OR = 1.8$ (95% CI: 1.04-3.31), which means that adolescent girls who were affected by the teacher's bad eating habits had a risk of 1, 8 times higher for unhealthy eating behavior than adolescent girls affected by bad teacher eating habits.

Teachers had an influence on students' dietary behavior, one of which was water consumption. However, only a few teachers consume water in front of their students, which is often seen by students, teachers consume hot chocolate, soft drinks, and smoothies (33). Teachers can play a role in nutrition education besides that they can also shape students' healthy dietary behavior through health practices, especially when observed by students.

The results showed that 40 adolescent girls (52.6%) who were influenced by their peers would have unhealthy eating behavior, which was greater than 35 adolescent girls who were not influenced by their peers (26.1%). The results of statistical tests

showed that peers affected the unhealthy eating behavior of adolescent girls ($p=0.000$). Bad eating habits of peers were risk factors for unhealthy eating behavior in adolescent girls with $OR = 3.1$ (95% CI: 1.73-5.68), which means that girls who were affected by the eating habits of bad peers had a risk 3.1 times higher for unhealthy eating behavior than adolescent girls who were not affected by the bad eating habits of their peers.

The influence of friends begins to play an important role in the formation of adolescent self-concept. The influence of friends is high because most of the teenage time is spent at school or other places with friends so that friends can change good and healthy behaviors and habits related to healthy diet behavior and unhealthy diet. The high influence of peers on unhealthy dietary behavior tends to be caused by the attitude of teenagers who like to try new things in this case starting to learn to determine the food to be consumed³¹. Adolescents who are experiencing growth and development also require high amounts of energy, protein, and micronutrients. However, most adolescents prefer to eat outside the home and have high peer influence (34).

The results showed that 50 adolescent girls who were malnourished would have unhealthy eating behaviour (51.0%) which was greater than that of 25 adolescent girls with good nutritional status (22.3%). The results of statistical tests showed that malnutrition affected the unhealthy eating behavior of adolescent girls ($p = 0.000$). Nutritional status was a risk factor for unhealthy eating behavior in adolescent girls

with OR = 3.6 (95% CI: 1.99-6.57), which means that malnourished girls had a 3.6 times higher risk for bad eating behavior than adolescent girls who had good nutritional status.

A person's nutritional status is determined based on nutritional consumption and the body's ability to use these nutrients. Normal nutritional status indicates that the quality and quantity of food have met the needs. Adolescents with overweight and obese consume more sugar, saturated fat, and sodium from snacks than adolescents with normal nutritional status who consume snacks with low energy density. Meanwhile,

adolescents with poor nutritional status occur when the body experiences one or more essential nutrients (35).

The results showed that adolescent girls who experienced early menarche would have unhealthy eating behavior as many as 4 people (66.7%) larger than adolescent girls who experienced normal menarche as many as 34.8%. The results of statistical tests showed that early menarche did not affect the unhealthy eating behavior of adolescent girls ($p=0.241$). The influence of predisposing, enabling and reinforcing factors on the eating behavior of adolescent girls is presented in **Table 2**.

Table 2. The effect of predisposing, enabling and reinforcing factors on adolescent girls' eating behavior

Variable	Unhealthy Eating Behavior		Healthy Eating Behavior		p value	OR	95% CI
	n	%	n	%			
Allowance					0.011*	2.1	1.22-3.88
Low	45	45	55	55			
Sufficient	30	27.3	80	72.7			
Eating Disorder					0.008*	2.2	1.26-4.00
Yes	45	45.5	54	54.5			
No	30	27	81	73			
Knowledge					0.016*	2.7	1.25-6.11
Poor	66	40.2	98	59.8			
Good	9	196	37	80.4			
Personality					0.002*	2.5	1.43-4.65
Risky	37	50	37	50			
Normal	38	27.9	98	72.1			
Body Image					0.006*	2.3	1.31-4.22
Dissatisfied	49	45	60	55			
Satisfied	26	25.7	75	74.3			
Social Media Influence					0.000*	3.3	1.85-6.21
Yes	53	48.6	56	51.4			
No	22	21.8	79	78.2			
Influence of Idols					0.03*	1.9	1.10-3.46
Yes	43	43.9	55	56.1			
No	32	28.6	80	71.4			
Family Influence					0.037*	2	1.08-3.78
Yes	56	41.2	80	58.8			
No	19	25.7	55	74.3			
Teacher's Influence					0.048*	1.8	1.04-3.31
Yes	47	42.3	64	57.7			
No	28	28.3	71	71.7			

Peer Influence					0.000*	3.1	1.73-5.68
Yes	40	52.6	36	47.4			
No	35	26.1	99	73.9			
Nutritional status					0.000*	3.6	1.99-6.57
Malnutrition	50	51	48	49			
Normal	25	22.3	87	77.7			
Menarche					0.241	NA	0.67-20.95
Early	4	66.7	2	33.3			
Normal	71	34.8	133	65.2			

Multivariate analysis with binary logistic regression resulted in factors that had the most influence on eating behavior among adolescent girls. The conditions for the variables that could be selected as candidates for multivariate logistic regression were if the relationship between the significance of the bivariate analysis (p -value) < 0.25 , especially for variables that were tested for bivariate, and there was not much literature showing a relationship with the dependent variable studied, as well as theoretically important variables.

Multivariate analysis was carried out after obtaining multivariate candidates with binary logistic regression analysis using the backward LR method. In the backward method, the analysis was carried out by including all multivariate candidate variables (allowance, eating disorder, knowledge,

personality, body image, influence of social media, influence of idol figures, influence of family, influence of teachers, influence of peers, nutritional status and menarche). Then, at each step/model, the non-significant variables ($p > 0.05$) were eliminated/excluded one by one from the largest p -value until the final model was obtained. In this study, modeling with logistic regression analysis was obtained up to model 5 as the final model.

In the initial model of binary logistic regression analysis, the p -value > 0.05 and the largest was the menarche variable ($p=0.395$) so the menarche variable was eliminated and not included in the next model (model 2), and so on until all variables had a p -value < 0.05 and this stage was the final model. The final model of binary logistic regression analysis is presented in **Table 3**.

Table 3. Final model based on the results of binary logistic regression analysis

Variable Name	B	SE	Wald	df	P-value	Exp(B)
Eating Disorder	1.170	.391	8.969	1	.003	3.222
Personality	1.094	.373	8.611	1	.003	2.987
Body image	1.165	.398	8.573	1	.003	3.204
The influence of social media	.818	.364	5.051	1	.025	2.266
The influence of idols	.758	.356	4.521	1	.033	2.133
Teacher's influence	.731	.363	4.054	1	.044	2.077

Peer influence	.867	.364	5.680	1	.017	2.379
Nutritional status	1.077	.366	8.641	1	.003	2.935
Constant	-11.0	1.753	39.397	1	.000	.000

Based on the final model of multivariate logistic regression analysis using the backward method, the results show that the variables of eating disorder, personality, body image, the influence of social media, the

influence of idol figures, the influence of teachers, the influence of peers, and nutritional status affect the eating behavior of adolescent girls, and it is obtained equation as follows:

$$\text{Unhealthy Eating behavior} = -11 + (1.17 \times \text{eating disorder}) + (1.09 \times \text{risky personality}) + (1.16 \times \text{dissatisfied body image}) + (0.81 \times \text{social media influence}) + (0.75 \times \text{influence of idol figures}) + (0.73 \times \text{influence of teachers}) + (0.86 \times \text{influence of peers}) + (1.07 \times \text{malnutrition})$$

CONCLUSION AND RECOMMENDATION

Unhealthy eating behavior in adolescent girls is quite high, namely 35.7%. The factors that most influence the eating behavior of adolescent girls are eating disorders, personality, body image, influence of social media, the influence of idol figures, the influence of teachers, the influence of peers, and nutritional status. It is necessary to conduct regular education on balanced nutrition and healthy eating behavior to adolescent girls on a tripartite basis, involving the adolescent girls, parents and teachers in schools.

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