

Dietary Behavior and the Risk of Developing Eating Disorders among Adolescent Girls who Participate in Modern Dance

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ABSTRACT

This study aims to determine the association between dietary behavior and the risk of developing eating disorders. The design of this study was cross-sectional and involved 61 adolescent girls who participated in modern dance. Sampling was based on the total population. The data collection was performed using the Eating Attitude Test 26 (EAT-26) to measure the eating disorder variable and a questionnaire to measure dietary behavior. For data analysis, the Chi square test was used with a 95% confidence interval or $\alpha=0.05$. The results of this study show that 23% of adolescent girls are at risk of developing eating disorders and 63.9% were on a diet. The Chi square test showed that there was a significant association ($p=0.024$) between dietary behavior and risk of developing eating disorders. Adolescent girls mostly go on unhealthy diets by eating very small portions and often skip meals; they are advised to adopt healthy dietary behaviors to prevent the risk of developing eating disorders.

Keywords: adolescent, dietary behavior, eating disorder, modern dance

INTRODUCTION

Global studies have shown that eating disorders are not only experienced by adolescents in western countries, but have also begun to be experienced by adolescents in Asian countries. In Korea, it is known that 37.75% of adolescent girls are at risk of developing eating disorders (Woo 2014). Studies in Malaysia also indicate that 14% of adolescents have an eating disorder (Gan *et al.* 2018).

Studies show that eating disorders have been experienced by adolescents in Indonesia. In East Jakarta, 52.7% of adolescent girls aged 15–19 years old have an eating disorder (Syifa & Pusparini 2018). Similarly, in East Kalimantan, especially in the capital city of Samarinda, it is known that 57.4% of senior high school adolescents are at risk of developing eating disorders (Badrah *et al.* 2020).

An eating disorder is a complex medical and psychiatric illness that affects a person's physical and mental health, involving intense emotions and food-related behavioral disorders (Ballard *et al.* 2019). Eating disorders have short and long term effects on health. Short term effects

include heart complications such as bradycardia and arrhythmia, electrolyte abnormalities, and dehydration, while long term effects include impaired bone health, infertility and mental health (Yin & Davis 2020). Eating disorders among adolescents are of serious public health concern owing to their high prevalence and adverse influence on psychological health (Mallick *et al.* 2014).

Modern dance is a risky activity that influences diet behavior. Studies have found that female dance students are more preoccupied with their weight and dietary behavior than girls in the general population and that they are in greater danger of developing eating disorders (Walter & Yanko 2018). Female dancers are a high risk group for developing an eating disorder because there is pressure in the world of dance to be thin (Doria 2017).

In the city of Samarinda, modern dance is offered as an extracurricular activity in senior high schools where most of the participants are adolescent girls. A preliminary study by the researchers on 22 adolescent girls who participated in modern dance in senior high schools in Samarinda found that 63.6% paid

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attention to their figure, 31.8% follow a diet and 36.3% made efforts to lose weight. This study was carried out to determine the association between dietary behavior and the risk of developing eating disorders.

METHODS

Design, location, and time

This study used a cross-sectional design. It was conducted at six senior high schools in Samarinda that have modern dance as an extracurricular activity, namely No. 1 Senior High School, No. 3 Senior High School, No. 4 Senior High School, No. 5 Senior High School, No. 6 Senior High School 6, and No.14 Senior High School. The study was carried out in June 2020.

Sampling

The population in this study was adolescent girls who participated in the modern dance extracurricular activity at their school. A sample size of 61 adolescent girls was taken as the population of this study. The ethical clearance for this study was issued by the Ethical Committee of Mulawarman University Faculty of Medicine in Samarinda (Number 17/KEPK-FK/VIII/2020).

Data collection

The data collected were primary data, consisting of subject characteristics, dietary behavior and eating disorders. Subject characteristic data were collected by using a self-administered questionnaire. The data on dietary behavior were collected using a questionnaire that had its validity and reliability tested on 30 adolescent girls who participated in modern dance at private senior high school in Samarinda. Based on the validity test, the 13 out of 13 questions on dietary behavior were valid.

The reliability showed Cronbach alpha values of 0.96 for each item, while the data on eating disorders were collected using the Eating Attitude Test 26 (EAT-26), which had also been tested for validity and reliability. Based on the validity test, 26 out of the 26 questions on eating disorders were valid. The reliability showed Cronbach alpha values of 0.88 for each item.

Data analysis

Dietary behavior is categorized as going on a diet (trying to lose or maintain weight) and

not following a diet (not trying to lose weight). The measurement of the diet variable (trying to lose or maintain weight) consists of 12 questions that include questions on a healthy diet (physical exercise, increasing the consumption of fruit and vegetables, reducing high fat food consumption and reducing consumption of sweet food), unhealthy diet (not eating anything from morning to night/ fasting outside of religious requirements, eating small portions, using a food substitute, skipping meals) and extreme diet (taking diet pills, anorexia (vomiting on purpose), using laxatives and diuretics).

Eating disorders are categorized as at risk of developing an eating disorder if the total score is ≥ 20 and not at risk of developing an eating disorder if the total score is < 20 .

The data were analysed using univariate and bivariate analysis. Univariate analysis was used to analyse the distribution of subject characteristics such as age, father's education, mother's education, father's occupation, mother's occupation, pocket money per month, dietary behavior and eating disorders. Pocket money per month was divided into three categories, namely low (IDR 800,000), middle (IDR 800,000–1.2 million) and high ($>$ IDR 1.2 million).

Bivariate analysis was used to see the possibility of a significant association between the independent (dietary behavior) and dependent variable (eating disorder). In this study, the bivariate analysis used the Chi square test with a 95% Confidence Interval (CI) or $\alpha = 0.05$.

RESULTS AND DISCUSSION

The characteristics of the subjects are shown in Table 1. The results show that overall, the age of the respondents ranged from 15–18 years, which includes middle and late adolescence categories, and the majority of the subjects were 16 years old (47.5%).

The majority of the fathers' and mothers' education were of the senior high school level with a percentage 45.9% and 44.3%, respectively. The majority of the fathers' occupation were private employees (37.7%), while most of the mothers were housewives (60.6%). The majority of respondents fell in the low category (80.3%) of pocket money received per month.

Based on Table 2, 23% of respondents were at risk of developing an eating disorder and

Table 1. Subject characteristics

Subject characteristics	(n=61)	%
Age (years)		
15	18	29.5
16	29	47.5
17	12	19.7
18	2	3.3
Father's education		
Elementary school	3	4.9
Junior high school	6	9.8
Senior high School	28	45.9
Bachelor degree	24	39.3
Mother's education		
Elementary school	3	4.9
Junior high school	8	13.1
Senior high school	27	44.3
Bachelor degree	23	37.7
Father's occupation		
Civil servant	15	24.5
Private employees	23	37.7
Entrepreneur	22	36.1
Unemployed	1	1.6
Mother's occupation		
Civil servant	8	13.1
Private employees	8	13.1
Entrepreneur	8	13.1
House wife	37	60.6
Pocket money per month		
Low	49	80.3
Medium	10	16.4
High	2	3.3

77% had no risk of developing an eating disorder; while 63.9 % of respondents were on a diet and 36.1 % were not on a diet. Table 2 showed that the majority of respondents did not adhere to a specific diet with a percentage of 42.6%. Some respondents were following other types of diets, such as the carbohydrate diet, the calorie diet, the mayo diet, the mediteranian diet, and the OCD (Obsessive Corbuzier's Diet).

The results of this study indicate that respondents tend to not to be at risk of developing an eating disorder, however the frequency

distribution of the respondents' answers on Table 3 shows that in the dieting sub-variable about 12 (19.7%) respondents answered that they are always terrified about being overweight and 13 (21.3%) respondents answered that they are sometimes terrified about being overweight.

Feeling terrified about being overweight is an indication of an eating disorder. Keel (2017) states that a great fear of weight gain makes individuals try to prevent weight gain. This is found in people with eating disorders, namely anorexia nervosa.

Table 2. Eating disorder, dietary behavior and diet type of adolescent girls

Variable	(n=61)	%
Eating disorder		
Risk	14	23
No risk	47	77
Dietary behaviour		
No diet	22	36.1
Diet	39	63.9
Diet type		
Calorie diet	1	1.6
Carbohydrate diet	6	9.8
Mayo diet	1	1.6
Mediterranean diet	1	1.6
OCD diet	4	6.6
No specific diet	26	42.6

OCD: Obsessive Corbuzier's Diet

The results of the frequency distribution of respondents also show that about 10 (16.4%) respondents answered that they always think about burning up calories when exercising and 12 (19.7%) respondents answered that often think about burning up calories during exercise. The desire to burn calories while exercising can make individuals do excessive exercise. Keel (2017) states that in people with eating disorders, namely bulimia nervosa, excessive exercise is

one of the compensatory efforts made after eating large portions in a short time (binge eating).

The results of the distribution of respondent answers to the food preoccupation and bulimia sub-variables on Table 4 showed that about 11 (18%) respondents always felt preoccupied with food and about 12 (19.7%) respondents feel that they are usually preoccupied with food. 14 (23%) respondents also answered that they sometimes experience problems with

Table 3. The frequency distribution of the EAT-26 questionnaire answers by dieting sub-variable

Statement	Always		Usually		Often		Sometimes		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%	n	%
Am terrified about being overweight	12	19.7	5	8.2	8	13.1	13	21.3	7	11.5	16	26.2
Aware of the calorie content of foods that I eat	2	3.3	1	1.6	2	3.3	9	14.8	21	34.4	26	42.6
Particularly avoid food with a high carbohydrate content	2	3.3	1	1.6	0	0	6	9.8	14	23	38	62.3
Feel extremely guilty after eating	1	1.6	2	3.3	2	3.3	7	11.5	8	13.1	41	67.2
Am preoccupied with a desire to be thinner	9	14.8	4	6.6	7	11.5	9	14.8	3	4.9	29	47.5
Think about burning up calories when I exercise	10	16.4	7	11.5	12	19.7	13	21.3	6	9.8	13	21.3
Am preoccupied with the thought of having fat on my body	7	11.5	9	14.8	7	11.5	10	16.4	12	19.7	16	26.2
Avoid foods with sugar in them	4	6.6	2	3.3	0	0	8	13.1	16	26.2	31	50.8
Eat diet foods	2	3.3	2	3.3	3	4.9	8	13.1	8	13.1	38	62.3
Feel uncomfortable after eating sweets	3	4.9	1	1.6	3	4.9	9	14.8	13	21.3	32	52.5
Engage in dieting behavior	1	1.6	5	8.2	3	4.9	15	24.6	7	11.5	30	49
Like my stomach to be empty	3	4.9	5	8.2	2	3.3	12	19.7	4	6.6	35	57.4
Enjoy trying new rich foods	5	8.2	5	8.2	5	8.2	22	36.1	16	26.2	8	13.1

Table 4. The frequency distribution of the EAT-26 questionnaire answers by food preoccupation and bulimia sub-variable

Statement	Always		Usually		Often		Sometimes		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%	n	%
Find myself preoccupied with food	11	18	12	19.7	8	13.1	14	23	10	16.4	6	9.8
Have gone on eating binges where I feel that I may not be able to stop	2	3.3	8	13.1	9	14.8	14	23	16	26.2	12	19.7
Vomit after I have eaten	0	0	1	1.6	1	1.6	0	0	8	13.1	51	3.6
Feel that food controls my life	7	11.5	6	9.8	2	3.3	12	19.7	9	14.8	25	41
Give too much time and thought to food	3	4.9	9	14.8	4	6.6	14	23	15	24.6	16	26.2
Have the impulse to vomit after meals	0	0	1	1.6	1	1.6	1	1.6	4	6.6	5.4	88.5

food where the respondent cannot stop eating. Feeling preoccupied with food and feeling that they cannot stop eating are found in people with bulimia nervosa and binge eating.

The distribution of the frequency of the respondent answers to the oral control sub-variable on Table 5 showed that about 15 (24.6%) respondents felt that other people always wanted them to eat more. Pressure from other people can cause individuals to develop abnormal eating behaviors, which is an indication of an eating disorder.

Based on Table 6, most of the diet efforts undertaken by respondents were healthy diet efforts, such as physical exercise (92.3%), increase eating fruit and vegetables (84.6%), and reducing the consumption of high-fat foods (53.8%).

Most respondents also have gone on unhealthy diet efforts such as eating in very small portions (53.8%) and skipping meals (no breakfast, lunch or dinner) (48.7%). Some respondents also performed extreme diet efforts such as using diet pills, vomiting on purpose, and using laxatives and diuretics.

Based on Table 7, the results show that 33.3% of respondents were on a diet and are at risk of developing an eating disorder, while 95.5% of respondents were not on a diet and not at risk of developing an eating disorder.

The Chi-Square test shows a p-value of 0.024. This shows that there is a significant association between dietary behavior and the risk of developing an eating disorder. This is in line with the study of Laila (2013), which shows that there is a relationship between dietary behavior

Table 5. The frequency distribution of the EAT-26 questionnaire answers by oral control sub-variable

Statement	Always		Usually		Often		Sometimes		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%	n	%
Avoid eating when I am hungry	0	0	3	4.9	3	4.9	13	21.3	13	21.3	29	47.5
Cut my food into small pieces	6	9.8	6	9.8	6	9.8	22	36.1	11	18	10	16.4
Feel that others would prefer if I ate more	15	24.6	8	13.1	6	9.8	12	19.7	6	9.8	14	23
Other people think that I am too thin	5	8.2	9	14.8	3	4.9	18	29.5	11	18	15	24.6
Take longer than others to eat my meals	3	4.9	9	14.8	4	6.6	14	23	15	24.6	16	26.2
Display self-control around food	4	6.6	5	8.2	7	11.5	13	21.3	10	16.4	22	36.1
Feel that others pressure me to eat	5	8.2	6	9.8	4	6.6	16	26.2	13	21.3	17	27.9

Table 6. Dietary efforts of adolescent girls

Dietary effort	Frequency (n=39)	
	n	%
Healthy diet		
Physical exercise	36	92.3
Increase consumption of fruit and vegetables	33	84.6
Reduce high fat food consumption	21	53.8
Reduce sweet food consumption	14	35.9
Unhealthy diet		
Not eating anything from morning to night (fasting outside religious requirements)	6	15.4
Eating very small portions		
Using a food substitute	21	53.8
Skipping meals	10	25.6
Extreme diet		
Taking diet pills	19	48.7
Vomiting on purpose	2	5.1
Using laxatives	1	2.6
Using diuretics	4	10.3

and eating disorders. The study was conducted on 120 adolescents at Madrasah Aliyah UIN Jakarta Development and showed that of 61 adolescents there were 16 (26.2%) who were on a diet and were at risk of developing an eating disorder.

The result of the bivariate analysis also showed a prevalence ratio of 7.3, which means that respondents who were on a diet had a 7.3 times higher risk of developing an eating disorder compared to respondents who were not on a diet. This is in line with research conducted by Golden *et al.* (2016) in secondary schools in Australia that found that adolescents aged 14–15 years who went on a diet have 5 times greater the risk of developing eating disorders.

This study shows that 63% of adolescent girls with an age range of 15–18 years were on a diet. The types of diets followed by the respondents in this study include the carbohydrate diet, mayo diet, calorie diet, OCD diet, and Mediteranian diet. Most of the respondents, with a percentage of 42.6%, did not follow a specific diet and only made dietary efforts such as eating more fruits and vegetables, exercising, and reducing their consumption of high-fat and sugary meals.

The results of this study indicate that the majority of respondents were on a diet and were not at risk of developing eating disorders, which amounted to 66.7%. Regarding the diets carried out by the respondents, the majority

Table 7. Correlation between dietary behavior and eating disorder

Dietary behavior	Eating disorder						p	PR
	Risk		No risk		Total			
	n	%	n	%	n	%		
Diet	13	33.3	26	66.7	39	100		
No Diet	1	4.5	21	95.5	22	100	0.024	7.3
Total	14	23	47	77	61	100		

of respondents went on a healthy diet such as exercised (92.3%), increased the amount of fruit and vegetables (84.6%) and reduced consumption of high-fat foods (53.8%). These healthy dieting efforts of the respondents resulted in the respondents who were on a diet to be not at risk of developing eating disorders.

Some respondents underwent unhealthy diet efforts, such as not eating anything from morning to night (fasting outside of religious requirements), skipping meals (not having breakfast, lunch or dinner) and eating very small portions. A study by Tajik *et al.* (2016) on 1,565 students in secondary schools in Southern Malaysia reported that 20–30% of adolescents skip breakfast, while 12–20% skip lunch. Skipping or missing main meals can negatively affect adolescents. Study results by Tajik *et al.* (2016) illustrates that there is a relationship between skipping meals and poor quality of diet with stress and depression among adolescents. Moreover, skipping meals also prevent adolescents from obtaining useful nutrients to meet their daily energy needs.

Eating very small portions is also considered as an unhealthy diet. This is because eating very small portions is practically done by consuming foods that contain a very large amount of energy at an amount far less from the amount needed. This can also cause large deficiencies of nutrients needed by the body and will affect the body's metabolism and may affect their health if it is continued.

Some respondents also went through extreme dietary efforts such as using diet pills, vomiting on purpose and using laxatives and diuretics. Unhealthy and extreme diets can make adolescents be at risk of developing eating disorders. The dietary behavior of adolescents only aims to lose weight without paying attention to the quality of the diet and the energy needs of the body.

A study by Kurniawan dan Briawan (2014) on 103 new students majoring in the nutritional program in Bogor Agricultural University (IPB) found that the demand for adolescent girls to have a slim body will cause them to go on a strict diet to have the ideal body. For an adolescent girl participating in modern dance, the ideal body is a demand to facilitate better dance movements and good performance aesthetics. This is in line with the research of Walter and Yanko (2018), which

argues that an adolescent girl who participates in modern dance are more focused on body weight, body image and dietary behavior compared to teenage girls in general.

A study by Doria (2017) of 12 female dancers aged 14–18 years in Canada found that there is pressure in the world of dance to be thin, which causes female dancers to reduce excessive food consumption and develop eating disorders. Excessive and continuous dietary behavior such as unhealthy and extreme diets can cause individuals to experience eating disorders. Eating disorders have both short and long term effects on a person's health. Adolescents who are at risk of developing eating disorders are expected to consult a doctor or an expert in their field so that appropriate treatment efforts are made to avoid the onset of eating disorders that may cause negative health impacts. Counseling also needs to be done to promote a healthy and balanced diet for adolescents including working with anemia prevention programs anemia organized by community health centers. This is so that adolescents can develop nutritionally balanced eating patterns and avoid unhealthy and extreme dietary behaviors that can increase the risk of developing eating disorders

CONCLUSION

There is a significant association between dietary behavior and eating disorders; adolescent girls who are on a diet are more likely to experience eating disorders. Based on this research, 23% of adolescent girls were at risk of developing an eating disorder, while 63.9% were on a diet.

Adolescent girls who are at risk of developing eating disorders are expected to consult with a doctor or an expert in their field so that appropriate treatment can be made, as well as counseling with nutritionists to understand what needs to be done to develop a healthy and balanced diet for adolescent girls.

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AUTHOR DISCLOSURES

The authors have no conflict of interest.

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