UNHEALTHY DIET AND STRESS ARE CORRELATED WITH PREMENSTRUAL SYNDROME IN ADOLESCENT GIRLS IN TANGERANG

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ABSTRACT

Adolescent girls is one of the age groups that are vulnerable to menstrual disorders, especially in the first year after menarche. Premenstrual syndrome (PMS) is a group of physical and emotional symptoms that emerge 7 to 14 days before menstruation and diminish once menstruation starts. This study was aimed to analyze the correlation between unhealthy diets and stress on premenstrual syndrome in adolescent girls. This study employed an observational study with a cross-sectional approach. The population of this study was all adolescent girls at State Junior High Schools in Tangerang City who aged 13-15 years. The sampling technique used cluster random sampling, consisting of 120 respondents. The data was collected through validated questionnaires, namely Food Frequency Questionnaire (FFQ), Perceived Stress Scale (PSS-10), and Shortened Premenstrual Assessment Form (SPAF). The obtained data were analyzed using Spearman statistical test. The results showed that there was a significant correlation between sweet foods ($p = 0.039$; $r = 0.188$), sweet drinks ($p = 0.006$; $r = 0.247$), salty foods ($p = 0.026$; $r = 0.203$), fatty foods ($p = 0.000$; $r = 0.366$) and fast food ($p = 0.001$; $r = 0.313$) and stress ($p = 0.000$; $r = 0.564$) on PMS. In conclusion, maintaining healthy diet and controlling stress is important to prevent and manage PMS among female adolescent.

Keywords: adolescent girls, premenstrual syndrome, stress, unhealthy diets

INTRODUCTION

Premenstrual syndrome (PMS) is a collection of physical and psychological symptoms during the luteal phase of the menstrual cycle. Generally, PMS occurs one or two weeks before menstruation and disappears at the start of menstruation until a few days after menstruation ends (Gnanasambanthan & Datta, 2019). The most common physical and psychological symptoms associated with PMS are headache, breast tenderness, muscle aches, fatigue, depression, hypersensitivity, and mood changes (Katzinger et al., 2020). PMS begins to become an issue in adolescence that can affect productivity, health-related quality of life, interpersonal relationships, and daily activities (Goker et al., 2015).

The American College of Obstetrics and Gynecologists reports that 85% of women experience one or more premenstrual symptoms (American College of Obstetricians and Gynecologists, 2001). A meta-analysis involving 17 studies showed that the prevalence of PMS worldwide was 47.8% with Asia being the continent with the highest prevalence of PMS (Direkvand-Moghadam et al., 2014). A study of 1,379 adolescent girls in Iran found about 99.5% of students reported at least one premenstrual symptom. Of these, 66.3% were mild, 31.4% were moderate, and 2.3% were severe (Delara et al., 2013).

Lifestyle factor is one of the predictor factors that affect the severity of PMS. Currently, the lifestyle of adolescents is changing. One of which is a change in diets that is high in risky foods (foods high in salt, sugar, and fat), low consumption of fruit and vegetables, and high consumption of energy-dense but low-nutrition foods (Keats et al., 2018). A recent study reported that young women with a western diet (fast food, soft drinks, processed foods with preservatives, high-salt foods, sugar-sweet desserts) had a 1.77 times greater risk of developing PMS than adolescents with traditional and healthy diets (Moradifili et al., 2020). Foods that are high in calories, fat, sugar, salt, and low in fiber that are consumed continuously can increase estrogen

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levels in the blood. High levels of estrogen cause fluid retention in the body which results in swelling and pain (Bertone-Johnson et al., 2005).

Psychological disorders such as stress have a significant influence on PMS. A study reported that stress in adolescent girls was associated with the severity of PMS. Symptoms of severe PMS were found in adolescent girls who experience moderate or severe stress (Rasheed & Al-Sowielem, 2003).

The research on correlation between unhealthy diets and stress with PMS in adolescent girls are still limited and show varying results. Adolescents are the largest age group in Indonesia's population structure as the focus of intervention for human resource development (Soeroso, 2016). Reproductive health problems are one of the important indicators in determining the health of adolescent girls (Šaffa et al., 2019). Thus, this study was aimed to analyze the correlation between unhealthy diets and stress with premenstrual syndrome in adolescent girls in Tangerang.

METHODS

This study was an analytic observational study with a cross-sectional approach, which was conducted in June and July 2021 at State Junior High Schools in Tangerang City Education Office's operational region in Banten Province. The population of this study was all adolescent girls at State Junior High Schools in Tangerang City, aged 13-15 years.

The sampling method employed was cluster random sampling, where schools were randomly selected obtaining 3 State Junior High schools from 28 State Junior High Schools in Tangerang City. The sample size was counted by Slovin formulas and resulted 120 adolescents girls aged 13 – 15 years who met the inclusion and exclusion criterias as the sample. The inclusion criterias in this study were adolescents girls aged 13-15 years, had begun menstruation and were able to communicate online. The exclusion criterias were adolescent girls who took hormonal drugs and painkillers during menstruation.

The study was conducted online using a Google Form due to the COVID-19 pandemic. The respondents who participated in this study had previously signed informed consent as evidence of their willingness to participate in the study. This study obtained ethical approval from the Health Research Ethics Committee of Politeknik Kesehatan Kementerian Kesehatan Jakarta II (KEPK-PKJ II) LB.02.01/I/KE/00/554/ 2021.

Data of unhealthy diet was obtained by using the Food Frequency Questionnaire (FFQ), where the types of unhealthy foods attached were adopted from The Indonesioan Basic Health Research in 2018 (RISKESDAS). The FFQ was used to identify the type and frequency of food/beverage consumption in the previous month which includes a list of sweet foods/drinks, fatty foods, salty foods, and fast foods. Furthermore, the FFQ was rated using a score calculation based on the Likert scale. The score was categorized as 6 for consuming foods >1 time a day, 5 for 1 time a day, 4 for 3-6 times a week, 3 for 1-2 times a week, 2 for 1-3 times a month, and 1 for never. After the coding, the scores were added up and the average score was calculated. The score of more than equal to mean was categorized often and the score of less than to mean was categorized as rare (Sirajuddin et al., 2018)

The stress data were obtained from the Perceived Stress Scale (PSS-10) questionnaire which had been previously validated with a Chronbach Alpha coefficient of 0.96 (Pin, 2011). PSS-10 questionnaire consisted of 10 questions with 6 negative questions and 4 positive questions and rated based on five Likert scales. On the negative questions, the score was categorized as 0 for never, 1 for almost never, 2 for sometimes, 3 for often and 4 for very often. The score of positive questions are reversed. Furthermore, the scores were added up and categorized into mild stress (1 – 14), moderate (15 – 26), and severe (>26). Premenstrual syndrome data were obtained from the SPAF (Shortened Premenstrual Assessment Form) questionnaire. The SPAF questionnaire in Indonesian was declared valid and reliable with a Chronbach Alpha coefficient of 0.84 (Damayanti & Samaria, 2021). The SPAF questionnaire is an assessment instrument that contains 10 question items collected on a four Likert scales related to complaints of premenstrual symptoms. The score is added up categorized into normal (0 – 14), mild (15 – 34), moderate (35 – 44), and severe (45 – 60).

The data was analyzed descriptively univariately and presented in a frequency distribution table. Because the data scale of the variables is numerical, bivariate analysis was conducted using Spearman's test to analyze the correlation between unhealthy diets and stress with PMS in adolescent girls. The data analysis was performed using IBM SPSS Statistics 23 software.

RESULTS AND DISCUSSION

The characteristics of respondents in this study including age, unhealthy diet (sweet foods, sweet drinks, salty foods, fatty foods and fast food), stress and premenstrual syndrome. Table 1 shows 45.0% of respondents were 14 years old. This age group is generally prone to menstrual disorders, especially in the first year after menarche (Islamy & Farida, 2019). Menstrual disorders that commonly occur in adolescent girls are dysmenorrhea, PMS, and menstrual cycle irregularities (Negi et al., 2018).

Table 1. Distribution of Age, Unhealthy Diet (Sweet foods/drinks, Fatty foods, Salty foods, and Fast foods), Stress, and Premenstrual syndrome

Characteristics	n	%
Age (years)		
13	41	34.2
14	54	45.0
15	25	20.8
Sweet Foods		
Rarely	71	59.2
Frequently	49	40.8
Sweet Drinks		
Rarely	68	56.7
Frequently	52	43.3
Fatty Foods		
Rarely	53	44.2
Frequently	67	55.8
Salty Foods		
Rarely	56	46.7
Frequently	64	53.3
Fast Foods		
Rarely	63	52.5
Frequently	57	47.5
Stress		
Mild	41	34.2
Moderate	64	53.3
Severe	15	12.5
PMS		
Normal	7	5.8
Mild	60	50.0
Moderate	44	36.7
Severe	9	7.5

The results of the study showed that 59.2% of respondents consumed sweet foods in the rare category. Meanwhile, some other respondents consumed fatty and salty foods in the frequent category (respectively 55.8% and 53.3%). This indicates that adolescent girls tended to consume the food that high in salt, sugar, and fat. The excessive unhealthy food consumption can pose a risk to health problems and trigger various chronic diseases, such as obesity, heart disease, stroke, cancer, type 2 diabetes mellitus, and osteoporosis (Croll et al., 2001).

This result supported the Basic Health Research in 2018 which showed that almost half of teenagers consumed risky foods. There were 50.4% of adolescents aged 10-14 years who consume sweet foods ≥ once a day; 31.4% salty foods; 44.2% fatty/fried foods; 8.8% processed foods with preservatives; 78.5% foods flavored; and 61.9% sweet drinks (Kementrian Kesehatan RI, 2018).

The distribution of respondents based on stress levels shows that almost half of the respondents had stress levels in the moderate category (53.3%). All the samples reported to experience stress from time to time, at least academic-related stress. The excessive worries about academic achievement can lead to stress symptoms such as changes in appetite,anxiety, insomnia, and mood swings (Bhargava & Trivedi, 2018).

PMS is a collection of physical and emotional symptoms that occur during the days leading up to the menstrual period (American Psychiatric Association, 2014). Almost every girl experiences one or more menstrual disorders in her life,. It was reported that 75% of girls experience some problems related to menstruation (Slap, 2003). Table 1 presents that almost all respondents experienced premenstrual syndrome (94.2%), where 50.0% having mild symptoms. This is supported by a study conducted in India which reported that 94.8% of girls had at least one PMS

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symptom with 65.7% having moderate to severe symptoms (Chowdhury & Chakraborty, 2017).

Based on table 2, there was a correlation between sweet foods (p = 0.039), sweet drinks (p = 0.006), fatty foods (p = 0.000), salty foods (p = 0.026), and fast food (0.001) on PMS in adolescent girls. The Spearman correlation value indicated a positive correlation direction. The more frequent consumption of sweet foods, sweet drinks, fatty foods, salty foods, and fast food, the higher the severity of PMS.

A study on Arab adolescents found a correlation between high-calorie/fatty/ sweet/salty food consumption and physical and psychological symptoms of PMS (Hashim et al., 2019). The consumption of fast food, fatty, salty and sugary foods increase the risk of PMS related to inflammation induction. There is an imbalance of the oxidant or antioxidant system caused by the consumption of unhealthy foods, thereby increasing PMS symptoms (Duvan et al., 2011).

Another study in Indonesia reported that adolescents with unhealthy food consumption had a 2.3 times greater risk of premenstrual syndrome (Nurmiaty et al., 2011). Unhealthy food such as fast food contains high saturated fatty acids which can cause several health problems related to menstruation (Shinde et al., 2017). Dietary fat and saturated fatty acids have been shown to be pro-inflammatory factor that increase the concentration of C-Reactive Protein (CRP) (Santos et al., 2013). High CRP concentrations and other inflammatory cytokine levels are associated with PMS symptoms (Ronnenberg et al., 2014).

Foods high in calories, sugar, salt, fat, and low in fiber that consumed frequently can increase blood levels of estrogen, triggering PMS symptoms. Dietary modification is necessary to minimize the severity of PMS. Fruits and vegetables are foods that are high in fiber, bioactive phytochemicals, and antioxidants. Daily consumption of non-starchy fruits and vegetables has been reported to help reduce the severity of PMS by converting estrogen to its inactive form (Hashim et al., 2019).

Table 2 shows a correlation between stress and premenstrual syndrome in adolescent girls (P = 0.000). The Spearman correlation value of 0.564 indicates a positive correlation with a moderate correlation strength. A possible explanation is that

Table 2. The Correlation between Unhealthy Diet (Sweet foods/drinks, Fatty foods, Salty foods, and Fast foods) stress and Premenstrual Syndrome in Adolescent Girls

Variable	Premenstrual Syndrome										p-value	r
	Normal		Mild		Moderate		Severe		Total			
	n	%	n	%	n	%	n	%	n	%		
Sweet Foods												
Rarely	7	100.0	38	63.3	23	52.3	3	33.3	71	59.2	0.039*	0.188
Frequently	0	0	22	36.7	21	47.7	6	66.7	49	40.8		
Sweet Drinks												
Rarely	6	85.7	39	65.0	18	40.9	5	55.6	68	56.7	0.006*	0.247
Frequently	1	14.3	21	35.0	26	59.1	4	44.4	52	43.3		
Fatty Foods												
Rarely	5	71.4	36	60.0	11	25.0	1	11.1	53	44.2	0.000*	0.366
Frequently	2	28.6	24	40.0	33	75.0	8	88.9	67	55.8		
Salty Foods												
Rarely	6	85.7	30	50.0	15	34.1	5	55.6	56	46.7	0.026*	0.203
Frequently	1	14.3	30	50.0	29	65.9	4	44.4	64	53.3		
Fast Food												
Rarely	6	85.7	38	63.3	18	40.9	1	11.1	63	52.5	0.001*	0.313
Frequently	1	14.3	22	36.7	26	59.1	8	88.9	57	47.5		
Stress												
Mild	5	71.4	30	50.8	5	11.1	1	11.1	41	34.2		
Moderate	2	28.6	28	47.5	32	71.1	2	22.2	64	53.3	0.000*	0.564
Severe	0	0.0	1	1.7	8	17.8	6	66.7	15	12.5		

the higher the stress level, the higher the severity of PMS.

Based on this study, it can be seen that 66.7% of respondents who had severe stress tend to experience severe PMS. A study showed a correlation between stress and PMS (Walton et al., 2018). A case-control study on women in Spanish reported that psychological factors in the form of stress were positively associated with the incidence of PMS (Regueira-me et al., 2019). Various forms of stressors can trigger stress in adolescents, namely academic demands, finances, time, and relationships. It has been associated with negative health outcomes including physical, psychological, and emotional problems. Stress can exacerbate PMS symptoms as a result of disruption of the body's hormonal balance (Zaddana, 2018).

This study was one of the study which measured multifactorial aspects of PMS determinant, including nutritional and psychological. Thus, the factors complement each other in determining PMS in adolescent girls. The limitation of the study is that this study cannot measure unhealthy diets in terms of the portion consumed, but focuses on the frequency of consumption qualitatively. Also, the online data collection may resulted some bias because the researchers cannot monitor the respondents directly.

CONCLUSIONS

The results of this study showed that unhealthy diet and stress were associated with PMS in adolescent girls. Respondents who often eat unhealthy foods (sweet foods, sugary drinks, fatty foods, salty foods, and fast food) and have severe stress tend to experience PMS in the severe category. Lifestyle modification is needed by reducing the consumption of foods high in calories/fat/sugar/salt and controlling stress as an effort to minimize the severity of PMS.

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