

The Relationship between High Fiber Diet and Severity of Premenstrual Syndrome Symptoms in Medical Students of Pelita Harapan University

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Abstract

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Introduction: 47.8% of women worldwide experience symptoms of premenstrual syndrome and 20% of women experience symptoms that are severe enough to interfere with daily activities. This occurs during the last 14 days of the menstrual cycle or luteal phase, and it is caused by hormonal fluctuations.

Aim: This study is going to be conducted to determine the relationship between high fiber diet and the severity of premenstrual syndrome in adolescents.

Method: This study used a comparative analytic categorical study with two unpaired categories with a cross-sectional study design. The research sample is female students at the Faculty of Medicine, University of Pelita Harapan who met the inclusion criteria of at least 74 samples by judgmental sampling. Data were collected using a questionnaire in the form of a Premenstrual Symptom Scale, Esitimated Food Record and Perceived Stress Scale with the the chi-square method, and data analysis using SPSS 24.0.

Results: There were 85 samples that matched the inclusion and exclusion criteria of this study. The majority of the sample came from the 2018 class (64.7%), 20 years old (61.2%), experiencing moderate stress (61.2%), and have normal body mass index (72.9%). Researcher found a p value of 0.309 ($p > 0.05$), which means that there is no significant relationship between a high-fiber diet and the severity of premenstrual syndrome symptoms.

Introduction

Diet is a habit made by an individual or a certain group of people regarding what food choices they eat in their daily lives.¹ A proper diet requires the consumption of vitamins, minerals, carbohydrates, proteins, and fats to achieve balanced nutrition.¹ Dietary choices play an important role in human health.¹ An adequate and balanced diet is necessary to maintain a healthy body and mind and prevent disease.² A study of health-related diet and lifestyle shows that a poor diet is not only interfere with

physical growth but also affect emotional development.²

Premenstrual syndrome is a clinical symptom that occurs significantly, including somatic and psychological symptoms. This occurs during the last 14 days of the menstrual cycle and causes substantial and functional impairment.³ Premenstrual syndrome occurs in 47.8% of women of childbearing age worldwide and in 20% of women occurs so severely that it can interfere with their daily activities.⁴ The symptoms of premenstrual syndrome include weight gain, pain in the abdomen and back, excessive anxiety,

fatigue and various other symptoms.⁴ A study conducted on 300 female university students in Sharjah, United Arab Emirates (UAE) for 4 months in 2016 showed that diet affects symptoms of premenstrual syndrome.⁵ Foods with high calories, fat, sugar, and salt have been shown to have an effect on aggravating symptoms of premenstrual syndrome. On the other hand, fruits that contain lots of fiber have been shown to relieve symptoms of premenstrual syndrome.⁵ However, a study conducted on 11,429 women aged 25-42 years stated that carbohydrates and fiber did not affect the symptoms of premenstrual syndrome, only women who smoked had an index Excess body mass (BMI), and excessive consumption of maltose have a high risk of severe premenstrual syndrome symptoms.⁶

Factors that play an important role in premenstrual etiology, when compared with asymptomatic women, women with symptoms of premenstrual syndrome were shown to consume more refined sugar, refined carbohydrates, sodium, and dairy products and less B vitamins, iron, zinc, and zinc. manganese.

Vegetarian women who consumed less total fat and more fiber than omnivorous women were shown to have fewer symptoms of premenstrual syndrome. This suggests that an increase in dietary fiber and a decrease in fat intake significantly affects estrogen levels in a woman's body.

Consumption of refined sugar can interfere with levels of chromium, manganese, zinc, and B vitamins in the body, this is due to substances needed by the body to process glucose.⁷ In addition, sugar consumption also increases a person's risk of experiencing hypoglycemia, irritability, craving for something sweet, and headaches. Consumption of high sugar with sodium

intake can interfere with the kidney's job of clearing excess water and sodium.⁷

Other dietary habits such as excessive consumption of alcohol and caffeine as well as irregular eating patterns that cause a person to experience malnutrition can interfere with liver function. Disrupted liver function causes an increase in circulating estrogen.⁷

When compared with people in general, people who follow a high-fiber diet tend to have a lower body mass index (BMI), lower total cholesterol and low-density lipid (LDL) cholesterol, lower blood pressure, and lower blood pressure. increase insulin sensitivity. Some of these things cause someone who runs a high-fiber diet to avoid obesity and dyslipidemia.⁸

Given the conflicting research results regarding the relationship between diet and the severity of premenstrual syndrome symptoms, the authors wanted to find out whether diet really has an influence on PMS symptoms. It is hoped that with this research, more of the population will be educated about how they choose a diet that is suitable for PMS.

Objective

This study aims to determine the relationship between a high-fiber diet and the severity of premenstrual syndrome symptoms.

Subject and Methods Samples

The research sample is adolescents of reproductive age at the Faculty of Medicine, Pelita Harapan University who met the inclusion criteria and agreed to sign an informed consent. The data obtained from research respondents were 85 respondents. Data collection is carried

out using google form in the period January to March 2021.

Study Design

A cross sectional study was conducted in Faculty of Medicine, Pelita Harapan University from January to March 2021. The data obtained was processed using the chi square test in accordance with this research method, namely a cross-sectional study with unpaired categorical analytical methods. The minimum number of research samples is 74 respondents.

Data Collection Method

Data was collected using several questionnaire methods. The sociodemographic information such as name, age, Body Mass Index (BMI), batch and caffeine consumption were collected using a self-administered questionnaire. Perceived stress data was collected using the Perceived Stress Scale-10 questionnaire (PSS-10), and the severity of premenstrual syndrome symptoms was collected using Premenstrual Syndrome Scale questionnaire (PMSS). The answers regarding Body Mass Index (BMI) are classified into <17.0 = severe underweight, 17.0 – 18.49 = mild underweight, 18.5 – 25.0 = Normal, 25.1 – 27.0 = Mildly overweight, >27.0 = overweight.^{9,10} The Perceived Stress Scale-10 questionnaire answers are classified into mild stress (0- 13), moderate stress (14-26), severe stress (27-40).^{11,12} The PMSS questionnaire consist of 44 questions symptoms that happened during menstruation. Each assessment criterion on the PMSS questionnaire is filled in by considering the conditions that occurred during the week before menstruation and divided into 1 – 44 = no symptom, 45 – 103 = mild symptoms, 104 – 163 = moderate symptoms, 164 – 220 = severe symptoms.^{13,14} Estimated Food Record

was used to determine UPH Faculty of Medicine students dietary habit, it was divided into 2 categories based on WHO recommendation which is healthy diet(> 400 grams of vegetables and fruit a day or at least one serving of fiber a day), unhealthy diet (<400 grams of vegetables and fruit a day or no consumption of vegetables and fruit in a day).^{1,15} The exclusion criteria for this study are experiencing severe stress, consumed caffeine (coffee) in the last 24 hours, and overweight.

Statistical Analysis

All of the collected data were analyzed using Microsoft Excel 2019 and Statistic Package for Social Sciences 24th version (IBM SPSS 24). The relationship between high fiber diet and premenstrual syndrome symptoms in medical students of Pelita Harapan University were analyzed using Chi square test. Other variables such as caffeine, stress, and nutritional status are also analyzed using Chi square tests. The result said to be significant if the p-value below 0.05 ($p \leq 0.05$) in two tailed hypothesis testing.

Results

Demographical Data and Respondent Characteristics

Table 1 . Respondent Characteristics (N=85)

Variable	Frequency (n)	Percentage (%)
Age (years)		
19	29	34,1
20	52	61,2
21	4	4,7
Batch		
2018	55	64,7
2019	29	34,1
2020	1	1,2
Stress		
Mild Stress	33	38,8
Moderate Stress	52	61,2
Body Mass Index		
Severe Underweight	6	7,1
Mild Underweight	14	16,5
Normal	62	72,9
Mildly Underweight	3	3,5

In this study, the data obtained from research respondents namely preclinical students of the Faculty of Medicine, Pelita Harapan University, were 85 respondents. The respondents have met the inclusion criteria. Respondent characteristics can be seen in **table 1**. The majority of respondents in this study were 20 years old as many as 52 people (61.2%), respondents from the 2018 batch were 55 people (64.7%), and experiencing moderate stress as many as 52 people (61.2%). Most respondents had normal Body Mass Index (BMI) as many as 62 people (72.9%).

Eating Habits of Medical Students of Pelita Harapan University

Table 2. Eating Habits of Medical Students of Pelita Harapan University (N=85)

Variable	Frequency (n)	Percentage (%)
Frequency of Eating Fiber in a day		
Do Not Consume		
1	29	34,1
2	52	61,2
3	4	4,7
4	1	1,2
Dietary Habit		
Fiber Consumption	55	64,7
No Fiber Consumption	30	34,1
WHO Recommendation		
Fulfil	0	0
Do Not Fulfil	85	100
Fiber Portions		
Do Not Consume	30	35,3
½ Portion	3	3,5
1 Portion	18	21,2
1½ Portions	4	4,7
2 Portions	22	25,9
3 Portions	7	8,2
4 Portions	1	1,2
Jenis Serat		
Fruit Juice	23	23,9
Fruit Salad	3	3,2
Fresh Fruit	4	4,1
Beans, Peas	4	4,1
Vegetables Salad	4	4,1
Fruit Cake	2	2,1
Mixed Vegetables with Peanut Sauce	1	1,1
Stir-fried Vegetables	22	22,9
Vegetables Soup	21	21,9
Vegetarian Noodles	1	1,1
Steamed Taro	1	1,1
Kale cooked with Shri Paste	4	4,1
Cornbread	1	1,1
Fried Breadfruit	1	1,1
Chinese Cabbage	4	4,1

Table 2. Shows a picture of dietary habit of students of the Faculty of Medicine, University Pelita Harapan, where none of them meet the recommendations for a fiber diet from the WHO, namely 5 servings of vegetables and fruit a day. The closest dietary fiber pattern is 4 servings of vegetables and fruit made by 1 (1.2%) participants. For the types of vegetables and fruit, fruit juice was the most frequently consumed fiber, which was consumed 23 (23.9%) times by participants.

Characteristics of Premenstrual Syndrome Severity

Table 3. Characteristics of Premenstrual Syndrome Severity (N=85)

Age	PMS Severity			Total (%)
	Mild	Moderate	Severe	
19	16 (55,2%)	9 (31,0%)	4 (13,8%)	29 (100%)
20	27 (51,9%)	24 (46,2%)	1 (1,9%)	52 (100%)
21	3 (75,0%)	0 (0,0%)	1 (25,0%)	4 (100%)
TOTAL	46 (54,1%)	33 (38,8%)	6 (7,1%)	85 (100%)

Based on table 3, the majority of respondents experiencing mild premenstrual syndrome symptoms, that happened to 46 (54.1%) respondents. Researchers categorized the severity of moderate and severe premenstrual syndrome into one category, namely severe severity, where 39 (45.9%) respondents experienced severe premenstrual syndromesymptoms.

The relationship between diet and the severity of premenstrual syndrome symptoms

Table 4. The relationship between diet and the severity of premenstrual syndrome symptoms

Eating Habits	PMS Severity		Total N(%)	P Value	OR (95%CI)
	Low	High			
Fiber	32 (58,2%)	23 (41,8%)	55 (100%)	0,309	1,590 (0,650-3,893)
No Fiber Consumption	14 (46,7%)	16 (53,3%)	30 (100%)		
Total (N,%)	46 (54,1%)	39 (45,9%)	85 (100%)		

In this study, statistical analysis assessed using the Chi squared test to obtain a pvalue obtained of 0.309 (>0.05). This shows that there is no significant relationship between a high-fiber diet and the severity of premenstrual syndrome symptoms in UPH Faculty of Medicine students.

Discussion

In this study, researchers compared the consumption of a high-fiber diet, in this case the consumption of vegetables and fruit of more than five servings a day according to WHO recommendations or consuming fiber at least once a day, and the consumption of a low-fiber diet which consume vegetables and fruit of less than five servings in a day or eating patterns without vegetables and fruit in one day.¹⁶ Researchers also saw a picture of the dietary habit and menstrual patterns of UPH Faculty of Medicine students.

The dietary habit of UPH Faculty of Medicine students as shown in table 5.2 shows that the consumption of vegetables and fruits of UPH Faculty of Medicine students is not in line with the fiber recommendation from WHO. WHO recommends 400 grams of vegetables and fruit or the equivalent of five servings of good food to be consumed in a day or at least once a day in every serving of food consumed.¹⁶ This is in line with the findings made by the Ministry of Health in a 2013 basic health research study which stated that 93.5% of the population aged > 10 years consume vegetables and fruits below the recommended level.¹⁷ Even though vegetables and fruit are an important part of achieving balanced nutrition, the Ministry of Health recommends consuming 3-4 servings of vegetables and 2-3 servings of fruit a

day.¹⁷ In addition, through the community movement (GERMAS) in 2017, the Ministry of Health recommended to consume vegetables and fruit every day so that balanced nutrition can be realized in the community.⁴⁷ According to Agus in 2011, there was a reduction in the consumption of vegetables and fruits in almost all of Indonesia.¹⁸ This is due to changes in food consumption patterns in Indonesia. Another reason is that urban communities experience lifestyle changes to become more mobile and busier so they tend to consume fast food.¹⁸ The fast food diet causes a shift in eating patterns from high carbohydrates, fiber and low fat to low carbohydrates and fiber, high fat diets. and protein.¹⁸ In addition, as many as 30 (35.3%) respondents did not consume vegetables and fruit in their diet.

In this study, researchers compared the association of a high-fiber diet with the severity of premenstrual syndrome symptoms. Because none of the respondents met the requirements for a high-fiber diet as recommended by WHO, the researchers divided diet into two new categories, namely diets with fiber consumption and diets without fiber consumption. The fiber referred to in this case is vegetables and fruit in accordance with WHO recommendations where the requirement for a healthy diet is the consumption of vegetables, fruit, nuts, and legumes in a day.

The results of the analysis test using chi squared obtained a p value of 0.309 (p > 0.05). A p-value greater than 0.05 indicates that there is no significant relationship between a high-fiber diet and the severity of premenstrual syndrome symptoms in UPH Faculty of Medicine students. This study is in line with research conducted by Houghton, et al in 2017 on 116,429 women aged 25-42 years in Boston, United States.⁶ This study states that consumption of carbohydrates and fiber does not have a significant relationship with a person's risk of experiencing symptoms of premenstrual syndrome.⁶ Body mass index is said to have a greater influence on a person's risk of experiencing symptoms of premenstrual syndrome.⁶

However, another study conducted by Hamad, et al in 2019 on 300 students in Sharjah, UAE in a cross-sectional section stated that consumption of fruits can reduce the risk of developing premenstrual syndrome symptoms in women.⁵

In a study conducted by Hamad, et al in 2019, there were several other variables that were also investigated in this case smoking habits and eating patterns high in sugar/fat/calories/ and salt.⁵ Smoking habits have been proven to increase a person's risk of suffering from premenstrual syndrome symptoms. In addition, a diet high in sugar/fat/calories and salt also has a significant relationship with the risk of developing premenstrual syndrome symptoms in women.⁵ This is contrary to the research revealed by Houghton, et al in 2017. However, in this study it was said that there was a significant increase in total energy and all macronutrients before menstruation when compared to after menstruation. This makes it difficult to determine whether the increase in calories exacerbates premenstrual syndrome or as a result of hormonal changes occurring.⁵

Conclusion

Based on the results and discussion of the research on the relationship

between a high-fiber diet and the severity of premenstrual syndrome symptoms in UPH Faculty of Medicine students, it can be concluded that there is no significant relationship between a high-fiber diet and the severity of premenstrual syndrome symptoms in UPH Faculty of Medicine students.

Limitation

There is some limitation in this study. In this case, the first is the limitations of the data collection method carried out by the researcher, the researcher uses the judgmental sampling method so that the sampling is not random and cannot be said to represent the entire population. In addition, the use of the questionnaire method that was distributed online caused respondents to answer the questionnaire subjectively and some did not understand the question clearly, causing bias. Researchers have tried to avoid bias by contacting respondents directly one by one and explaining questions that are considered difficult but due to time and place limitations caused by the pandemic, researchers have difficulty getting responses from respondents and there are limitations in explaining online questionnaires.

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