THE CORRELATION BETWEEN NUTRITIONAL STATUS AND CALCIUM ADEQUACE LEVEL ON THE INCIDENCE OF PREMENSTRUAL SYNDROME (PMS) IN FEMALE STUDENTS AT THE FACULTY OF PUBLIC HEALTH UNIVERSITAS AIRLANGGA

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ABSTRACT

Premenstrual syndrome (PMS) is a series of symptoms consisting of physical symptoms, emotional symptoms, and behavioral symptoms experienced by women before menstruation. PMS is caused by several factors, including nutritional status and calcium intake. This study was conducted to analyze the correlation between nutritional status and adequacy levels of calcium with the incidence of PMS in female students at the Faculty of Public Health, Universitas Airlangga. This research used a cross sectional design. The sample consisted of 83 female students at the Faculty of Public Health, Airlangga University class of 2015-2017, chosen through simple random sampling. Data and methods used in the study included measurements of body weight and height to get nutritional status variable, the food recall 2x24 hours form to record adequacy levels of the calcium variable, and the Shortened Premenstrual Assessment Form (SPAF) questionnaire to get incidence of the PMS variable. Data were analyzed using the Chi-square test. The results of statistical tests showed that there was a correlation between nutritional status (p = 0.012) and PMS, but there was no correlation between calcium intake (p = 0.878) and the incidence of PMS. The conclusion of this study is women were overweight were more likely to experience more severe PMS and women who had low calcium did not experience notable patterns in their incidence or severity of PMS.

Keywords: nutritional status, calcium, premenstrual syndrome

INTRODUCTION

Premenstrual syndrome (PMS) is a sequence of symptoms consisting of physical, emotional, and behavioral symptoms in women prior to their menstruation. The syndrome usually occurs between the 7th day and 10th day before menstruation (Bungasari, Hermie, and Suparman, 2015). The issues commonly experienced are feelings of anxiety, depression, fatigue, difficulty of concentrating/focusing, insomnia, breast pain, abdominal pain, ankles and hands swelling, and headaches (Ramadani, 2012). 85-90% of women of childbearing age are estimated to experience physical issues prior to menstruation, with mild severity recorded in 8% to 20% of women (Soviana and Putri, 2017).

According to data from the World Health Organization (WHO) in 2005, 38.45% of the world's female population has experienced premenstrual syndrome (Namsa, Palandeng, and Kallo, 2015). The American College of Obstetricians and Gynecologists (ACOG) stated that 85% of females who are menstruating experience at least one PMS symptom during their menstrual cycle each month (Saryono and Sejati, 2009). Meanwhile, in Indonesia, the frequency of PMS symptoms in women of childbearing age ranges from 80% to 90% (Pudiastuti, 2012). Based on research by Alvionita (2016), as many as 65.5% of female students experience PMS with mild severity and 35.5% with moderate severity.

There are several theories on the causative factors of PMS, though until now the exact cause of the incidence itself has not been properly discovered even though

there have been studies conducted on a large scale (Andrews, 2009). Ramadani (2012) stated that premenstrual syndrome is caused by several complex factors such as hormonal, genetic, chemical, physical activity, as well as calcium, magnesium and vitamin B6 intake. In addition to these factors, an individual nutritional status also shows certain correlation with the incidence of premenstrual syndrome (Novita, 2018).

Nutritional status has a close corresponding bond with the level of fat in the human body. In addition, it also has an influence on levels of the insulin and leptin hormones. High levels of fat in the body may also cause abnormal hormone production in the menstrual cycle. The hormonal imbalances may cause menstrual disorders such as PMS (Karina, Nuryanto, and Kusumastuti, 2017).

In female students with obesity, PMS incidence were more often found (57.3%) (Nasrawati, 2016). Other research conducted by Estiani and Nindya (2018) also shows a significant relationship between nutritional status and PMS.

Apart from nutritional status, another cause of PMS is lack of calcium intake. Calcium is a mineral that regulates cell functions such as nerve transmission, muscle contraction, blood clotting, and maintaining cell membrane permeability. Calcium also regulates the hormones and growth factors (Almatsier, 2001). When muscles contract, calcium plays a role in the interaction of proteins in the muscles, namely actin and myosin. When the level of calcium in the blood is low, the muscles will have difficulties to relax, and, as a result, the body becomes rigid and may experience seizures (Dewantari, 2013). Women with low calcium intake are 2.2 times more likely to develop PMS when compared to women who have adequate calcium intake (Christiany, Mohammad, and Sudargo, 2009).

Based on the results of an initial survey conducted on the female students of the Faculty of Public Health, as many as 82.35% of the students had experienced PMS during their menstrual cycles. The survey results also show the negative influence of PMS on their daily activities, such as feeling uncomfortable and having their productivity disrupted.

This study was conducted to analyze the correlation between nutritional status and the adequacy level of calcium intake on the incidence of PMS in the female students of the Faculty of Public Health, Universitas Airlangga.

METHOD

This is an observational study with a cross sectional design. The study was conducted at the Faculty of Public Health, Universitas Airlangga from November 2018 to August 2019. The population of this study were undergraduate students of Public Health at Universitas Airlangga, specifically students from the class of 2015-2017, totaling 587 female students. The sample of this study was 83 students from Universitas Airlangga in the Public Health Undergraduate Program Class of 2015-2017. Inclusion criteria included subjects that were between the age of 19-23 years, had started mestruating, were willing to be involved in the research, and filled out an informed consent statement. The sampling method applied was simple random sampling. The sample size was determined based on the results of calculations using the simple random sampling formula (Sugiyono, 2011).

The dependent variable in this research was PMS and the independent variables were nutritional status (BMI) and calcium intake. The type of data used for this research were primary data obtained through interviews via a research questionnaire in the form of 2x24 hour food recall and SPAF and anthropometric measurements of the body based on body weight and height.

The PMS data were obtained from the SPAF questionnaire. The SPAF is a summarized form of the original questionnaire, which in this case was the

premenstrual assessment form (PAF). PAF has been standardized and is permanent, valid, and reliable (Allen, McBride, and Pirie, 1991). The SPAF is a questionnaire consisting of 10 questions related to PMS experienced by the respondents. The questions in the SPAF questionnaire were divided into three subscales consisting of pain (questions number 1, 6, and 8), emotions (questions number 2 to 5), and water retention (questions number 7, 9, and 10). Each question in the SPAF was worth 1-6 points (1 = never experience it, 2 = very mild, 3 = mild, 4 = moderate, 5 = severe, and 6 = extreme). The scores depended on the answers chosen by the respondent. The results of the questionnaire were then categorized into four: 1) did not experience PMS if the score was 10; 2) experienced mild PMS if the score was 11 to less than 30; 3) experienced moderate PMS if the score was 30 to less than 45; and 4) experienced severe/extreme PMS if the score was 45-60 (Allen, McBride, and Pirie, 1991; Ratikasari, 2015).

The data used for the variable of calcium intake was obtained through the results of filling out a 24-hour food recall questionnaire over a two-day period. The questionnaire was filled out by researchers using interview techniques towards the respondents. With the results of the questionnaire which have been filled out, the researchers conducted data material processing using the Nutrisurvey application to calculate the amount of nutrient intake of the respondents. Through this application, the total nutrients produced from the food that had been consumed by the respondents was found out. The measurement results of the test variables were divided into two categories: 1. adequate, if less than or equal to EAR (694 mg); 2. less/inadequate, if less than EAR (694 mg) based on the results of FAO / WHO Recommended Nutrient Intake for the EAR table (Gibson, 2005).

The data used for the nutritional status variable were based on body mass index/BMI. This was obtained from the results of anthropometric measurements, which were carried out through weight measurement (in kg units) using a digital weight scale (accuracy of 0.1 kg) from Kern MGB and height measurements (units cm) using microtoise from GEA SH-2A brand (accuracy 0.1 cm). The categorization of the nutritional status of respondents was based on BMI of the standard adult woman which are: 1) thin if the IMT value is less than 17.0-18.4; 2) normal if the IMT value is 18.5-25.0; and 3) fat if the BMI value is 25.1- more than 27.0 (Departement of Health, 2011).

The data analysis conducted in this research was divided into descriptive and inferential analysis, which was processed through the SPSS software. The statistical test used in the inferential data analysis was the Chi-square test. This research has been registered and has obtained the permission and official approval from the Ethics Commission of the Faculty of Nursing, Universitas Airlangga with the Ethics Number of 1399-KEPK.

RESULTS
Characteristic of Respondents

The respondents were college students aged 19-22 years old. The characteristics distribution of the research respondents is presented in Table 1. Based on Table 1, the majority of respondents were female college students aged 21 years old (36.1%). The menarche age is the age of first menstruation. The data on the menarche age was obtained from the results of the questionnaire, which was filled out based on interviews with the respondents.

Table 1. Characteristics of Respondents

Characteristic of Respondents	n	%
Age		
19	10	12
20	18	21.7
21	30	36.1
22	25	30.1
Menarche Age		

Early	14	16.9
Normal	48	57.8
Late	21	25.3
Menstruation Length		
Normal	74	89.2
Abormal	9	10.8
Menstruation Cycle		
Normal	71	85.5
Abormal	12	14.5
Total	**83**	**100**

Respondents were classified as having a normal menarche if menarche occurred at the age of 10-16 years old, while it was categorized as abnormal if menarche was experienced when they were under 10 years old or over 16 years old (Ramadhy, 2011). Most respondents experienced menstruation for the first time at the age of 12 years old with an average menarche at 12.64 years ± 1.321. Other results also indicated that the lowest age of respondents when they experienced their first menstruation was 10 years old, and the highest age of respondents experiencing menarche was 16 years old.

Menstrual length is the total number of respondents' menstrual days in one menstrual cycle. The data of the menstrual lenght were obtained from questionnaire results answered by the respondents. The data on the menstruation lenght had the criterion that is the average total of menstrual days in at least the last three menstrual cycles. Respondents were considered to have normal menstrual periods if the menstruation lasted for 3 to 7 days, and it was considered abnormal otherwise (Sinaga, 2017). The respondents had an average menstruation period of 7.07 days ± 1.276. The shortest recorded menstruation period was 4 days and the longest length was 10 days.

The menstrual cycle is the number of days in a period where a female experiences menstruation. The menstrual cycle data were obtained from the results of the questionnaire answered by the respondents. Menstrual cycles had the criterion of the average number of days of at least the last three menstrual cycles. Respondents were considered to have a normal menstrual cycle if the cycle was in the range of 28-35 days and considered to be abnormal otherwise (Sinaga, 2017). In this study, the results found that the respondents had an average menstrual cycle of 30.07 days ± 5.101. The longest recorded cycle was 60 days and the shortest was 20 days. The average respondent's menstrual cycle was normal. According to Sinaga (2017), a woman is considered to have a normal cycle when it occurs for 28-35 days.

Nutritional Status

The data for the nutritional states were based on the body mass index of the respondents, which was obtained through anthropometric measurements in the form of measurements of the body weight and height. The measurement results were then calculated using the BMI formula. The weighing was done using digital scales with an accuracy of 0.1 kg, while the height was measured using microtoise with an accuracy of 0.1 cm.

The results showed that the average BMI of the respondents was 21.8 kg/m2 ± 3.75814. The lowest value/score of the respondents' BMI was 16.44 kg/m2 and the highest was 40 kg/m2. The distribution of the nutritional status of the female students at the Faculty of Public Health Universitas Airlangga is presented in Table 2 below.

Table 2. Nutritional Status of the Female Students of the Faculty of Public Health Universitas Airlangga, 2019

Nutritional Status (BMI)	**n**	**%**
Thin	15	18.1
Normal	58	69.9
Fat	10	12
Total	**83**	**100**

Most respondents had he normal nutritional status (69.9%), followed by respondents in the thin category (18.1%) and fat or overweight category (12%).

Adequacy Level of Calcim (Ca)

The data for calcium intake were obtained from the total amount of food consumed by the respondents within 2x24 hours using the recall method. The results of the recall were converted into grams and analyzed using the Nutrisurvey software. The results of the analysis were then compared with the FAO/WHO Recommended Nutrient Intake, which was then converted to the Estimated Average Requirements (EAR).

Table 3. Calcium Adequacy Level of Female Students of the Faculty of Public Health Universitas Airlangga 2019

Calcium Intake	n	%
Inadequate	77	92.8
Adequate	6	7.2
Total	**83**	**100**

The average calcium intake from the respondents was 360.871 mg. The lowest calcium intake of the respondents was 54.3 mg and the highest was 1,582.4 mg ± 257.9377. The following is the distribution table of the level of calcium adequacy of the respondents.

The incidence of Premenstrual Syndrome (PMS)

The incidence of PMS in the respondents was measured using the SPAF questionnaire. It was found that the minimum value of the SPAF questionnaire was 16 and the maximum value was 42. The average value of the questionnaire was 29.02 ± 6.695. The following is a table of the distribution of premenstrual syndrome incidence among the respondents.

Table 4. The Incidence of PMS in Respondents

PMS Incidence	n	%
Never Experienced PMS	0	0
Mild PMS	44	53
Moderate PMS	39	47
Severe PMS	0	0
Total	**83**	**100**

Based on Table 4, all respondents had either experienced mild PMS (53%) or moderate PMS (47%).

Correlation Between Nutritional Status with Premenstrual Syndrome (PMS)

The analysis results on the correlation of nutritional status with the incidence of PMS in the respondents is presented in Table 5.

Table 5 presents the results that underweight students had a higher proportion of experiencing PMS with a mild severity (80%). A larger portion of female students who had normal nutritional status experienced mild PMS (51.7%) compared to moderate PMS (48.3%). In overweight students, the incidence of PMS with moderate severity was greater (80.0%).

Based on the Chi-square test, the p-value was 0.012, which means that there was a correlation between nutritional status and the incidence of PMS.

The Correlation between Calcium Adequacy Level and Premenstrual Syndrome (PMS)

The data for calcium intake were obtained from the results of a 24-hour food recall questionnaire of the respondents over a two-day period conducted on different days. The results of the food recall were then analyzed using the Nutrisurvey software. The analysis results of the correlation between calcium adequacy levels with the incidence of PMS on female

students of the Faculty of Public Health, Universitas Airlangga are presented in Table 6.

As seen in Table 6., the results show that there were more female students with inadequate calcium levels who experienced mild PMS (53.2%) than those who experienced moderate PMS (46.8%).

As for the respondents with adequate calcium levels, the proportion of mild and moderate severity of the incidence of PMS had the same value (50%). The Chi-Square test results show that the p-value was 0.878. The test results also show that there was no relationship between the levels of calcium with the incidence of PMS in the respondents.

This means that having adequate or inadequate calcium intake did not affect the presence of the syndrome or the severity of PMS.

Table 5. The Correlation Between Nutritional Status and Premenstrual Syndrome (PMS) Incidence on the Female Students of the Faculty of Public Health, Universitas Airlangga in 2019

Nutritional Status	PMS Incidence				Total		P-value
	PMS with Mild Severity		PMS with Moderate Severity		n	%	
	n	%	n	%			
Underweight/Thin	12	80	3	20	15	100	0.012
Normal	30	51.7	28	48.3	58	100	
Overweight/Fat	2	20	8	80	10	100	

Table 6. The Correlation Between the Calcium Adequacy Level (Ca) and the Premenstrual Syndrome (PMS) Incidence on the Female Students of the Faculty of Public Health of Universitas Airlangga in 2019

Calcium Intake (Ca)	PMS Incidence				Total		P-value
	PMS with Mild Severity		PMS with Moderate Severity		n	%	
	n	%	n	%			
Kurang	41	53.2	36	46.8	77	100	0.878
Cukup	3	50	3	50	6	100	

DISCUSSION
Charateristics of Respondents

The majority of respondents were 21 years old. According to Adriani and Wirjatmadi (2012), this age is considered as late adolescence and early adulthood. The late stage of adolescence begins at the age of 19-21 years old, while the early adulthood phase begins at the age of 20-40 years old. In the age category formulated by the Indonesian Ministry of Health in 2009, the age limit for early adulthood is 35 years old.

The average age where the respondents experienced menarche is at the age of 12.64 years old. The age of first menarche/menstruation differs from one woman to another. Women who experience menarche at an age of less than 10 years old experience precox puberty. When the menarche age is over 16 years old, it is reffered to as tarda puberty (Ramadhy, 2011).

The average menarche age of the respondents was nomal. According to Herawati (2013), the age range of menarche in Indonesia is usually between 10-16 years old and the average menarche occurs at 12.5 years old. This is in line with research by Renata, Widyastuti, and Nissa (2018),

which stated that as many as 67.7% of young women experience menarche at the age of 12-13 years.

Based on the characteristics of menstruation length, the average length of respondents' menstruation was 7 days. The respondents' menstrual length were categorized as normal. According to Sinaga (2017), the normal menstrual length for women is 3-7 days.

The results on the menstrual cycle show that the average respondent had a menstrual cycle of 28-30 days. The menstrual cycle is the period of time calculated from the first day of menstruation until the time of the next menstrual period (Proverawati and Misaroh, 2008). The length of the menstrual cycle can be influenced by several factors such as hormonal factors, enzyme factors, vascular factors, and prostaglandin factors. In addition, there are also variability factors in the menstrual cycle such as diet, physical activity, body weight, stress, exposure and working environment conditions, and endocrine disorders (Kusmiran, 2013).

The average respondent's menstrual cycle was normal. This is in accordance with Sinaga (2017), who stated that the length of a normal menstrual cycle is 28-35 days.

The menarche age, menstruation length/duration, menstrual cycle, and the conditions experienced during menstruation differ among women. The differences that occur are not always considered to be abnormal. There are variations which, if still within the reasonable limits, are then called physiological variations. Whereas if it occurs outside the normal limits, it is called a pathological variation (Sinaga, 2017). A woman who has pathological variations in the reproductive system needs to be examined by health workers.

On the characteristics of respondents, the menarche age is known to be related to the severity of PMS. This has been proven by the results of research conducted by Padesma and Ocviyanti (2013), which states that there is a significant relationship between the menarche age and the incidence of PMS.

Nutritional Status

Most of the respondents' nutritional status were in the normal category. While the average body mass index of all respondents was 21.8 kg/m2. The BMI value indicates that the average nutritional status of the female students of the Faculty of Public Health was within the normal category.

According to Adriani and Wirjatmadi (2012), nutritional status is a health condition that explains the use and utilization of food in the body. Nutritional status is affected by direct factors and indirect factors. Factors that have a direct influence on nutritional status are divided into various food intake and infectious diseases, while factors that have an indirect effect are family economic factors, food production, healthcare facilities, culture, and sanitation as well as environmental hygiene (Adriani and Wirjatmadi, 2012).

Nutritional status determines nutritional problems in an individual. Besides that, nutritional status also has an influence on health status. Supariasa, Bakri, and Fajar (2001) state that a person with nutritional status in the thin/underweight category may have an increased risk of infectious diseases, while being overweight may increase the risk of degenerative diseases. In addition to this, being overweight may also increase the risk of experiencing PMS (Christiany, Mohammad, and Sudargo, 2009; Estiani and Nindya, 2018).

Calcium (Ca) Adequacy Level

More than half of the total respondents had inadequate calcium intake. The lack of calcium intake in respondents was also influenced by the inadequate frequency of respondents' eating habits in one day. According to Pollan (2008), the habits of students in dealing with their busy

activities such as completing college assignments and studying can trigger stressful conditions that have an impact on reducing or skipping meals.

At the individual level, the inadequate amount of calcium in the body may occur due to inhibited calcium absorption. According to Almatsier (2001), there are several factors that may cause the process of calcium absorption to be disrupted, such as active vitamin D deficiency and oxalic acid and phytic acid compounds in the body.

In adults, the requirement for micronutrients is very important for the body as these micronutrients have the function to support the body's metabolism and to maintain immunity. In women, the need for calcium is very important because calcium works to reduce the risk of bone loss or osteoporosis (Adriani and Wirjatmadi, 2012). As for reproductive health, calcium has a role in reducing cramps and pain in menstruation (Enikmawati, 2012).

Premenstrual Syndrome (PMS) Incidence

PMS is a series of physical, psychological, and emotional symptoms related to a woman's menstrual cycle. The syndrome usually appears 6-10 days before menstruation and will disappear when menstruation begins (Ramadani, 2012). Other complaints that occur due to PMS include feeling tired, anxious, difficulties to concentrate, insomnia, headache, breast pain, and loss of energy (Bungasari, Hermie, and Suparman, 2015).

PMS, based on the severity, can be divided into mild, moderate, and severe. PMS is categorized as mild if a woman feels complaints/issues and symptoms of PMS, but is still able to be mobile very well. In the moderate category, women are still able to do activities, but not optimally. PMS is categorized as severe if the woman is unable to do any activities at all to the point of necessary total rest (Saryono and Sejati, 2009).

Assessment of PMS incidence for the respondents was done using the SPAF questionnaire, which contained questions about PMS symptoms in the form of breast pain, back pain, lower abdominal pain, weight gain, edema, as well as feelings of being unable to overcome a problem, sadness, depression, and being easily offended. These symptoms were given a score value of 1-6.

The results showed all respondents had experienced PMS. The prevalence of PMS among respondents had a greater value than in research by Pudiastuti (2012), which stated that the prevalence rate of PMS in Indonesia was 80%-90% of the total female population.

PMS experienced by the respondents was found to only be in the category of mild and moderate PMS. The number of respondents who experienced mild PMS exceeded the number of ones with moderate PMS. This is because the total SPAF value obtained by most respondents was less than 30.

The Correlation Between Nutritional Status and Premenstrual Syndrome (PMS) Incidence

Based on the results of this research, it was found that there was a correlation between nutritional status and the incidence of PMS. Students with thin/underweight and normal nutritional status will likely mild PMS. Students within the fat/overweight category were found to more likely experience moderate PMS.

Nutritional status measured based on body mass index had an important role in determining the severity of PMS. This is due to the fact that an overweight person may have an increased risk of inflammation, and this condition can lead to a risk of experiencing PMS symptoms (Bussel, 2014). Obesity is related to the amount of fat present in the human body. These conditions affect the levels of the hormone insulin and the hormone leptin. The hormone insulin in the reproductive system affects the secretion of the

Gonadotropin Releasing Hormone (GnRH). The GnRH will affect the release of Folicle Stimulating Hormone (FSH) and Luteinizing Hormone (LH) and stimulate the ovary for folliculogenesis (ends with ovulation) and steroidogenensis (produce estrogen and progesterone) (Sugiharto, 2009).

Issues that occur during menstruation can be caused by hormonal factors which regulate the reproductive hormones. In addition, lifestyle factors that play an important role in the nutritional status of a woman also affects PMS. In adolescent females/teenagers who are overweight, excess fat level in the body affects the production of estrogen. This is because, apart from the ovaries, the estrogen is also produced by the adipose tissue; therefore, the amount of the hormone becomes abnormal and increases along with the growth of the tissue. This hormone imbalance can cause PMS symptoms (Karina, Nuryanto, and Kusumastuti, 2017).

This is in line with research conducted by Dwiningtyas (2016), which found that there was a significant correlation between nutritional status and the incidence of PMS. Other research conducted by Christiany, Mohammad, and Sudargo (2009) also found a correlation between nutritional status and PMS, and that overweight women had 2.3 times the chance to experience PMS. Balanced nutrition obtained through food consumption according to nutritional needs is necessary in order to maintain adequate nutritional status (Adriani and Wirjatmadi, 2012). Moreover, routine exams on the nutritional status by measuring weight is also important to be done as a preventive measure in dealing with nutritional problems.

The Correlation Between Calcium Adequacy Level and Premenstrual Syndrome (PMS)

The results of this research indicate that there was no correlation between calcium intake with the incidence of PMS in the female students of Faculty of Public Health at Universitas Airlangga. The absence of a correlation between calcium intake and the incidence of PMS is suspected due to the data in this research being homogeneous, where most of the calcium intake from respondents was inadequate. In addition, this research was limited to measurements of intake or consumption, and no biochemical examination was carried out. Biochemical examinations are known to provide more precise and objective results compared to assessing food consumption. This is because biochemical examinations are able to show the results of how much of the nutrients in food can be absorbed by the body (Widajanti, 2009). The results of this research are in line with research by Anggraeni, Pangastuti, and Ronny (2018), which found that there was no relationship between calcium intake with the incidence of PMS. This shows that having adequate calcium intake does not necessarily rule out the possibility of experiencing PMS.

The difference between the results of research with existing theories shows that it is not only calcium intake that affects the incidence of PMS, but there are other factors as well. According to Sibagariang (2010), PMS occurs due to several complex factors, among which are age, stress, hormonal, and reduced physical activity. Other factors such as chemical, genetic, and psychological factors are also factors which may cause PMS (Ramadani, 2012).

CONCLUSION

This study concluded that overweight women may have increased risk of PMS severe compared to underweight and normal women. As for the calcium adequacy level, low calcium adequacy levels did not affect or influence the incidence or severity of PMS. The researchers hope that the female students of the Faculty of Public Health, Universitas Airlangga will routinely examine their

nutritional status based on body mass index in order to know and control their weight and height. This is is because higher BMI will able to affect the severity of PMS. Aditionally, it is recommended for female students to further increase their intake of foods that contain high calcium such as dried anchovies, dried shrimp, milk and its byproducts, nuts, and cereals.

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