Volume 01, Number 01, February 2018
p-ISSN: 2615-3769 ; e-ISSN: 2615-3750

Isoflavone, Nutrients Intake and Stress Level To Premenstrual Syndromes

Cantika Zaddana[*)]

[*)]*Pakuan University, Bogor, Indonesia*
Corresponding Author: cantikazaddana@gmail.com

Abstract. Menstruation is a characteristic of puberty in adolescent girls. Adolescent girls often have complaints of premenstrual syndrome (PMS) that is characterized by a collection of physical and psychological symptoms which occur in 7 to 10 days before menstruation. Studies have shown that there are several ways to relieve PMS. Therefore, the main objective of this study was to analyze isoflavone, nutrients intake, and stress level to Premenstrual Syndromes in adolescent girls in Bogor, West Java. The study was conducted on 100 girls aged 15-16 years at two high schools in Bogor. This present study showed that the majority of adolescent girls had PMS which most of them suffered severe symptoms. Results showed that the isoflavone and nutrients intake were not significantly associated with premenstrual syndromes. Stress level had a positive correlation to the PMS but did not seem to be a risk factor to PMS. Howefer, this implies that controling stress is important so that young women can avoid severe premenstrual syndromes.

Keywords: Adolescent Girls, Isoflavone, Nutrients, Stress, Premenstrual Syndromes

I. INTRODUCTION

Adolescence is a transitional period between childhood and adulthood that occurs during puberty period in the range of development when children change from asexual beings into sexual being that begins between the ages of 10 to 14 years. The most commonly used criteria for determining the onset of puberty is menstruation. During menstruation, young women often complain of premenstrual syndrome (PMS) which is characterized by a set of physical and psychological symptoms that usually occurs in 7-10 days before menstruation. The real cause of PMS is not clearly known, but most professionals believe that PMS is triggered by hormonal changes of impending menstruation (Shreeve, 1989; Freeman et al., 2003; Bryant et al., 2005).

According to the studies, there are several ways to relieve premenstrual syndrome. Faustino et al. (2009) stated that the level of

stress can increase PMS complaints because someone is having stress also experience physical and psychological complaints that can increase the symptoms. Hardinsyah (2004) also mentions that nutritional factors may play a role in reducing PMS complaints by consuming foods that contain micro nutrients such as calcium, vitamin B6, vitamin A and vitamin C. Consumption of isoflavone foods especially in soy products and derivatives (soy beans, tempeh, tofu, oncom, taucho, etc) can reduce the symptoms of PMS because isoflavone is considered as the structure and activity of estrogen-like (phytoestrogens).

Phytoestrogens may be effective at reducing some premenstrual syndromes because they have ability to act as antioxidants, inhibit angiogenesis, facilitate neurobehavioural actions and exhibit weak estrogenic and anti-estrogenic effects (Setchell and Cassidy, 1999; Lephart et al., 2001; Bryant et al., 2005).

It is therefore plausible that phytoestrogens may reduce premenstrual syndromes by stabilizing the natural cyclical fluctuation of estrogen. Some of the descriptions which have been described above indicate that there are several factors that can affect PMS complaints in adolescent girls. According on the issues that have been described above made researcher interested in analyzing consumption of isoflavone foods, nutrients intake, and stress level to premenstrual syndromes (PMS) in adolescent girls.

II. RESEARCH METHODS

This study was designed as cross-sectional study. The research locations were in two high schools in urban and regency Bogor, West Java, Indonesia which was in August to October 2013. This study was conducted in 100 adolescent girls aged 15-16 years in the second grade. The data were collected consisted of primary data and secondary data. Primary data include consumption of isoflavone foods, nutritional adequacy level of Ca, vitamin B6, vitamin A and vitamin C and PMS.

Consumption of isoflavone foods taken with modified FFQ, the adequacy of nutrients (Ca, vitamin B6, vitamin A, vitamin C) taken with 7x24 h food records and the premenstrual syndromes with self-

Volume 01, Number 01, February 2018
p-ISSN: 2615-3769 ; e-ISSN: 2615-3750

questionnaires by respondents during a month. Secondary data were taken about the profile of the school and student names. Data were analyzed using the SPSS for windows (version 16.0). The correlation between variables were analyzed with Spearmans and risk factors of PMS were examined with logistic regression.

III. RESULTS AND DISCUSSION

PMS prevalence: Prevalence of respondents who had PMS were 86.0%, consisted of moderate (16.3%) and severe (83.7%) and do not experience PMS are 14.0%. Most of respondents who had PMS experienced breast tenderness, stomach cramps, food cravings, bloating, anxious, lack of concentration, forgetfulness, acnes, headache, muscle aches and pains, nauseous, vomit, sleep changes (less or excessive), tired/exhausted and mood swings. Prevalence of 86.0% indicates that the majority of respondents had PMS, as it is estimated that approximately 75.0-85.0% of reproductive women around the world experience premenstrual syndrome (Faustino et al., 2009) and in Indonesia about 85% of reproductive women also estimated have PMS (Supaman and Ivan, 2011).

Isoflavone Intake : Isoflavone intake was measured by Food Frequency Questionnaire (FFQ). FFQ method allows measurement for frequency of food consumption obtained in a week and calculated based on the types of foods consumed most frequently by respondents. Results showed that eggs, tofu and tempeh were isoflavone foods which consumed most frequently by respondents. Respondents ate eggs with an average of 2.5±0.7 times/week, 1.9±0.8 times/week and tempeh 2.2±0.7 times/week. Tofu and tempeh were usually consumed alternately while the eggs were also one of the foods most frequently consumed because it is easy to be processed and presented. However, the food frequency of isoflavone foods on respondents still considered very low, whereas BPOM RI (2004) recommends a minimum of isoflavone intake is 50 mg/day. That number can be obtained from the consumption of 30 g soy beans, 100 g tempeh, tofu 200 g, 100 g taucho, or 500 mL of soy milk every day. In addition, the Balanced Nutrition Guideline in Indonesia recommends to consume as much plant food at least 2 times a day which means also showed that the frequency of these respondents are far from recommended.

Average of isoflavone intake from various types of foods which was consumed by the respondents was 19.16±5.7 mg/day. This amount covers only 38.3% of isoflavone adequacy which are recommended by BPOM RI (2004) for healthy adults. The majority of respondents (54.0%) were also known that still had adequacy level of isoflavone below the average intake of all respondents. This is presumably due to the low food frequency of isoflavone foods so that affects the low of isoflavone intake. Spearman's test also showed no significant relationship ($p>0.05$) between adequacy of isoflavones with PMS presumably because of the low intake of isoflavones that cannot indicate a significant relationship (Nagata *et al*., 2005).

Nutritional adequacy level : Most of respondents (62.0%) still had sufficient level of Ca intake below the average of all respondents (309.8±152.0 mg/day) and still far less than the recommended adequate Ca to reduce PMS (1000 mg) (Thys-Jacobs *et al*., 1998; Thys-Jacobs, 2000). This indicates that respondents daily calcium intake is not enough to meet the recommended calcium intake to help relieve PMS. Spearman test also indicated that there was no significant relationship ($p>0.05$) between calcium adequacy level with scores of PMS allegedly caused by low consumption of calcium foods such as milk, eggs and other animal foods.

In addition to calcium, other nutrients that play an important role in alleviating PMS is vitamin B6. The results showed that the average intake of vitamin B6 was very low at 0.9±0.2 mg/day compared to the recommended daily intake of vitamin B6 to relieve PMS complaints which is equal to 50 mg/day (Doll *et al*., 1989) and partially respondents also known still had adequacy levels of vitamin B6 intake below the average of all respondents (58.0%). Spearman's correlation test also showed that there was no significant relationship ($p>0.05$) between the adequacy of vitamin B6 with scores of PMS. This is allegedly due to low daily intake of vitamin B6 daily so cannot reflect a significant relationship with perceived premenstrual syndromes.

Other nutrients that can alleviate PMS complaints are the intake of vitamin A and vitamin C. Survey results revealed that the average intake of vitamin A and vitamin C on the respondents is 749.6 RE/day and 29.3 mg/day and the majority still had adequacy of vitamin A (62.0%) and vitamin C (57.0%) is below the average. These results suggest that the intake of those vitamins is still relatively low and still far less than the recommended adequacy which is 600 RE of vitamin A for respondents aged 13-18 years and 65 mg of vitamin C for respondents aged 13-15 years and 75 mg for respondents aged 16-18 years (WNPG, 2004). Study conducted by Piscesa S (2012) in adolescents in the United States also showed that the intake of nutrients including vitamin A and vitamin C during menstruation was lower than the recommended adequacy. The results of this study also showed that the majority of respondents based on the stress level (low, medium, or high) had adequacy of vitamin A and vitamin C is below average as well. This reflects that the consumption of food sources of those vitamins such as animal foods, green vegetables and fruits is low. Spearman's test showed no significant correlation ($p>0.05$) between adequacy level of vitamin A and vitamin C with PMS whereas these vitamins are important to counteract the effects caused by stress and can further help alleviate PMS complaints. This is presumably due to the intake of the vitamin is not

Volume 01, Number 01, February 2018
p-ISSN: 2615-3769 ; e-ISSN: 2615-3750

directly related to the complaints of PMS but related to the level of perceived stress. However, because only few respondents who had high stress level (13.0%) also allegedly cannot reflect the significant relationship between intake of these vitamins with stress. Low intake of vitamin A and vitamin C from foods consumed by respondents were also factors that might cause insignificant correlation with PMS.

Stress level : The stress level was mostly in moderate category (82.0%). Almost all complaints of stress experienced by respondents, but most of them were experienced feeling tired, feeling sad and wanted to cry, feeling less excited go to school, having difficulty in concentrated, feeling difficulty in sleeping (sleep soundly), feeling depressed with school assignments, changes in appetite, loss of interest in activities, feeling dizzy or headaches for unknown reason, feeling stiff in the neck, back and shoulder, feeling depressed with hectic school schedule, feeling bored because they did not have time to play, more irritable, bloating, heartburn, nausea and diarrhea when going to do something and feeling cold and sweating more than usual. According Hardinsyah (2004), stress conditions can lead to disruption of the hormonal balance of the body which would cause various problems both physically and psychologically, so that may further exacerbate complaints of premenstrual syndrome. Spearman's test also showed that there was a significant relationship ($p = 0.001$, $r = 0.32$) between the stress level with symptoms of PMS. This indicates that the more severe or higher of stress could impact on the severity of PMS complaints.

Risk factors of PMS : Risk factors of PMS were examined by logistic regression test. In this study the factors that assumed at risk of premenstrual complaints were the adequacy of isoflavone, the adequacy of Ca, vitamin B6, vitamin A and vitamin C, as well as the stress level. Based on logistic regression was known that there were no significant relationships between the variables were allegedly become risk factors with PMS. This may occur because the distribution of these variables is similar or homogeneous among respondents. As discussed previously, the majority of respondents had low nutrients adequacy (isoflavone, Ca, vitamin B6, vitamin A and vitamin C). In addition, the stress level of most respondents was classified as being insignificant be a risk factor for PMS. It is because the stress was allegedly can cause hormonal changes, especially adrenaline which is secreted when an individual experiences stress, but the factor that allegedly play a role in PMS is a hormonal imbalance due to the menstrual cycle itself, which is the increase of estrogen in a woman's body when the luteal phase of the menstrual cycle or before the onset of menstruation. Despite of that, based bivariate test found a significant relationship ($p>0.05$) between the stress level with symptoms of premenstrual and based on univariate tests also showed that there is an increasing trend between increasing levels of stress with symptoms of PMS. Therefore, these stress conditions should be controlled by the individual as much as possible to avoid severe PMS complaints and overall health complaints.

IV. CONCLUSION

Results showed that the majority of respondents had PMS where most of the complaints were severe. Isoflavone foods consumed most often by respondents were eggs, tofu and tempeh with an average intake of isoflavones from various types of food consumed was 19.16±5.7 mg/day, but the majority still had isoflavone adequacy level in below average. Calcium, vitamin B6, vitamin A and vitamin C intake were also low and the majority had adequacy level is below the average of all respondents. In this study, the majority of respondents had moderate stress levels although there were few of them experienced high stress. Spearman correlation test showed that stress levels were positively associated with premenstrual syndrome scores, but not enough to be a risk factor for PMS because factors that are assumed to contribute the premenstrual syndromes is a hormonal condition itself that occurs before menstruation.

Recommendations

According to the study, adolescent girls did not know that the specific nutrients could reduce some syndromes of premenstrual. They also experienced stress in high level which is could impact in their premenstrual complaints. Therefore, counseling about PMS and the role of nutrients such as isoflavone, calcium and vitamin B6 as well as the importance of increasing physical activity and controlling stress in order to help reduce PMS complaints. In addition, the limitation of this study regarding the dimensions in measuring nutrient intake could be an interesting thing to be further investigated using the respondents in larger quantities and more diverse characteristics. Further research is expected to be input to the women in order to address the perceived PMS complaints.

REFERENCES

[BPOM RI]. 2004. *Pedoman Pangan Fungsional Edisi I.* Jakarta: Direktorat Standardisasi Produk Pangan BPOM.

Bryant, M., A. Cassidy, C. Hill, J. Powell, D. Talbot and L. Dye, 2005. *Effect of consumption of soy isoflavones on behavioral, somatic and affective symptoms in women with premenstrual syndrome*. Br. J. Nutr., 93: 731-739.

Doll, H., S. Brown, A. Thurston and M. Vessey, 1989. *Pyridoxine (vitamin B6) and the premenstrual syndrome: a randomized crossover trial.* Journal of the Royal College of General Practitioners, 39: 364-368.

Faustino, R., L. Perez, C. Peter, P. Gonzalo, T. Mary, B. Lopez and L. Jose, 2009. *Premenstrual syndrome and premenstrual dsyphoric disorder: symptoms*

Volume 01, Number 01, February 2018
p-ISSN: 2615-3769 ; e-ISSN: 2615-3750

and clusters influences. The Open Psychiatry J., 3: 39-49.

Freeman, E.W., 2003. *Premenstrual syndrome and premenstrual dyspohoric disorder: definitions and diagnosis*. Psychoneuroendocrinol., 28: 25-37.

Hardinsyah, 2004. *Minimizing Menstruation Complaints. Consulting and Clinical Nutrition Diet Club GMSK*. Bogor: Bogor Agricultural University.

Hendrick, V., 2007. *Premenstrual syndrome*. www.womenshealth.gov.

Lephart ED, West TW, Weber SW, Rhees R, Setchell KDR, Aldercreutz H, Lund T. (2001). *Neurobehavioural effects of dietary soy phytoestrogens*. Neurotoxicol Teratol 24:5-16.

Nagata, C., K. Hirokawa and H. Shimizu, 2005. *Associations of menstrual pain with intakes of soy, fat and dietary fiber in Japanase women*. Eur. J. Clin. Nutr., 59: 88-92.

Piscesa S. 2012. *Hubungan aktivitas fisik dan pola konsumsi dengan keluhan menstruasi pada wanita peserta senam aerobic di Kota Bogor* [skripsi]. Bogor: Departemen Gizi Masyarakat, Fakultas Ekologi Manusia, Institut Pertanian Bogor.

Setchell KDR, Cassidy A. 1999. *Dietary Isoflavones: biological effects and relevance to human health*. *Am. J. Nutr* 129:758-767.

Shreeve, C., 1989. *Premenstrual syndrome*. Jakarta.

Thys-Jacobs, S., P. Starkey, D. Bernstein and J. Tian, 1998. *Calcium supplementation in premenstrual syndrome: a randomized crossover trial*. J. Gen Intern Med., 4: 183.

Thys-Jacobs, S., 2000. Micronutrient and the Tortora, G.J. and B. Derrickson, 2006. *Principles of premenstrual syndrome: the case for calcium. J*. Anatomy and Physiology. New Jersey: Wiley. *Am. College of Nutr*., 2: 220-227.

[WNPG]. 2004. *Ketahanan Pangan dan Gizi di Era Otonomi Daerah dan Globalisasi*. Jakarta: LIPI