Menstrual Pattern Disorder Related to Physical Activity and Stress Psychic Soldiers Female Student of Indonesian Navy

Mardiah Pratami[1], Lilik Herawati[2], Jimmy Yanuar Annas[3]

[1]Midwifery Study Program student, Faculty of Medicine, [2]Lecturer,Department of Physiology, Faculty of Medicine, [3]Lecturer,Department of Obstetrics and Gynecology, University of Airlangga Surabaya, Dr Soetomo General Hospital, Surabaya

Abstract

A disorder of menstrual patterns in women of productive age can have an impact on quality of life, risk factors for menstrual pattern disorders include physical activity and psychological stress. The purpose of the study was to analyse the correlation between physical activity and stress relations with the pattern of correlations between female students in the Indonesian Navy's First Bintara Education. This research was an observational analytic study using cross sectional study. The sample in this study was 95 female students. For measuring the grade of physical activity using the International Physical Activity Questionnaire (IPAQ) the grade of psychological stress using Depression Anxiety Stress Scale 42 (DASS 42), and monitoring patterns of menstrual patterns in the first 3 months during military education, then analysed using bivariate. The results of statistical tests using Chi Square obtained p value of physical activity that has (p = 0.008; OR 24.3) and stress (p = 0.019), showing related correlations related to physical activity and psychological stress on the correlation of menstrual patterns in the troops female soldiers in military education.

Keywords: *Disorders of menstrual patterns, Physical Activity, Stress, Female Soldiers.*

Introduction

Menstruation is the excretion of blood, mucus and remnants of cells originating from the uterine mucosa and occurs relatively regularly[1]. Menstrual bleeding patterns are one indicator of reproductive health and changes in menstrual patterns can affect a woman's quality of life[2]. Menstrual pattern disorders occur in 9-14% of women of childbearing age (between menarche and menopause) and have a significant impact on quality of life[3]. Risk factors that can affect menstrual pattern disorders are physical activity, stress, polycystic ovary syndrome, hyperprolactinemia, hypothyroidism, immaturity of hypothalamic pituitary ovarian axis, obesity and anorexia[4][5]. The level of moderate or heavy physical activity can affect the menstrual phase. Heavy physical activity can stimulate Gonadotrophin Releasing Hormone (GnRH) inhibition and Gonadotropin activity and reduce serum oestrogen levels. Resulting in changes in the menstrual cycle [6]. Physical activity coupled with calorie restriction affects the suppression of luteinizing hormone (LH), whereas exercise alone has no influence on pulsatility LH[7]. In times of stress the body's neurendocrine system becomes disrupted, resulting in the activation of the amygdala in the limbic system, then this system stimulates the release of corticotropic releasing hormones (CRH) and stimulates an increase in adrenocorticotropic hormone (ACTH). These hormones can affect the extension of the follicular stage or luteal stage in the menstrual phase, so that menstrual cycle disorders occur[8]. In accordance with Schneider et al[13] of female cadets at the USMA, almost all participants

Corresponding Author:
Jimmy Yanuar Annas
Lecturer, Department of Obstetrics and Gynecology,
Universitas Airlangga/Dr Soetomo General Hospital,
Surabaya, Indonesia
Phone: +628983844159
e-mail: jimmyyanuar@gmail.com

(91%) experienced secondary amenorrhea or menstrual irregularities as much as 48.2% during their first year of military training, where there is a perceptual experience of menstrual disorders caused by physical and emotional training. However, as many as 10.8% found that their menstrual data became more regular. This shows that the use of unbalanced energy can also cause a decrease in GnRH pulsatility in this case FSH, which results in an extension of the follicular phase.

From a previous preliminary study of 32 Indonesian Naval Academy Cadets, 25 people (78.1%) had menstrual disorders and 7 people (21.9%) had no menstrual disorders during military training. Referring to the above, a study was conducted to find out about the correlation between physical activity and psychological stress experienced by young women in military basic training against menstrual pattern disorders that are experienced.

Method

The cross-sectional study design was carried out on female student soldiers in the Indonesian Navy's First Education, with a total population of 124 people. The sampling technique used is total sampling. The sample of the study were female students aged 18 - 21 years old, had menstruated, were willing to be a sample, were not pregnant, did not use drugs that affect the menstrual cycle, did not have a history of menstrual pattern disorders (at least 3 months before entering military education), and has no history of gynaecological surgery.

Operational Definitions of Research Variables:

(a) Physical Activity Variable is any body movement produced by skeletal muscle that requires energy expenditure, in the form of activities carried out by respondents during military basic education during the first 3 months after starting education. The questionnaire uses the Automatic Report-IPAQ Short Form[9].

Table 1. Physical Activity category

	Category	Physical Activity	MET score
1	Weight	Heavy intensity for a minimum of 3 days	1500 MET-minutes / week
		Combination of walking, medium intensity or heavy intensity for 7 days or more that reaches a minimum value	3000 MET-minutes / week
2	Medium	Heavy physical activity for 3 days or more, for at least 20 minutes per day.	
		Conduct moderate-intensity physical activity and / or walk for 5 days or more, for at least 30 minutes per day.	
		Combination of walking, medium intensity or heavy intensity for 5 days or more that reaches a minimum value	600 MET-minutes / week
3	Light weight	Do not meet the criteria for categories 1 and 2 categorized as mild physical activity level	

(b) Stress Variable is a condition perceived by female student soldiers to various stimuli that come, both in the form of support and pressure and can affect the physical, psychological and behavioural balance during the first 3 months after starting education. The questionnaire used the DASS 42[10].

Table 2. Stress Category

	Category	Score
1	Normal/not stressed	0-14
2	Mild stress	15-18
3	Moderate stress	19-25
4	Stress weight	26-33
5	Very heavy stress	>34

(c) Menstrual Pattern Disorders Variable is a term used to describe all menstrual abnormalities in terms of frequency, duration and volume, in the form of menstrual pattern disorders experienced by respondents during their first military education during the first 3 months after starting education. The questionnaire uses a measurement of menstrual history[11]. Not experience menstrual patterns (normal) if, menstrual cycles 24-38 days, menstrual periods 4-8 days, lots of periods 5 ml-80 ml. Having menstrual patterns if, menstrual cycles <24 days or> 38 days, menstrual periods <4 days or> 8 days, lots of periods <5 ml or> 80 ml.

The independent variables in this research are physical activity and psychological stress with an ordinal scale. The dependent variable is disruption of menstrual patterns on a nominal scale. The grade of physical activity was measured using IPAQ the grade of psychological stress using DASS 42, and a history of menstrual pattern disorders during the first 3 months of entering military education. Data collection was carried out in April-May 2019. Respondents were given a questionnaire to measure physical activity, stress and menstrual pattern disorders. Data processing is done by editing, coding, entry and tabulating. Data that has been collected is processed using the Chi Square test with the help of the SPSS computer program.

Result

The population of respondents was 124 people. Respondents were present at the distribution of questionnaires as many as 120 people. Of the 120 people there were 95 respondents who met the inclusion criteria.

Table 3 shows the characteristics of the sample, most of them at the age of 19 years 29 people (30.5%) the majority experienced heavy physical activity 91 people (95.8%) the majority did not experience stress 73 people (76.8%), and 82 people (86.3%) had disorders menstrual patterns.

Table 3. The characteristics of respondents

Variables	f	Percentage (%)
Age		
18	26	27.4
19	29	30.5
20	22	23.2
21	18	18.9
Total	**95**	**100.0**
Physical Activity		
Medium	4	4.2
Weight	91	95.8
Total	**95**	**100.0**
Psychic Stress		
Normal	73	76.8
Light	12	12.6
Medium/rarely	8	8.4
Weight	2	2.1
Total	95	100.0
Menstrual pattern disorders		
There are no distractions	13	13.7
There is interference	82	86.3
Total	**95**	**100.0**

Source: Data: primary data processed

Table 4. Frequency Distribution of Menstrual Patterns

Types of Menstrual Pattern Disorders	Frequency n=95	
	Yes	%
Frequency		
Often	13	13.3
Normal	24	24.5
Rarely	29	29.6
Long		
Long-term	15	15.3
Normal	39	39.8
Short-term	12	12.2
Blood Volume		
Weight	5	5.1
Normal	56	57.1
Light	5	5.1
Secondary Amenorrhea	29	29.6

Source: Data: primary data processed

Table 4 shows that the frequency of menstrual patterns is almost half the rare frequency of 29.6% the duration of menstruation is almost half the normal menstrual period of 39.8% the blood volume of menstruation is mostly the normal blood volume of 57.1%, and secondary amenorrhea of 29.6%.

Correlation between Physical Activity and Menstrual Pattern Disorders:

Table 5. Correlation between Physical Activity and Menstrual Pattern Disorders

Physical Activity	Menstrual Pattern Disorders				Total		P value	OR
	No		Yes					
	n	%	n	%	Amount	%		
Light	0	0	0	0	0	0	0.008	24.3 CI 95% (2,302-256.484)
Medium	3	75.0	1	25.0	4	100.0		
Weight	10	11.0	81	89.0	91	100.0		
Total	**13**	**13.7**	**82**	**86.3**	**95**	**100.0**		

Source: Data: primary data processed

Table 5 shows that the proportion of respondents who experienced the most disruption of menstrual patterns in heavy physical activity was 81 people (89.0%). Statistical test results using Chi Square obtained p value of 0.008, when compared with an α value of 0.05 the value of p <0.05, which means the test results have a significant correlation between physical activity and menstrual pattern disorders in respondents. Odds Ratio (OR) is 24.3 with 95% CI (2,302-256,484) meaning that respondents who experience strenuous physical activity are 24.3 times more likely to experience menstrual patterns.

Correlation of Stress with Menstrual Pattern Disorders:

Table 6. Correlation of Stress With Menstrual Pattern Disorders

Stress	Menstrual Pattern Disorders				Total		P value
	No		Yes				
	n	%	n	%	Amount	%	
Normal	8	11.0	65	89.0	73	100.0	
Light	5	41.7	7	58.3	12	100.0	
Medium	0	0	8	100.0	8	100.0	0.019
Weight	0	0	2	100.0	2	100.0	
Very Heavy	0	0	0	0	0	0	
Total	**13**	**13.7**	**82**	**86.3**	**95**	**100.0**	

Source: Data: primary data processed

Table 6 shows that the stress level of respondents who experienced menstrual pattern disorders, with no stress conditions (normal) 65 people (89%), experienced mild stress 7 people (58%), moderate and severe stress experienced menstrual pattern disorders 100%. Statistical test results using Chi Square obtained a p value of 0.019, when compared with a value of α 0.05 the value of p <0.05, which means the test results have a significant correlation between stress and menstrual disorders in female students in military basic education.

Discussion

Based on the Chi Square test results for physical activity showed a significant correlation to menstrual pattern disorders. The results of the study of respondents who carry out heavy physical activity the majority experience menstrual disorders by 89%. In line with the results of the study of Sianipar et al[12], two thirds of respondents who experience menstrual disorders have high intensity and frequency of physical activity

so that the greater possibility of menstrual disorders, while physical activity intensity is lowering the risk of menstrual disorders.

The results of the study stated that there was a significant correlation between menstrual pattern disorders and physical activity in female student soldiers in Indonesian military basic education. In line with research Quah[14] on a non-Leannes sports athletes in Malaysia with the results of 14.3% of athletes who experience oligomenorrhea. Accordance with Asmarani[15] the nature and severity of symptoms of the menstrual cycle depends on several things such as the type of exercise the intensity, and the duration of exercise and the rate of deepening of the training program. Excessive physical activity can cause hypothalamic dysfunction which causes interference with GnRH secretion. This causes delayed menarche and disruption of the menstrual cycle, with changes in steroid metabolism that affect the release or the release of gonadotropin. Menstrual pattern disorders and delayed menarche are experienced by adolescents and adult women who conduct intensive training for 15 hours or more every week[16]. The intensity of physical activity that is too high so that it cannot be compensated by the body can cause endocrine disruption in the body one of which is menstrual cycle irregularities [17].

The results of research on cross tabulation between menstrual pattern disorders and stress, there is a significant correlation between menstrual pattern disorders and stress. According to Nepomnaschy et al[18]) that stress causes activation of the hypothalamic-pituitary-adrenal (HPA) axis, which inhibits the hypothalamic-pituitary-gonad (HPG) axis. In addition, secretion of corticotropin-releasing hormone (CRH) secretion, vasopressin, and endogenous opioid peptides play a role in the occurrence of menstrual disorders. The researchers point out that psychological stress produces physiological responses, such as CRH activation, which tends to affect menstrual function, regardless of other adverse effects[19]. The research conducted by Nazish and Mona[20] at the Immam Abdulrahman Bin Faisal University health college, that 91% percent of female college students experience menstrual problems. Various menstrual problems were reported, and their incidents included irregular menstruation (27%), abnormal vaginal bleeding (9.3%), amenorrhea (9.2%), menorrhagia (3.4%), dysmenorrhea (89.7%), and premenstrual symptoms (46.7%), which was identified in 39% of students experiencing high stress. A significant correlation was found between stress and menstrual disorder problems. Students with stress had 2 times, 2.8 times, and 4 times increased odds ratios for experiencing dysmenorrhea, amenorrhea, and premenstrual syndrome (p <0.05).

The above research contradicts the results of research conducted by Shahida Nagma et al[21] on 100 college undergraduate medical students that no correlation was found in students with PSS> 20 with dysmenorrhea, menorrhagia, hypomenorrhoea, short cycle length and long cycle length. High stress levels (PSS> 20) are associated with only menstrual irregularities and not with duration, amount of flow or Dysmenorrhoea. Therefore, research needs to be done on young women who complain about other causes of menstrual problems before stress is assumed to be the cause.

In this study it was found that respondents who did not experience stress, but still experienced abnormal menstrual patterns as much as 89%. This shows that disruption of menstrual patterns is not only influenced by stress factors in individuals, but there are still many other factors that affect the duration of menstruation in respondents who experience abnormal menstruation even though they are not stressed. According to the researchers' assumptions that menstruation is not normal in respondents who inexperience stress in this study is influenced by the physical activity of respondents who are likely to be excessive. This is reinforced by the results of observations and interviews with respondents at a glance when the distribution and filling of questionnaires where most respondents in the study carried out strenuous physical activity.

Conclusion

Based on the research objectives the results of the above research analysis data can be concluded that the majority of respondents experienced heavy physical activity. Most respondents did not experience stress (normal) but experienced menstrual patterns and moderate and severe stress all experienced menstrual patterns. There is a correlation between physical activity and stress with disruption of menstrual patterns. Further research needs to be done related to physical activity with menstrual pattern disorders using all other variables. As well as knowing the effect of disruption of menstrual patterns in reproductive health is faced with dynamic assignments and assignments that are more severe in the future.

References

1. Barret, Kim E, et al. Ganong's Review Of Medical Physiology Twenty Third Edition. New York: Mc Graw Hill Medical, 2010.

2. Rebar, Robert. Evaluation of Amenorrhea, Anovulation, and Abnormal Bleeding. Western Michigan University Homer: MDText.com, inc., South Dartmouth 9MA, 2018.

3. Fraser, I. S, Langham, S and K, Uhl-Hochgraber. Health-related quality of life and economic burden of abnormal uterine bleeding. Expert Rev Obstet Gynecol., 2009, pp. 4 : 179-189.

4. Munro, Malcom G., et al. FIGO Classification System (PALM - COEIN) for Causes of abnormal Uterine bleeding in Nongravid women of Reproductive age. International Journal of Gynecology and Obstetrics, 2011, pp. 3-13.

5. Sharma, Ila, et al. Adolescent Abnormal Uterine Bleeding - The PALM COEIN Approach. Current Medicine Research and Practice 5, 2015, pp. 105-109.

6. Asri, Yuni and Handayani, Dewi. Reproductive Health for Health Expertise. Jakarta: ECG, 2015.

7. Loucks, AB. Exercise Training in the Normal Female. In Sports Endocrinology. Totowa: Humasa press, 2000.

8. Suyono. Stress as a cause of menstrual disorders. Seminar on menstrual abnormalities. Semarang 2000.

9. IPAQ. Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (IPAQ). 2005.

10. Lovibond, S.H and Lovibond, P.F. The structure of negative emotional states: Comparison of the Depression anxiety stress Scales (DASS) with the Beck Depression and Anxietyu Inventories. Behaviour Research and Therapy, 1995, pp. 335-343.

11. Fritz, Marc A and Speroff, Leon. Clinical Gynecologic Endocrinology and Infertility. Philadelphia, USA : Lippincott Williams & Wilkins, 2011.

12. Sianipar, Olaf, et al. Prevalence of Menstrual Disorders and Related Factors in High School Girls in Pulo Gadung District, East Jakarta. Indonesian Medicine, 2009, 308-313.

13. Schneider, Marcie B., Et al. Menstrual and Premenstrual Issues in Female Military Cadets: A Unique Population With Significant Concerns. North American Society for Pediatric and Adolescent Gynecology, 1999, pp. 195-201.

14. Quah, YV., et al. The Female Athlete Triad Among Elite Malaysian Athletes: prevalence and associated factors. 2009, Asia Pasific J Clin Nutrition.

15. Asmarani, R. Influence of Sports of Athlete Menstrual Cycles. Semarang: Faculty of Medicine, Diponegoro University, 2010.

16. Nattiv, A., et al. American College of Sports Medicine stand. The Female Athlete Triad. Med. Sci Sport Exerc., 2007, 39 :1867-1882.

17. Jorge, EC, et al. Protein Intake and Ovulatory Infertility. AM J Obsetet Gynecol, 2008, 160 : 131-140.

18. Nepomnaschy, Pablo A., et al. Stress, Immune Function, and Women's Reproduction. Annals of the New York Academy of Sciences, 2007, 350-364.

19. Chrousos GP, Torpy DJ, Gold PW. Interactions between the hypothalamic pituitary adrenal axis and the female reproductive system: Clinical implications. Ann Intern Med, 1998, 129:229 40.

20. Rafique, Nazish and Al-Sheikh, Mona H Prevalence of menstrual problems and their association with psychological stress in young female students studying health sciences.. Saudi Medical Journal, 2018, pp. 67-73.

21. Nagma, Shahida, et al. To Evaluate the Effect of Perceived Stress on Menstrual Function. Journal of Clinical and Diagnostic Research, 2015, pp. QC01-QC03.