

CORRELATION BETWEEN MENSTRUAL PAIN AND LEVEL OF CORTISOL AMONG NURSING STUDENT OF NAHDLATUL ULAMA UNIVERSITY, SURABAYA

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ABSTRACT

Background: The stress faced by the final student due to the demands of completing a thesis on time triggers the activation of the HPA axis so that it can increase the secretion of the cortisol produced by the adrenal cortex. Increased cortisol secretion increases uterine muscle contraction thereby aggravating menstrual pain.

Objective: The purpose of this study was to analyze the correlation between cortisol levels and menstrual pain in nursing students of Nahdlatul Ulama University, Surabaya (UNUSA).

Methods: This study is an analytic observational with cross sectional approach. Population of this study were all nursing students who met the inclusion and exclusion criteria. The subjects of this study were 46 people selected through purposive sampling. Data was collected through observations with VAS and cortisol laboratory results. Data were analyzed by using Spearman rank test.

Results: The results showed that: 1) All students experience menstrual pain 2) Cortisol levels in all students are still in the normal range 3) There is a correlation between cortisol levels with menstrual pain ($p = 0.009$).

Conclusion: Increasing cortisol levels are followed by aggravating menstrual pain. Future research is expected to examine other factors that cause menstrual pain in final semester students.

Key words: Endorphin massage, menstrual pain, primary dysmenorrhea.

INTRODUCTION

The final year students have a high-stress level because they are required to complete their thesis on time with a high-grade point average (GPA). This condition makes students vulnerable to primary dysmenorrhea (Sari, 2015). Primary dysmenorrhea is menstrual pain among women who have normal hip anatomy, usually occurs in the teenager. Pain that is experienced is usually centered on the

suprapubic region and radiates to the back and the feet (Katwal, Karki, Sharma, & Tamrakar, 2016). Dysmenorrhea in the final year students can make it difficult to concentrate on doing their thesis (Rahayu, Pertiwi, Patimah, & Kunci, 2017). Primary dysmenorrhea can also interfere with social activities, sports, and cause sleep disturbance (Armour, Smith, Steel, & Macmillan, 2019).

One of the factors that can affect pain is stress (Yanti & Marlina, 2018). Stress is a major cause of menstrual disorders in women. Several studies have shown that stress is a major factor causing menstrual disorders such as menorrhagia, oligomenorrhea, dysmenorrhea, and premenstrual syndrome (Rafique & Al-Sheikh, 2018).

Analysis of 1160 working women in China found 388 women experiencing stress ranging from mild to severe stress, and 44.4% of the women who experienced the stress experienced dysmenorrhea (Wang et al., 2004). The incidence of dysmenorrhea in the world is very large, a study conducted in Iran in 71% of students experienced menstrual pain and 15% of them were absent from school 1-7 days each year (Bakhtshirin, Abedi, YusefiZoj, & Razmjooee, n.d.). The prevalence of dysmenorrhea in Indonesia is 64.25% whereas many as 54.89% of primary dysmenorrhea and 9.36 secondary dysmenorrhea, and 75% of them experience severe pain (Ulya et al., 2017). Preliminary studies conducted among the final year nursing students at Nahdlatul Ulama University, Surabaya showed that almost 80% had experienced dysmenorrhea, 20% were severe dysmenorrhea. Most of the students stated that dysmenorrhea was experienced disturbing in lecture activities, especially in doing their thesis.

The stress faced by the final year students due to the demands of completing the thesis on time. Stress can trigger the activation of the HPA axis. Activation of the HPA axis can increase the secretion of the hormone cortisol produced by the adrenal cortex (Wang et al., 2004). Increased cortisol secretion causes increased uterine muscle contraction thereby aggravating menstrual pain (Isnaeni, 2010).

The results of Hatmanti's study (2015) showed that most students experiencing

moderate to severe stress showed an abnormal menstrual cycle. The results of an analysis using Spearman rank test found that the relationship (r) = 0.464 which showed that there was a sufficient relationship between stress levels with menstrual cycles in nursing students of Nahdlatul Ulama University, Surabaya.

METHODS

Study Design

The study was observational analytic with the cross-sectional approach.

Setting

This research was conducted in the Nursing and Midwifery Faculty of the Nahdlatul Ulama University, Surabaya.

Research Subject

The population in this study were all final year nursing students of the Nursing and Midwifery Faculty of the Nahdlatul Ulama University, Surabaya who met the following criteria:

- a) Inclusion Criteria: UNUSA Nursing first-degree students with primary dysmenorrhea, 18-20-year-olds, normal menstrual cycle (21-35 days), menstrual periods 3-7 days, no menstrual abnormalities, willing to be investigated and signed informed consent,
- b) Exclusion Criteria: female students who consume pain-reducing drugs or herbs, are married and pregnant. The research subjects in this study were some of the final year nursing students at UNUSA. The research subjects were 46 students who determined through a purposive sampling technique.

Instruments

The instrument used were cortisol levels measured through laboratory

examinations and menstrual pain measured by the Visual Analog Scale (VAS) observation sheet.

Data Analysis

The data that has been collected is then processed with SPSS using the Spearman rank test.

Ethical Consideration

This research has gone through an ethical test from the Nahdlatul Ulama University, Surabaya.

RESULTS

Characteristics of Respondents

Table 1. Distribution of Frequency of Respondents by Age and Age of Menarche in the Nursing and Midwifery Faculty of the Nahdlatul Ulama University, Surabaya (n = 46).

Characteristics of Respondents	Frequency (f)	Percentage (%)
Age		
20 years-old	8	17.39
21 years-old	26	56.52
22 years-old	12	26.09
Total	46	100.00
Age of Menarche		
10 years-old	5	10.87
11 years-old	11	23.91
12 years-old	16	34.78
13 years-old	8	17.39
14 years-old	6	13.05
Total	46	100.00

Based on table 1 above, there are 56.52% of students were 21 years-old, while the least 20-year-old amounted to 17.39%. The most of the students experienced menarche at the age of 12 years which was 34.78%, while the least number of students experienced menarche at the age of 10 years which was 10.87%.

Examination of Correlation between Cortisol Levels and Menstrual Pain in Nursing Students of Nahdlatul Ulama University, Surabaya (UNUSA) using Spearman Rank Test

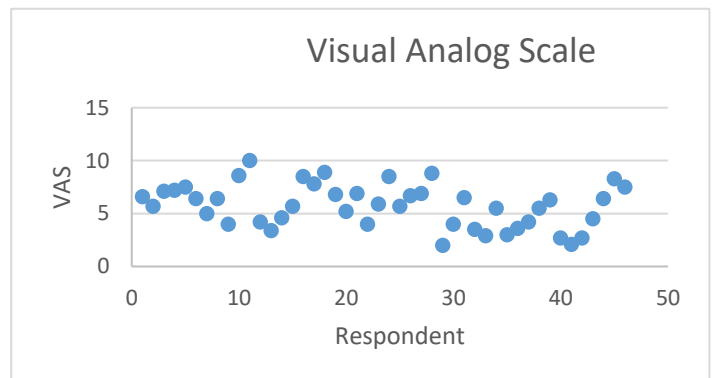


Figure 1. Diagram of VAS among Nursing Students of UNUSA (n = 46).

Figure 1 shows that students experience mild to severe pain, but most of the student experience moderate-severe pain. The VAS instrument does not divide the level of pain, so the data collected is in the form of ratios. Some students can describe the perceived dysmenorrhea, both the intensity, location, and how strong they can hold it.

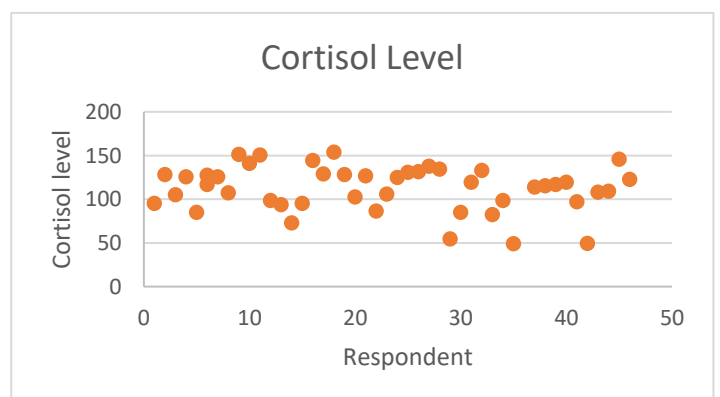


Figure 2. Diagram of Cortisol Level among Nursing Students of UNUSA (n = 46).

Figure 2 shows the results of laboratory tests on cortisol levels, where blood is drawn in veins. The results of cortisol levels for all students were still in

the normal range, namely cortisol levels of 47.5-157.4 ng/ml.

Table 2. Analysis of Correlation between Cortisol Levels and Menstrual Pain in Nursing Students of Nahdlatul Ulama University, Surabaya (UNUSA) (n = 46).

Spearman rho	VAS
Cortisol level	$p = 0.000$
Correlation coef.	0.619

In table 2 the results of the analysis of the relationship between cortisol levels and dysmenorrhea show a p -value of 0.00 which means there is a correlation between cortisol levels and primary dysmenorrhea in nursing students of UNUSA. The correlation coefficient of 0.619 indicates a strong correlation between cortisol level and dysmenorrhea, i.e. the higher the cortisol level, the more severe dysmenorrhea is felt.

DISCUSSION

The Cortisol levels among Nursing Student of UNUSA

Laboratory results of cortisol levels for all students showed within the normal range of 47.5-157.4 ng/ml. These results indicate the level of stress felt by students is still normal. Some students can cope with stressors received including during menstruation. Some can adapt to the pain that is felt.

Stressors received by students provide stress responses in the form of sympathetic catecholamine secretions (epinephrine and norepinephrine) and neuroendocrine hormones (cortisol). (Katwal et al., 2016). Cortisol is a vital catabolic hormone produced by the adrenal cortex of the kidney. This hormone is released diurnal, with blood levels peaking in the morning

and decreasing thereafter (Hannibal & Bishop, 2014).

Stressors for students in the field of health, especially medicine such as examinations, or assignments can trigger academic pressure. Academic pressure can trigger stress, anxiety, and depression. This condition is proven by the increase in salivary cortisol (Singh et al., 2012). Stress will affect the hypothalamus to release CRH (Corticotrophin Releasing Hormone), they stimulate the release of ACTH (Adreno Corticotropic Hormone). ACTH secretes GnRH (Gonadotrophins Releasing Hormone) which triggers the anterior pituitary to release FSH (Follicle Stimulating Hormone) and LH (Luteinizing Hormone) which causes estrogen and progesterone production at the beginning of decreased menstruation resulting in menstruation (Hatmanti, 2018).

All humans must experience stress with different stressors, including students. Students are required to complete the final project and obtain a high-grade point average (GPA). Every student has a coping strategy in dealing with stress. Most students realize that stressors who come are not a threat so coping with stress is good enough. Stress measurement should not only be done by examining cortisol levels, but it should also be observed by a stress questionnaire.

Dysmenorrhea among Nursing Student of UNUSA

In Figure 1, the VAS diagram shows all students experience dysmenorrhea with different pain scales. The lowest VAS value is 2.1 while the highest VAS value is 10. Primary dysmenorrhea is menstrual pain that is usually felt 3 years after menarche (Armour et al., 2019). Dysmenorrhea is caused by increased production of prostaglandins in the blood. Pain that is felt

by everyone is different because pain is often a subjective thing (Septianingrum, Hatmanti, & Fitriyasari, 2019).

The use of the Visual Analog Scale (VAS) pain instrument does not categorize pain into levels such as mild, moderate, or severe pain. The pain threshold of each student is different and so is the event to deal with pain.

The Correlation between Cortisol Level and Dysmenorrhea among Nursing Student of UNUSA

As cortisol levels increase, the dysmenorrhea that is felt is getting heavier. Stress faced by nursing students such as examinations, practical work, and college assignments causes stress, causing menstrual disorders such as dysmenorrhea (Hatmanti, 2018)

Wang et al. (2004) show that the risk of dysmenorrhea is doubled in women who experience high stress than women who experience low-stress levels. This is also supported by research Katwal et al (2016) which states that there is a positive relationship between psychological stress and dysmenorrhea, and dysmenorrhea is the main cause of female college attendance.

The results of an examination of cortisol levels in all students were within normal limits, perhaps because the stress felt was not as heavy as that of a mother giving birth, and some of them were able to adapt to that stress. Stress and dysmenorrhea are very strongly related because these two variables affect each other. Stress is felt to aggravate dysmenorrhea, while dysmenorrhea can also cause stress in adolescent girls.

CONCLUSION

1. All nursing students of UNUSA have cortisol levels in the normal range

because coping mechanisms against stress are quite good

2. All nursing students of UNUSA experience dysmenorrhea ranging from mild to severe.
3. There is a correlation between cortisol levels and dysmenorrhea. Increasing cortisol levels will make dysmenorrhea worse for UNUSA Nursing undergraduate students.

SUGGESTION

Future studies are expected to examine other factors that cause dysmenorrhea in final year nursing students. Students need to be taught to adapt to stressors so it is not easy to experience distress.

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