

Stress due to online learning during the COVID-19 pandemic affects the menstrual cycle in college students



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ABSTRACT

Introduction: The demands of academic life and obstacles during online learning in the Covid-19 pandemic make female students physically and mentally exhausted which can trigger stress. Stress involves the neuroendocrinological system that can affect the menstrual cycle. This study aims to analyze the correlation between stress due to online learning during the Covid-19 pandemic with students' menstrual cycles.

Method: The data measured are the stress due to online learning during the pandemic and the student's menstrual cycles through the DASS 42 questionnaire (Depression Anxiety Stress Scale 42) to measure stress levels and a questionnaire containing categories to measure students' menstrual cycles.

Results: This study found that stress levels are correlated with the menstrual cycle. Stress levels affect the condition of the menstrual cycle.

Conclusion: This study proves that stress due to online learning during the Covid-19 pandemic is related to the menstrual cycle of students.

Keywords: *Online learning, stress, menstrual cycles.*

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INTRODUCTION

One of the effects of the COVID-19 pandemic is learning from home. The Indonesian Minister of Education and Culture also issued circular letter number 4 of 2020 stating that all teaching and learning activities both at schools and universities use online methods or online learning as an effort to prevent the development and spread of Coronavirus disease (Covid-19).¹

Online learning is expected to provide convenience in the teaching and learning process because it can be done anytime, anywhere and it is also supported by technology that can be used to conduct teaching-learning activities virtually.² However, in reality, there are many obstacles faced during the teaching and learning process. Students feel burdened by online learning compared to the offline teaching-learning process because of the tight schedule of lectures, the material which is presented is not fully understood

by students, and the time limit given for assignments and quizzes is short enough that make students confused in completing their assignments.¹ By all those assignments given, students can spend time all day and night to complete various online tasks, and also the condition of the internet network which is sometimes unstable makes the online classes often experience disturbances.³

Instead of those academic problems, students also have personal problems such as how to divide the schedule of study time and motivation. Motivation is needed in the teaching and learning process, especially when you are a final-year student.⁴ The demands of academic life and the problems faced by these students can trigger stress. In female students, stress can influence the menstrual cycle because of the increase of the hormone cortisol which can interfere with the production of reproductive hormones.⁵

The factors that can affect the menstrual cycle are hormone function disorders,

systemic disorders, physical activity patterns, diet, and stress.⁶ When women are under stress, there is an activity in the amygdala of the limbic system which this system will stimulate the release of hormones from the hypothalamus, namely corticotrophic releasing hormone (CRH).⁷ The increasing CRH will stimulate the release of endorphins and adrenocorticotrophic hormone (ACTH) into the blood. The increase in ACTH levels results in an increase in blood cortisol levels. These hormones cause a decrease in Gonadotropin-Releasing Hormone (GnRH) levels which can affect the synthesis and release of hormones that play a role in the process of menstruation so that the menstrual cycle which is previously normal becomes abnormal.⁸

The purpose of this study is to analyze the correlation between stress due to online learning during the pandemic with the menstrual cycle of undergraduate students of the Nursing Study Program of Nahdlatul Ulama University Surabaya.

METHODS

Study Design

The type of research conducted is a cross-sectional study that used primary data by questionnaire obtained from undergraduate students of the Nursing Study Program.

Data Collection

The population of this research is the 2017 students of the undergraduate Nursing Study Program, Nahdlatul Ulama University Surabaya. The researcher found that 46 students have normal menstrual cycles. The research subjects are 41 respondents who were taken through a simple random sampling technique. The data was collected using the DASS 42 questionnaire (Depression Anxiety Stress Scale 42) to measure stress levels (Jena, 2020) and a questionnaire containing categories of menstrual cycles to measure female students' menstrual cycles.¹

Data Analysis

Data analysis was conducted with a Chi-Square statistical test with a significant $p < 0.05$. The results of the analysis can be concluded if the p -value < 0.05 then H_0 is rejected, meaning that stress due to online learning during the pandemic is related to the menstrual cycle of female students.

RESULTS

Respondents Characteristics

Table 1 shows that of the 41 respondents most (63.4%) are at the age of 22 years. Most (63.4%) had normal menarche. Most of the body mass index (BMI) (58.5%) was normal and almost all (95.1%) of the respondents lived with their parents.

Table 2 shows that of the 41 respondents, almost half (43.9%) experienced mild stress levels and most (61%) experienced abnormal menstrual cycles.

Table 3 shows that of the 18 respondents with mild stress levels, most of them (66.7%) had normal cycles and of 15 respondents with moderate stress levels, almost all (93.3%) had abnormal menstrual cycles. The results of the cross-tabulation of the relationship between stress due to online learning during the pandemic and the menstrual cycle of female students were analyzed by Chi-

Table 1. Frequency Distribution of Respondent Characteristics (n=41).

Characteristics	F	%
Student Age		
21 years old	6	14,6
22 years old	26	63,4
23 years old	7	17,1
24 years old	2	4,9
Age of Menarche		
Early	5	12,2
Normal	26	63,4
Tarda	10	24,4
Residence		
Boarding house	2	4,9
Live with parents	39	95,1
Body Mass Index (BMI)		
Very thin	0	0
Thin	6	14,6
Normal	24	58,5
Fat	4	9,8
Very fat	7	17,1

Table 2. Frequency Distribution of Stress Levels and Menstrual Cycle (n=41).

Characteristics	Respondent	
	F	%
Stress Level		
Normal	3	7,3
Mild	18	43,9
Moderate	15	36,6
Heavy	5	12,2
Menstrual Cycle		
Normal	16	39,0
Abnormal	25	61,0

Table 3. The Correlation Between Stress due to Online Learning During the Pandemic With The Menstrual Cycle Of S1 Nursing Students Of UNUSA (n=41).

Stress Level	Menstrual Cycles						p value
	Normal		Abnormal		Total		
	f	%	f	%	f	%	
Normal	3	100	0	0	3	100	0.000
Mild	12	66,7	6	33,3	18	100	
Moderate	1	6,7	14	93,3	15	100	
Heavy	0	0	5	100	5	100	

Square statistical test, the results were $p = 0.000$, which means that there is a relationship between stress due to online learning during the pandemic and female students' menstrual cycles.

DISCUSSION

The results showed that there was a correlation between stress due to online learning during the pandemic and the menstrual cycle of undergraduate nursing

students at Nahdlatul Ulama University Surabaya with $p = 0.000$. Stress can affect the hormonal system in the body which can cause menstrual cycle disorders. Under stress, the limbic system is activated. This system stimulates the release of hormones from the hypothalamus, namely Corticotrophic Releasing Hormone (CRH) or the hormone cortisol.⁹ Increased CRH will stimulate the release of endorphins and Adrenocorticotrophic

Hormone (ACTH) into the blood.¹⁰ This increase in ACTH causes an increase in blood cortisol. These hormones can, directly and indirectly, cause a decrease in Gonadotropin-Releasing Hormone (GnRH) levels which can affect the synthesis and release of hormones that play a role in the process of menstruation.¹¹ This can cause disturbances in the menstrual cycle. The previously normal menstrual cycle becomes abnormal.¹² If the level of stress experienced is getting heavier, then the incidence of the menstrual cycle is also getting worse or abnormal, and vice versa.¹³ Efforts and solutions to prevent disruption of the menstrual cycle caused by stress during online learning include positive thinking and optimism that can counteract the negative effects of stress, rest and sleep, exercise, and meditation to relieve stress and relax muscles.⁷

Several factors that affect the menstrual cycle besides stress are age, living environment, and body mass index (BMI). **Table 1** shows that most (63.4%) female students at the age of 22 enter a quarter-life crisis which can affect a person's psychological condition. Where at this age a feeling of fear arises about the continuation of life in the future, including in career matters, relationships, and social life.⁶

Table 1 shows that almost all (95.1%) female students live with their parents. Students return home during online lectures, so students must adapt to the online learning process, and lecture assignments and must share roles in the family environment.¹⁴ Some are also influenced by environmental factors that are less conducive (noise and lack of lighting) for the learning process and lack of family support.⁹ In line with this, that various kinds of emotional changes due to a stressor have been associated with hormonal fluctuations during the menstrual cycle.⁴

Based on **table 1** shows that most (58.5%) of BMI is normal. Nutritional status plays an important role in influencing the function of reproductive organs.¹ Someone who has poor nutritional status has a risk of menstrual cycle disorders caused by disruption of growth and development of the reproductive system.¹⁵ Menstrual cycle

disorders are also found in someone with more nutritional status. This is related to the amount of body fat.⁷

Based on **table 1** shows that most (63.4%) experienced normal menarche (11-14 years). This age is the onset of puberty in women who generally get their first menstruation and the dominant hormone is estrogen.¹⁶ The dominance of the hormone estrogen at the beginning of menstruation is very important because it causes the growth and development of secondary sex signs which is why the beginning of the bleeding is often irregular because the menstrual form is anovulatory (without releasing eggs).¹⁷ The age of menarche relates to the time it takes to achieve a regular ovulatory cycle. If a woman has early menarche, 50% of her ovulation cycles occur in the first year after menarche, whereas women with late menarche take 8-12 years to fully ovulate.¹⁸

CONCLUSION

The purpose of this study is to determine the correlation between stress due to online learning during the pandemic with students' menstrual cycles. This study found that the stress due to online learning during the Covid-19 pandemic is related to female students' menstrual cycles.

DISCLOSURE

Author Contribution

All authors have contributed to this research process, including conception and design, analysis and interpretation of the data, drafting of the article, critical revision of the article for important intellectual content, final approval of the article, collection and assembly of data.

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Conflict of Interest

There is no conflict of interest for this manuscript.

Ethical Consideration

This research was approved by the Health Research *Ethics* Committee of

Nahdlatul Ulama Surabaya University. Letter of exemption No. 209/EC/KEPK/UNUSA.2021

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