

Original article

Relationship between Chronotype and Stress Level in Female Students during COVID-19 Pandemic

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Abstract

Background: The Corona Virus Disease (COVID-19) pandemic has a negative impact on all sectors of life, especially in adolescence. The quality of sleep of that the impact and it can increase stress level. **Objective:** This study aims to analyze the relationship between chronotype and stress levels in female students during the Covid-19 pandemic. **Materials and Methods:** This is observational study with a cross-sectional design used the Morningness-Eveningness Questionnaire (MEQ) and Perceived Stress Scale (PSS-10) in 171 female students as respondents. The data were statistically analyzed using Rank Spearman test. **Results:** The results showed that 46,2% of respondents had intermediate chronotype and 7,6% evening chronotype. There are 81,3% of respondents with moderate stress and 9,9% of respondents with high perceived stress. There is relationship between chronotype and stress level in female students ($p=0,000$, $r=0,286$). **Conclusion:** There is relationship between chronotype and stress level in female students during COVID-19 pandemic.

Keywords: Chronotype, Stress, COVID-19

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Introduction

The COVID-19 pandemic that has occurred has resulted in various countries imposing lockdowns to reduce the spread of the virus which has an impact on lifestyle changes to become less exposed to sunlight which can affect a person's sleep-wake cycle or chronotype¹. Chronotype is a person's preference in carrying out activities according to their circadian rhythm². The circadian rhythm is different for each individual and can be classified into three chronotype categories: morning, intermediate, and evening. The morning type is someone who goes to bed early and wakes up early and reaches peak performance in the morning. Meanwhile, someone with evening tends to go to bed and wake up late and reach peak performance at night³. Circadian rhythms play

an important role in the regulation of biological functions including a person's sleep-wake cycles preference, temperature, hormonal secretions, food intake, physical activity, and cognitive⁴.

COVID-19 pandemic also causes changes in a person's chronotype and it affected sleep disturbances, decreases sleep quality, and increased insomnia^{5,6} and causes stress in adolescents. The adolescents phase is a time of psychosocial and physiological changes and is considered the most vulnerable period to stressful events^{7,8}. Evening chronotype was significantly associated with depressive symptoms. A person with evening chronotype shows higher levels of anxiety and poor sleep quality compared to someone with a morning chronotype⁹.

Materials and Methods

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This was an observational cross sectional study was conducted in Jebres, Surakarta from February to March 2022 including four high schools were selected by using multistage cluster random sampling. Total of 171 female students participated in this study which was calculated using OpenEpi (Open Source Epidemiological Statistics for Public Health).

Inclusion criteria in this study is female students who are registered as active students at SMA N 8 Surakarta, SMA Warga Surakarta, SMK N 8 Surakarta and SMK Kristen 1 Surakarta, 16-18 years old, willing to be a respondent. Female students who suffer from chronic disease and who receive treatment for anxiety disorders or depression were excluded.

The measurement uses a questionnaire distributed online with google form. Chronotype were evaluated using the *Morningness-Eveningness Questionnaire* (MEQ) is a validated item (Cronbach alpha 0,88). This is a self-report questionnaire includes 19 questions used to identify a person's circadian type. Circadian typology is classified as morning type >58, intermediate 42-58 and evening <42. Stress levels were measured with the PSS-10 questionnaire (Cronbach alpha 0,80). The questionnaire consists of 10 questions and is assessed using a Likert scale. Each item of the question will be given a score of 0 (never), 1 (almost never), 2 (sometimes), 3 (often) or 4 (very often). The data were measured will be analyzed using the Rank Spearman test.

Results

Based on the Table 1. Most respondents are 16 years old (56,7%) were mostly have morning and intermediate chronotype (46,2%) and 81,3% female students have a moderate stress.

Tabel 1. Characteristics of respondents

Variables	n	Percentage (%)
Age (Years)		
16	97	56,7
17	71	41,5
18	3	1,8
Chronotype		
Morning	79	46,2
Intermediate	79	46,2
Evening	13	7,6

Stress Level		
Mild	15	8,8
Moderate	139	81,3
High Perceived	17	9,9

Table 2. shows respondents who have the morning chronotype experience moderate stress 82,3% and high perceived stress 3,8%. Meanwhile, respondents who had intermediate chronotype and experienced moderate stress were 82,3% and 15,2% experienced high perceived stress. Based on the results of the Rank Spearman test p value 0,00 (<0,05) means that there are significant relationship between chronotype and stress levels in female students during the COVID-19 pandemic. R-value was 0,286 shows that there is positive correlation between evening chronotype with stress levels in female students.

Discussion

Respondents are adolescents aged 16-18 years, this age is a period of physical and physiological changes. Approximately 20-25% of adolescents aged 13-17 years experiences mental health disorders and the diagnosis will begin before the age of 18. The average age of onset of the disorder begins in childhood (anxiety disorders at age 6 years), and pre-adolescence (11 years of age with behavioral disorders) and mood disorders at the age of 13 years ¹⁰.

The results showed that respondents experienced mild to severe stress during the pandemic. This can be because adolescences are having a hard time because of the sudden changes. In these situations, they feel stressed and anxious because they have to adjust to uncertain situations¹¹. In addition, school closures and prolonged quarantine at home also have a negative impact on adolescent mental health ¹².

Rank Spearman test result showed there was a relationship between chronotype and stress levels in female students. The chronotype can be influenced by various factors, one of which is exposure to light from electronic devices. The study showed a significant relationship between the use of electronic devices and evening chronotype¹³. During the pandemic, learning is done online so that there is an increase in the use of electronic devices. Studies have shown that respondents with high intensity in using electronics and mobile phones at night have symptoms of severe insomnia,

Tabel 2. Relationship between Chronotype and Stress Level in Female Students during COVID-19 pandemic

Chronotype	Level of Stress						P-value	R value
	Mild		Moderate		High perceived			
	n	%	n	%	n	%		
Morning Type	11	13,9	65	82,3	3	3,8	0,000	0,286
Intermediate	2	2,5	65	82,3	12	15,2		
Evening Type	2	15,4	9	69,2	2	15,4		

decreased sleep quality, reduced sleep duration and delayed wake-sleep cycles^{14,15}. Sleep disorders can have a negative impact on learning as well as physical and mental health¹⁶. Adolescents who have evening chronotype and sleep disturbances are associated with depressive symptoms¹⁷.

Conclusion

Conclusion in this study is there are relationship between chronotype and stress level in female students during COVID-19 pandemic ($p=0,000$)

Ethical Approval:

This research has been approved by research ethics committee Faculty of Medicine

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Conflict of Interest

None declared

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Author's Contribution

Puji Lestari did the research, wrote the manuscript, and did all the statistical analysis. Editing and approval of final draft is all the author.

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