

## Research Article

# Stress in Adolescents During the Pandemic

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**Abstract.**

Due to COVID-19 the Indonesian Government issued a policy for Indonesian students to carry out learning activities from home. Teenagers are one of the main victims of the effects of the quarantine strategy, so they are vulnerable to various mental health problems. This study aimed to find out the relationship between the factors in stress levels in adolescents in the Public Health Center. This cross-sectional study was conducted in June 2021 until August 2021 at Public Health Center and involves 170 respondents. The sample was filled in questionnaires based on six variables studied: age 13-24 years, gender, education level consisting of middle school, high school, and college, sleep quality, academic burden, and online learning with stress levels. Furthermore, this research conducted data analysis and coding, which was then compiled in the discussion. The study used primary data by filling out Google forms independently and then analyzed using a univariate test, and bivariate analysis tests and then processed using SPSS. The chi-square statistical test found a relationship between the variables of gender, online learning system, academic load, and sleep quality with levels, namely sig values = 0.019; 0.018; 0.001; 0.002. Meanwhile, the age and education level variables were not found to correlate with stress levels with sig values = 0.376 and 0.240. After the multivariate test, the results obtained were not significant ( $P > 0.05$ ). It was concluded that the results of this study were clinically significant but not statistically significant. There was a relationship between gender, online learning system, academic load, and sleep quality on stress levels in adolescents. Further study is needed on other factors that can affect the stress levels of adolescents during the COVID-19 pandemic, such as economic, social and social interaction. The Public Health Center is expected to form a consulting team or work with psychologists and psychiatrists that aims to be a forum for consultation on mental health and reduce stress cases in adolescents. Furthermore, school-age and teenage health programs can work together with mental-health programs to conduct stress screening in adolescents.

**Keywords:** stress, adolescents, COVID 19, online learning

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## 1. INTRODUCTION

Coronavirus Disease 2019 could be an communicable disease caused by the Severe Acute Respiratory Syndrome 2. SARS-CoV 2 is a variety of virus that has ne'er been known before. Coronaviruses known to cause disease with severe symptoms include MERS and SARS. Common clinical conditions with COVID-19 is ARDS, shortness of breath, increased body temperature, and coughing (1). In 2020, a sudden and rapid viral attack has shocked the world, where the COVID-19 virus was first appear in Wuhan, China, December 2019. Where COVID-19 virus disease has so far caused a pandemic (2).

The pandemic has forced most people to change their daily activities, culture, personal practices, organizational practices in indoor and outdoor activities. Currently, countries have implemented dramatic changes in policies for their people to comply with every rule to protect their communities from this pandemic. However, many defiance may be caused by the drastic changes that occur due to the pandemic, including emotional changes (2). In this case, adolescents are the main toll of quarantine strategies, extensive changes from routines in school closures, distance learning, continuous contact with family, leisure activities, and even social communication, which made them susceptible to many mental health problems (3). There has been much investigation on the psychological health consistency, especially from Asia and Europe. The research shows that the disease resulted in a significant increase in cases of anxiety, depression, stress, and make away with oneself in scholar and college students (4,5).

The development of the COVID-19 virus continues to increase. 216 countries have been affected by this virus, as many as 8,242,999 positive cases with 445,535 people who died from the COVID-19 virus (6). In our country Indonesia, the number of positive cases of COVID-19 reached up to 42,762 cases, with a total of 16,798 patients who recovered, and The death toll has reached 2,339 people. East Java Province is one of the regions with increasing cases of COVID-19 to date (Satgas COVID-19, 2020). The President of the Republic of Indonesia, Joko Widodo, issued a policy for Indonesian students to carry out learning activities from home (online). The application of online activities is a policy of physical distancing and social distancing. From the regulation of the President of the Republic of Indonesia, there are 54% of the total 97.6% of schools have implemented policies in distance learning. Students and educators have carried out teaching and learning activities well in their respective homes (8). Stress is one of the non-specific responses of the human body to various demands called stressors; this response includes a positive response to a negative response (9). The workload

experienced by adults during the pandemic while working at home has resulted in difficulties, especially impacting the economy and everyone's question. Adults, students, or teenagers who use distance learning methods have also resulted in learning that is not entirely enjoyable; this is due to the limited direct interaction with others. This situation has affected people's psychological, including excessive some mental problem (10). The Indonesian Association of Psychiatrists, in their study, has explore mental health development of the people during the COVID-19 pandemic. Their research stated that 64.3% had experienced anxiety to stress from 1,522 respondents; this was the impact of the pandemic during 2020. With an incidence rate of 76.1% in female, this prevalence occurred at the age of 14 years to the age of 71. year. Respondents who experience anxiety and stress come from most of the island of Java, with the highest prevalence in West Java, namely 23.4%, Central Java as much as 15.5%, DKI Jakarta reaching 16.9%, and in East Java reaching a prevalence of 12.8% (11).

71.4% of teenage students experience stress due to many online assignments, and almost 20% of students receive quite a lot of assignments due to online learning at their schools. 10,233 residents are in their teens and have the opportunity to experience stress due to online learning during the pandemic, as well as the PKP data for the Southern City Health Center in Kediri City, the results of adolescent health screening in the work area of the public health center have not reached real coverage (12)

## 2. METHODS

Population in this research was all adolescents on the working area of the City Health Center of the Southern Region of Kediri; with the determination of the sample by purposive sampling method obtained a sample of 170 in 2 sample groups. The data used are primary data by filling out the google form independently.

Furthermore, in this study, data analysis and coding were carried out which were then compiled in the discussion. Conclusions and research reports are carried out in consultation with the supervisor of the University of Muhammadiyah Malang, the Superintendent of the Southern Region City Health Center and the Kediri City Health Department.

The data were analyzed using univariate tests to describe the characteristics of the variables and the size of the distribution to see the picture of the data collected; a bivariate analysis tempt was implement to determine the relationship between each independent variable and dependent variable, then processed using SPSS.

According to the test results in the table above, the p-value of the chi-squares test to decide the relation between the variables of gender, distance learning system, academic load, and sleep quality with stress level (PSS) which is 0.019; 0.018; 0.001; 0.002, where this number is smaller than alpha 0.05, so it can be concluded that between gender, distance learning system, academic load, and sleep quality there is a significant (significant) relationship with stress level (PSS).

Table 3.2 also shows that age and education level variables do not have a significant (significant) relationship with stress levels with p-values of 0.376 and 0.240, which are greater than alpha 0.05.

### 3. RESEARCH RESULTS AND DATA ANALYSIS

TABLE 1: Sample Distribution Data.

Variable	Indicator	Frequency	%
Age	13-16 years	66	38,4
	16-18 years	51	29,7
	> 18 years	55	32
Gender	Male	129	75
	Female	43	25
Education	Junior High School	57	33,1
	High School	57	33,1
	College (non medical major)	29	16,9
	College (medical major)	29	16,9
Online learning	Very good	1	0,6
	Good	13	7,6
	Fair	99	57,6
	Not quite good	58	33,7
	Poor	1	0,6
Academic load	Low	30	17,4
	Moderate	108	62,8
	High	34	19,8
PSQI	Good sleep quality	15	8,7
	Poor sleep quality	157	91,3
Stress level	Mild stress	20	11,6
	Moderate stress	134	77,9
	Severe stress	18	10,5

TABLE 2: Chi-square correlation test.

	Stress level (PSS)						p-value of the Chi Square Test
	Mild (n=20)		Moderate (n=134)		Severe (n=18)		
	Frequency	%	Frequency	%	Frequency	%	
<b>Age</b>							
13-15 years	9	5.2%	52	30.2%	5	2.9%	0.376
16-18 years	4	2.3%	43	25.0%	4	2.3%	
> 18 years	7	4.1%	39	22.7%	9	5.2%	
<b>Gender</b>							
Male	1	0.6%	34	19.8%	8	4.7%	<b>0.019</b>
Female	19	11.0%	100	58.1%	10	5.8%	
<b>Education</b>							
Junior High School	7	4.1%	45	26.2%	5	2.9%	0.240
High School	6	3.5%	47	27.3%	4	2.3%	
College (non medical major)	1	0.6%	22	12.8%	6	3.5%	
College (medical major)	6	3.5%	20	11.6%	3	1.7%	
<b>Online learning</b>							
Very good	1	0.6%	0	0%	0	0%	<b>0.018</b>
Good	1	0.6%	12	7.0%	0	0%	
Fair	13	7.6%	80	46.5%	6	3.5%	
Not quite good	5	2.9%	41	23.8%	12	7.0%	
Poor	0	0%	1	0.6%	0	0%	
<b>Academic load</b>							
Low	7	4.1%	23	13.4%	0	0%	<b>0.001</b>
Moderate	12	7.0%	87	50.6%	9	5.2%	
High	1	0.6%	24	14.0%	9	5.2%	
<b>PSQI</b>							
Good sleep quality	6	3.5%	8	4.7%	1	0.6%	<b>0.002</b>
Poor sleep quality	14	8.1%	126	73.3%	17	9.9%	

## 4. DISCUSSION

This research purpose is to determine what factors that influence stress level in adolescents in the work area of the Southern City Public Health Center during the pandemic.

Based on the chi-square test results managed to find the correlation between age and stress level, with result sig =0.376, which means there is no significant correlation between age and stress level. This follows research conducted by Rens et al., which states that age has no significant effect on the incidence of stress with a p-value of 0.454 (13). In addition, this study is in accordance with study is done by Khawar et al. p-value of 0.165 ( $p > 0, 05$ ) (14).

However, this study is not in accordance with the study done by AlAteeq, Aljhani and AlEesa (2020), Tee *et al.*, (2020), Nocentini, Palladino and Menesini (2021), which states that age has a relationship with stress levels in students with AlAteeq's study having a p-value of 0.006 ( $p < 0.05$ ), Nocentini et al.'s research and Tee M was  $p < 0.001$ . Stress levels occurred the most at juvenile at this pandemic. Due to their limited interaction with peers. Although this can be overcome with digital technology and social media, stress can still occur due to false and excessive information. In addition, they feel pressured because they cannot accept changes in academic activities and feel confined during their lifetime. They have prolonged COVID-19 restrictions (18). This study also contradicts the research conducted by Schwartz *et al.*, (2021) age has a significant relationship with stress levels (p-value =  $< 0.001$ ). Older age 15-18 years has a higher total stress level score than the younger age group (12-14 years). and p-value  $< 0.05$  at the age of 20-24 years, where the higher the age, the higher the stress level (20).

This study uses the chi square test by a significance mark of  $0.019 > 0.05$ , where the results show a significant value that there is in accordance with study between stress level and gender. The results in this study is in accordance with study is done by Khan et al., that gender, especially in female, affects the level with a value of  $p = 0.018$  (20). The study also showed significant results on the effect of young age, unmarried, and quarantine at home on stress levels. Another similar study was from Prowse *et al.*, (2021) with 366 students aged 18-29 years, and the average age was 21 years. This study shows that female report more about the worse impact of COVID19, namely higher to extreme stress levels compared with male with  $p < 0.05$ .21 In addition, research by Aslan, Ochnik and Çınar, (2020), D'Hondt *et al.*, (2020), Martínez Arriaga *et al.*, (2021), Pieh *et al.*, (2021).also showed that there was a relationship between gender and stress levels, where female had higher stress levels than male, with  $p < 0.001$  in research conducted by Pieh C, Wathelet M, and Aslan I. Meanwhile, for research, Arriaga R has a p-value = 0.001. Similar

to Fawaz's study, the results showed a significant difference between lacquer i-male and female at stress levels, wherein female recorded significantly higher stress levels ( $p = 0.00$ ) (26). Elsalem, Osayba and Ahmad (2020) demonstrated in one study that gender was significantly associated with self-declared mental problem. Among female scholar from all of the faculties, 38.17% telling that online controlled exams were more causing emotional stress to 24.79% male respondents with a p-value of 0.001. Chen et al.'s study showed that female adolescents in Wuhan had higher levels of stress is higher than in other parts of China, where Wuhan adolescents are too concerned about general health conditions, in contrast to parents who have higher stress levels so that it is possible to provide negative stress coping to their children. Therefore, we need to think about the psychological health of adolescents and the psychological health of parents because they are interrelated (28). Meanwhile, according to Clabaugh, Duque and Fields (2021), female report much top levels of disturbance in their home studies than male. Female also report higher perceived severity of COVID-19 as greater as the frequency of slightly in bad management behaviors.

In a study with a variable level of education on stress levels, the results were not significant shows that p-value of 0.24; this could due to the psychosocial factors of each individual. This study follows the research of Aiyer *et al.*, (2020), showing an insignificant relationship between education and stress levels in adolescents. We can see in the results of p greater than 0.05, where the research is in accordance with the authors' research. Research by Samadarshi also mentioned that, there hasn't significant result (p-value 0.148) with education level on stress in students who conducted a study entitled Online survey on the factors connecting with self-feeling stress during the early stages of the disease outbreak (31).

Due to the research managed by Abdulghani *et al.*,(2020) with the Kessler-10 stress measurement, a significant result was obtained between education level and stress, namely the p-value of 0.00 at the level of education in 1<sup>st</sup> semester – 5<sup>th</sup> semester of medical education. Wang *et al.*, (2020), in that study, found a significant value in the relationship between stress and education level, namely p-value <0.05.33 as was the case in Zhang et al.'s research discusses the degree of education as a research variable that produces a significant value for stress due to the pandemic. Where the high school education level feels more stressed due to online learning than the junior high school level, with a significant value obtained ( $p < 0,05$ ) (5).

Our research shows a higher value to the level of education, where a higher level of education will increase the ability to control stress better and have intellectual abilities so that they are required to control stress better. This study follows the research of

Aiyer *et al.*, (2020), which states that the prevalence of stress is higher experienced by high school students than college students or college students. The higher incidence of stress in students is a consequence of high prevalence of psychological health disorder because they experience a transition from youth to adulthood. In Xiong, *et al.* study also stated that non-medical students had higher stress levels than medical students. This is because knowledge about pandemics in medical scholar is higher than non-medical students. Sufficient information of COVID-19 will help in reducing feelings of helplessness or stress (34).

The outcome of this research with the Chi-square test, there is a relationship between distance learning and stress levels with a p-value = 0.018. This is consistent with the research conducted by Yang, Chen and Chen (2021), that found a relationship between academic load, distance-learning or often referred to as online, and fear of infection with stress levels. This study is in accordance with the study by Kecojevic *et al.*, (2020) that perceived academic difficulties in the form of difficulties in the capability to focus on academic tasks and online learning were associated with intensify levels of psychological mental health (p-value = 0.007), one of which could be difficulties with online learning modes bad WiFi or computer problem.

A similar study conducted by 372 students found (n = 229, 61.6%) reported feeling much depressed during pandemic study learning method (p-value < .001). Students also worry about the ineffectiveness of distance learning, arguing that students will have bad social contact, interact, and practice (37). Apart from students, research on online learning with stress levels was also carried out by students in this study conducted by researchers O'Byrne *et al.*, (2021) using a non-parametric analytics test found a positive relationship between stress levels and online learning (p < 0.0001) in medical students.

In the study of Al Omari *et al.*, (2020), internet use (p<0.001) was found to be a predictor of DAS. Internet use is increasing because the change in the learning system that online learning has higher internet uses of young people from an average of 5.46 hours a day before COVID-19 to 9.74 hours a day. Other journals show the result p-value < 0.001. The e-learning cracks in question are quality problems, lack of motivation to use e-learning, inadequate English language skills, low technical support and lack of overall e-Learning content development experience. seen as a major problem to an efficient e-learning system (40)

According to the results of the chi-square test that was carried out, it resulted in a relationship between academic load and stress level with a sig p-value = 0.01, with the results showing the number of respondents as many as 30 (17.4%) experiencing low academic load, 108 (62.8%) burden moderate academic, and 34 (19.8%) with a



heavy academic burden. These results are consistent with Yang, Chen and Chen (2021), This results show academic load has positive relationship with stress levels. Where the higher the academic load, the higher the stress level with a p-value < 0.0140. In accordance with the research from Schröpfer *et al.*, (2021), a multivariable regression analysis machine was carried out to find what related element such as the perceived study load ( $p = 0,0003$ ) on psychological stress levels. From research data, Zurlo, Cattaneo Della Volta and Vallone (2020), revealed significant results from all CSSQ scale scores with all SCL-90-R standard scale scores and the Global Severity Index. This reveals how identified specific sources of stress and shows negatively affect perceived psychophysical health conditions among students.

Most teenagers around the world have a night's sleep that is less than recommended. Low time of sleep can have a worse effect on a person's psychological and physical health level. In 2020, this pandemic caused class and educational institutions to be closed or diverted to online learning (43). In this study, it was found that sleep quality has a significant relationship with stress levels in adolescents ( $p\text{-value} = 0,002$ ) (44)

Statistically, sleep disturbance factors have a relationship with stress levels ( $p < 0.001$ ) during the pandemic (45). The same thing was also found the research by Du *et al.*, (2021), level of the perceived stress is also associated with sleep quality score ( $P < 0.001$ ), which means that sleep quality decreases when the perceived stress increases because a higher PSQI score indicates poorer sleep quality in individuals.

Other studies have shown that this pandemic shown the significant modification in sleep and wake schedules, especially in school-age children and adolescents. Sleep and stress levels in University of Indonesia students ( $p = 0.001$ ). It was found that students who has worse sleep quality were 4.7 times more having stress levels than with good sleep quality (47).

## 5. CONCLUSION

The age and education level variables did not find a significant relationship with stress levels on the chi-square test. Meanwhile, the gender variable has a significant relationship with stress levels, where female experience higher stress events than male.

Besides gender, other independent variables such as distance learning system, academic load, and sleep quality significantly correlate with stress levels. An inadequate online learning system, high academic load, and poor sleep quality can increase the incidence of stress in adolescents.

In this study, here are fewer subjects so that couldn't represent all adolescent in the Kediri Southern City Public Health Center region, so it is important that further study can be able to take larger number of subjects. Meanwhile, Further study is needed on other factors that can affect the stress levels of adolescents during the COVID 19 pandemic, such as economic social and social interaction. Kediri Southern City Public Health Center is expected to form a consulting team or work with psychologists and psychiatrists that aim to be a forum for consultation on mental health and reduce stress cases in adolescents. Furthermore, school-age and teen-age health programs can work together with mental-health programs to conduct stress screening in adolescent.

## ABBREVIATIONS

COVID-19: *Coronavirus Disease 2019*; SARS: *Severe Acute Respiratory Syndrome*; PKP : *Penilaian Kinerja Puskesmas*; PSS: *Perceived Stress Scale*

## CONSENT AND ETHICS FOR RESPONDENTS

This study obtained approval from the Health Office of the City of Kediri. Research respondents gave their consent to participate voluntarily through questions on the consent form before answering all questions on the google form.

## CONFLICT OF INTEREST

The authors declare that the authors have no conflict of interests.

## AVAILABILITY OF DATA AND MATERIALS

Data is available from the author according to a reasonable request

## AUTHOR CONTRIBUTION

All authors contributed to the interpretation of the data, reviewed, drafted the manuscript, and approved the final manuscript.

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