

## Interrelation between Physical Activity and Anxiety in the Covid-19 Pandemic Era

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### ABSTRACT

The Covid-19 pandemic is a global health problem that is affecting the entire population of the world. Decreased social interaction and lack of social support, also the demands to get good grades have a negative impact on student's mental health levels, one of the mental health problems is anxiety. The purpose of this study was to determine the relationship between the levels of physical activity and anxiety during the distance learning process in the Covid-19 pandemic era. This study used an observational analytical study with a cross-sectional design. The respondents were 107 Bengkulu University college students, consecutive sampling technique. Assessment using the Global Physical Activity Questionnaire and the Hamilton Anxiety Rating Scale questionnaire. The relationship between variable was analyzed by the Gamma correlation test. The results showed that the most level of physical activity in the research subjects was in the low category (59,8%), with the most anxiety level being mild anxiety (47,7%). Based on statistical analysis obtained  $p = 0,000$  and  $r = -0,499$ . This study shows that there is a significant relationship between the levels of physical activity and anxiety in Bengkulu University students during the distance learning process in the Covid-19 pandemic era with a moderate correlation.

**Keywords:** Covid-19, physical activity, anxiety, distance learning, student

The Covid-19 pandemic is a global health problem that is affecting the entire population of the world. Various policies are implemented to minimize the spread of the Covid-19 virus.<sup>1</sup> Policies implemented by schools and universities against the Covid-19 pandemic include distance learning or online learning. Although this is effective, it has an impact on students' life which has undergone drastic changes. Decreased social interaction and lack of social support, also the demands to get good grades will be impacted to harm students' mental health levels.<sup>2</sup> One of the mental health problems is anxiety.<sup>3</sup> Anxiety is a comorbidity of other mental health illnesses, including depression and substance use disorders.<sup>4</sup>

One of the factors that influence the incidence of anxiety is the level of physical activity. Physical

activity can reduce anxiety through psychosocial and biological mechanisms, such as increasing self-confidence and increasing levels of endorphins in the body.<sup>5</sup> Individuals with sufficient levels of physical activity showed lower levels of anxiety, but during this pandemic, the individual's level of physical activity showed a significant decrease. This is influenced by the lack of physical activity carried out during the quarantine period. Adequate physical activity will not only affect better mental health but will also reduce the risk of cardiovascular disease, diabetes, obesity, and others.<sup>6</sup>

Research conducted worldwide on the level of student anxiety during the Covid-19 pandemic showed quite high results. Research conducted on university students in the United States showed that 71% of students experienced an increase in anxiety at various levels during the Covid-19 pandemic.<sup>7</sup> A similar study conducted in Greece showed that 42.5% of university students experienced an increase in anxiety at various levels during the Covid-19 pandemic.<sup>8</sup> Several studies conducted in Indonesia during the Covid-19 pandemic showed similar results with a fairly large prevalence of

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anxiety. Research conducted by Hasanah, 2020, in Semarang, showed a low anxiety level of 41.58% and a moderate anxiety level of 16.84%.<sup>9</sup> Research conducted by Effendi, 2020, in Palembang, showed that the level of moderate anxiety was 32.3% and severe anxiety was 1.3%.<sup>10</sup>

Physical activity affects anxiety through physiological factors and psychosocial factors.<sup>11</sup> Physiological factors include the HPA axis, monoamine systems, and the release of endogenous opioids. The HPA axis has an important role in the body's adaptive response to stimulate anxiety. Dysregulation of the HPA axis has long been implicated in the manifestation of anxiety symptoms. Regular physical activity can cause changes in the HPA axis by modulating anxiety reactivity in individuals. Abnormalities of monoamine function in the brain are also implicated in anxiety. Research shows that sufficient physical activity can increase the activity of endogenous opioids in the central and peripheral nervous systems and can cause a state of euphoria.<sup>12</sup> Changes in the perception of body shape that occur due to routine physical activity will increase self-confidence and feel socially accepted.<sup>11</sup> Regular physical activity can also make individuals feel more capable of controlling the threat of anxiety.<sup>13</sup>

Research conducted in Canada showed that the physical activity level of 80.8% of individuals decreased during the Covid-19 pandemic.<sup>14</sup> In Palembang, 845 individuals, stated that 38.2% of individuals had a low level of physical activity, 57.2% had a moderate level of physical activity, and 4.6% had a level of heavy physical activity during the Covid-19 pandemic.<sup>10</sup>

## **METHODE**

This research is an analytical observational study with a cross-sectional design that aims to find the relationship between the levels of physical activity and anxiety in Bengkulu University students during the distance learning process during the Covid-19 pandemic era. This research will be conducted in Bengkulu City in June 2021. The target population of this research is Bengkulu University students. The accessible population in this study were active students at Bengkulu

University in the 2020/2021 academic year.

The inclusion criteria in this study were students in the class of 2020/2021, normal body mass index; abnormal body mass index will affect the level of physical activity, and undergoing distance learning for at least 50% of the total credits. Exclusion criteria in this study were final semester students who were doing their final undergoing undergo academic sanctions or getting counseling therapy such as counseling and cognitive behavioral therapy; undergoing pharmacological therapy such as anti-depressant drugs, anti-anxiety drugs, within the last 2 weeks; have a physical disability; have regular exercise activities for at least 30 minutes a day 3 times a week for the last 3 months; regular exercise activities will affect the level of physical activities, and have a history of heart or lung disease.

This study used non-probability sampling with a purposive sampling type, which means that all subjects that meet the criteria are included in the study until the required number of subjects is met.

The dependent variable in this study is the level of anxiety in Bengkulu University students during the distance learning process in the Covid-19 pandemic era which will be measured with the Hamilton Anxiety Rating Scale questionnaire/HARS<sup>23</sup>(no anxiety, mild, moderate, severe, and very severe based on the HARS). The independent variable in this study was the level of physical activity of Bengkulu University students during the distance learning process in the Covid-19 pandemic era which will be measured with the Global Physical Activity Questionnaire/GPAQ<sup>24</sup> (low, moderate or highly active based on the GPAQ). Analysis of the distribution of data in this study was tested by the Kolmogorov-Smirnov test. The relationship between these two variables will be analyzed by the Gamma correlation test.

## **RESULTS**

### **Research Subject Characteristics**

The frequency distribution of the research subject characteristics data can be seen in Table 1.

Table 1. Research subject characteristics data

Characteristics	Frequency		Median (Min-Max)
	n	%	
Age	Students in the Class of 2020/2021		19 (18 – 21)
Gender	Female	73	68,2
	Male	34	31,8
Faculty	Faculty of Teacher Training and Education	13	12,1
	Faculty of Law	13	12,1
	Faculty of Economics and Business	14	13,1
	Faculty of Social Science and Political Science	14	13,1
	Faculty of Agriculture	13	12,1
	Faculty of Math and Science	13	12,1
	Faculty of Engineering	13	12,1
	Faculty of Medicine and Education	14	13,1
Body Mass Index			20,5 (18,6 – 24,4)
Learning Process	Full Online	107	100,0
	Half Online	0	0,0
Length of online learning per hour per day			5 (3 – 8)

The results showed that all students in the class of 2020/2021 who were respondents in this study were mostly female, namely 73 people (68.9%) with the most age distribution of 19 years old as many as 63 people (58.9%). All subjects are students spread across faculties at Bengkulu University. The subjects taken in the study were subjects with normal body mass index with a value of 20.5 (18.6 – 24.4) kg/m<sup>2</sup>. All subjects undergo distance learning entirely online with the results of the length of online lectur being are 5 (2-8) hours per day.

**Description of Physical Activity Level of Bengkulu University Student During Distance Learning Process in The Covid-19 Pandemic era**

The level of physical activity of Bengkulu University students during the distance learning process during the Covid-19 pandemic era can be seen in Table 2.

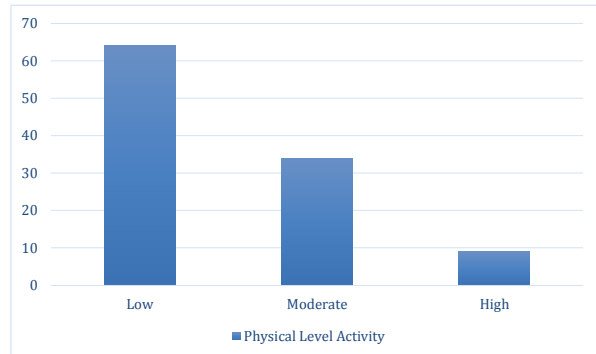


Figure 1. Distribution of Subjects Based on Physical Activity Level in the Era of the Covid-19 Pandemic

Based on Figure 1 it can be seen that majority of the research subject had a low level of physical activity, namely 64 people (59,8%). Research subject characteristic data based on physical activity level can be seen in Figure 2.

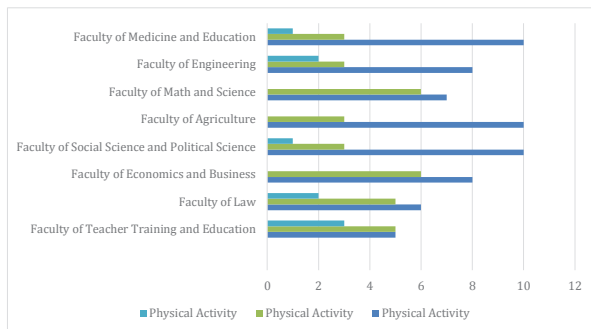


Figure 2. Characteristic Data Based on Physical Activity Level

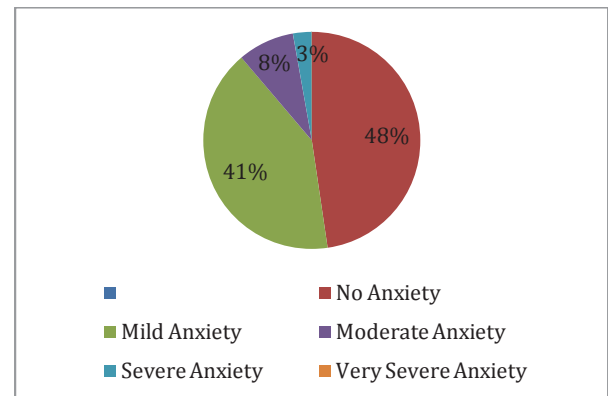


Figure 3. Distribution of Subjects Based on Anxiety Level in the Era of the Covid-19 Pandemic

### Description of Anxiety Level During Distance Learning Process in The Covid-19 Pandemic Era

The level of anxiety of Bengkulu University students during the distance learning process during the Covid-19 pandemic era can be seen in Figure 3.

Based on Figure 3, it can be seen that majority of the research subject had no anxiety, namely 51 people (47,7%), and mild anxiety, namely 44 people (41,1%). Research subject characteristic data based on anxiety level can be seen in Table 2.

Table 2. Characteristic Data Based on Anxiety Level in the Era of the Covid-19 Pandemic

Characteristics		Anxiety Level									
		No Anxiety		Mild Anxiety		Moderate Anxiety		Severe Anxiety		Very Severe Anxiety	
		n	%	n	%	n	%	n	%	n	%
Gender	Female	29	27,1	35	32,7	7	6,5	2	1,9	0	0
	Male	22	20,6	9	8,4	2	1,9	1	0,9	0	0
Faculty	Faculty of Teacher Training and Education	7	6,5	5	4,7	1	0,9	0	0	0	0
	Faculty of Law	5	4,7	6	5,6	2	1,9	0	0	0	0
	Faculty of Economics and Business	5	4,7	8	7,5	1	0,9	0	0	0	0
	Faculty of Social Science and Political Science	5	4,7	8	7,5	1	0,9	0	0	0	0
	Faculty of Agriculture	7	6,5	4	3,7	1	0,9	1	0,9	0	0
	Faculty of Math and Science	7	6,5	4	3,7	1	0,9	1	0,9	0	0
	Faculty of Engineering	8	7,5	4	3,7	0	0	1	0,9	0	0
	Faculty of Medicine and Education	7	6,5	5	4,7	2	1,9	0	0	0	0
Domicile	Bengkulu City	13	12,1	16	15,0	4	3,7	2	1,9	0	0
	Outside Bengkulu City	38	35,5	28	26,2	5	4,7	1	0,9	0	0

### Interrelation between the levels of physical activity and anxiety in Bengkulu University students during the distance learning process in the covid-19 pandemic era

Based on statistical analysis with Gamma Correlation Test obtained  $p=0,000$  and  $r=-0,499$  as seen in Figure 4. The results of this research indicate that there is a significant relationship between the levels of physical activity and anxiety of Bengkulu University students during the distance learning process in the Covid-19 pandemic era because the  $p$ -value  $< 0.05$  with a correlation strength value belonging to the moderate relationship category because it is between  $0.4 - <0.6$  and the direction of the correlation is negative, which means the better the level of student physical activity, the lower the possibility of the level of anxiety.

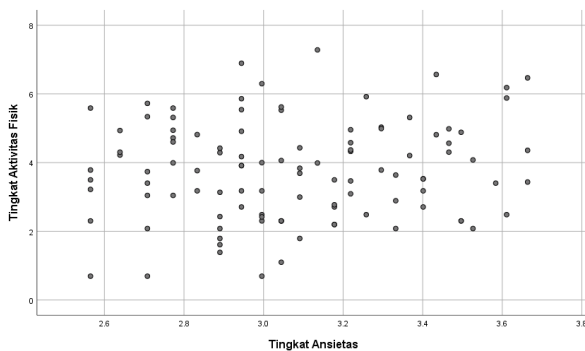


Figure 4. Interrelation between the levels of physical activity and anxiety

## DISCUSSIONS

### Distribution of Subjects Based on Physical Activity Level

The level of physical activity of Bengkulu University students during the distance learning process during the Covid-19 pandemic era showed that most of the research subjects had a low level of physical activity. The results of this study are in line with research conducted by Hendsun, on students at Tarumanegara University, which showed that most students had a low level of physical activity, namely 168 people (85.3%), and a moderate level of physical activity as many as 29 people (14.7 people).<sup>15</sup> The level of physical activity of students during the distance learning process in the

Covid-19 pandemic era in this study mostly had a low physical activity category because the distance learning process with an entirely online system made students sit in front of laptops for 5 (3 - 8) hours per day, this in the long term will result in sedentary behavior in students.<sup>16</sup>

Environmental factors affect the level of physical activity in terms of the availability of gyms or gyms, however, during a pandemic, policies such as closures of public places and quarantines make it more difficult for students to achieve an adequate level of physical activity.<sup>16</sup> Social isolation during the pandemic also affects the low level of physical activity because physical activity carried out in groups is limited or prohibited altogether, whereas social support is one of the factors that influence participation and doing sufficient physical activity.<sup>17</sup>

Characteristics of the sex of the subject found that most of the students with low physical activity were female (43%) and most of the students with high physical activity were male (5.6%). This study also found students who had moderate (31.8%) and high (8.4%) levels of physical activity, this could be due to individual factors in students, where this research was conducted one year since the Covid-19 pandemic so that the subject's knowledge of physical activities that can be done during quarantine is better.

### Distribution of Subjects Based on Anxiety Level

The anxiety level of Bengkulu University students during the distance learning process during the Covid-19 pandemic era showed that most of the research subjects were in the category of no anxiety and mild anxiety. These results can be caused by differences in the subjects taken, namely all students of the Faculty of Medicine, where in addition to being caused by the pandemic, the study load and lecture schedule of medical students are quite dense and this research was conducted in June 2020 or 3 months after the Covid-19 declared a pandemic by WHO.

The level of student anxiety during the distance learning process in the Covid-19 pandemic era in this study was mostly in the category of no anxiety and mild anxiety could be caused by



sociodemographic factors of students.<sup>18</sup> Most of the respondents in this study live in areas with a lower number of confirmed Covid-19 positives than in other regions in Indonesia. The results show that most of the students in the study are domiciled in the district area. The lower levels of anxiety in some areas can be caused by several things, such as the lack of mobility of mass migration movements, lower population density, and interactions that are quite far from cities with high confirmed cases of Covid, all of which influence the spread of the virus. Covid-19 and a person's level of anxiety.<sup>19</sup> However, other research shows that confirmed cases of Covid-19 in the domicile area do not have a big influence on students because the ease of internet access affects the individual's view of Covid-19 cases. Therefore, confirmed cases in each city or district tend not to affect student anxiety, but rather the direction of public opinion.<sup>20</sup> Research subjects who undergo a completely online distance learning system can also affect the level of student anxiety, which provides convenience for tasks that should be carried out face-to-face. In addition, this research was conducted in June 2021, or one year after Covid-19 was declared a pandemic WHO so that individual knowledge of Covid-19 and the precautions that can be taken to minimize the spread of this virus is also better.

This study also found students who had a moderate level of anxiety (8.4%) and severe anxiety (2.8%). This can be caused by erratic internet connections during distance learning in some areas where students live.<sup>21</sup> The entirely online learning system also causes students in the class of 2020/2021 to not be able to feel the atmosphere of the University and feel distant from their classmates who, even though they study together, have not been able to meet face-to-face.

The level of anxiety in the research subjects showed that moderate and severe anxiety was more common in the female sex. This result is in line with data from WHO, 2017, where anxiety symptoms are more common in women than men with a ratio of 2:1.

### **The Relationship between the Levels of Physical Activity Levels and Anxiety During the Distance Learning Process in the Covid-19 Pandemic Era**

This study shows that there is a significant relationship between the levels of physical activity and anxiety in Bengkulu University students during the distance learning process in the Covid-19 pandemic era with a moderate correlation. The results obtained in this study are consistent with previous studies regarding the relationship between levels of physical activity and anxiety. Physical activity can reduce anxiety symptoms because it can affect anxiety through various psychosocial and biological mechanisms, such as increasing endogenous opioids (endorphins), increasing the immune system, or increasing self-esteem.<sup>5</sup> Physical activity directly relieves negative feelings and has anxiolytic effects on college students during the Covid-19 pandemic<sup>22</sup>.

### **CONCLUSION**

This study shows that there is a significant relationship between the levels of physical activity and anxiety in Bengkulu University students during the distance learning process in the Covid-19 pandemic era with a moderate correlation. The correlation direction in this study is negative, where the correlation of physical activity and anxiety levels correlates in the opposite direction or vice versa.

### **LIMITATION**

The researchers acknowledge the limitation of the study, which may have only used one location in the University of Bengkulu. However, the various sample from different major has enabled the incorporation of different points of view.

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