

University Students' Daily Activities and Physical Fitness during COVID-19 Pandemic

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Abstract This study aims to evaluate university students' daily activities and the effect of physical activity on physical fitness, especially during the COVID-19 pandemic. This research used comparative and correlational research methods. Thirty research samples consisted of 13 junior year university students and 17 senior year university students were selected by the purposive sampling method. Every student was monitored for their daily activities for one week and categorized into sports, college, organization, and other activities. Physical fitness was measured using the MFT test to measure the VO_2Max in ml/kg/min units. The data analysis results showed no significant difference between junior and senior semester students in VO_2Max , physical exercise, organizational activities, lecture activities, sleeping, and other activities. There was a significant difference in VO_2Max and physical exercises ($sig < 0.05$) between genders. Male students spent more time exercising (17.87 ± 11.1) than female students (10.80 ± 6.04). Furthermore, male students had a higher average VO_2Max (42.38 ± 7.53) than female students (29.36 ± 6.07). Based on the regression analysis results, there is a significant value between physical exercises and sleeping toward VO_2Max capacity ($sig. < 0.05$).

Keywords Physical Fitness, Higher Education,

Physical Activities

1. Introduction

Physical fitness can be used as an indicator of a person's health [1] because it is closely related to health and quality of life [2]. Physical fitness has at least two health-related domains, such as cardiorespiratory capacity and body composition [3]. However, other components of physical fitness include body composition, muscle endurance, muscle strength, agility, and flexibility [4]. Balance, coordination, reaction time, and speed are components of physical fitness in performing motor skills [5].

Good physical fitness will support cognitive function and quality of life [6]. The physical fitness component associated with academic achievement is cardiorespiratory fitness [7]. Physical fitness also positively impacts motor skills [8], for example, the flexibility component, which relates to maximum joint range of motion without causing injury [9]. Agility is a physical fitness component in changing the direction of body position quickly [10]. Strength is also a critical component influenced by physical fitness [11].

VO_2Max describes as a level of physical fitness,

especially cardiorespiratory capacity [12]. VO_2Max is also used to assess cardiorespiratory fitness, aerobic function, and overall health risk [13]. Furthermore, VO_2Max is an excellent predictor of avoiding the risk of disease morbidity and mortality [14]. In professional athletes, VO_2Max is very much needed to improve performance. A good level of physical fitness will support the achievement of optimal results [15]. The factors that affect VO_2Max are age, gender, exercise state, blood pressure, and heart rate [16].

Physical activity has a vital role in physical fitness [17]. However, other factors such as sleep duration [18] and other daily activities can also influence physical fitness, potentially affecting a person's quality of life [19]. Physical activity is influenced by the intensity, frequency, and duration of physical activity [20]. The most prevalent physical activities throughout the pandemic included high-intensity interval training (HIIT). HIIT can increase VO_2Max and affect muscle endurance [21]. High-intensity interval training (HIIT) is also often used to reduce body mass [22].

Functional training is a new approach to physical exercise which can improve oxygen consumption and quality of life [23]. These exercises can improve functional performance in older adults [24]. In addition, there is body combat training which can be applied with music. It significantly increases positive feelings, reduces negative emotions, and becomes a source of motivation to comply

with physical exercise [25]. Tabata is also an alternative exercise that everyone at home can do because Tabata exercises can provide various benefits in improving the components of physical fitness [26]. Movements or modalities such as squat jumps, stair running, or cycling were performed for 20 seconds with maximum effort with 10 seconds of rest for eight total cycles [27].

Daily activities are the number of activities that a student in a particular time must complete. In the context of this research, students' daily activities are all activities and responsibilities that the student must carry out. It is related to the activities carried out in physical exercise, organizational activities, lecture activities, sleeping, and other activities. Student daily activities are associated with student workload. Furthermore, it needs to be considered because it can affect student stress levels [28]. Balancing students' daily activities could influence the student's achievement and productivity. A positive relationship between workload and academic stress was also found in students [29].

This study aimed to compare the daily activities between students' study levels (junior and senior students) and gender (male and female students). Furthermore, the pattern of student daily activities (physical exercise, organizational activities, lecture activities, sleeping, and other activities) was correlated with students' physical fitness based on a predetermined sample group.

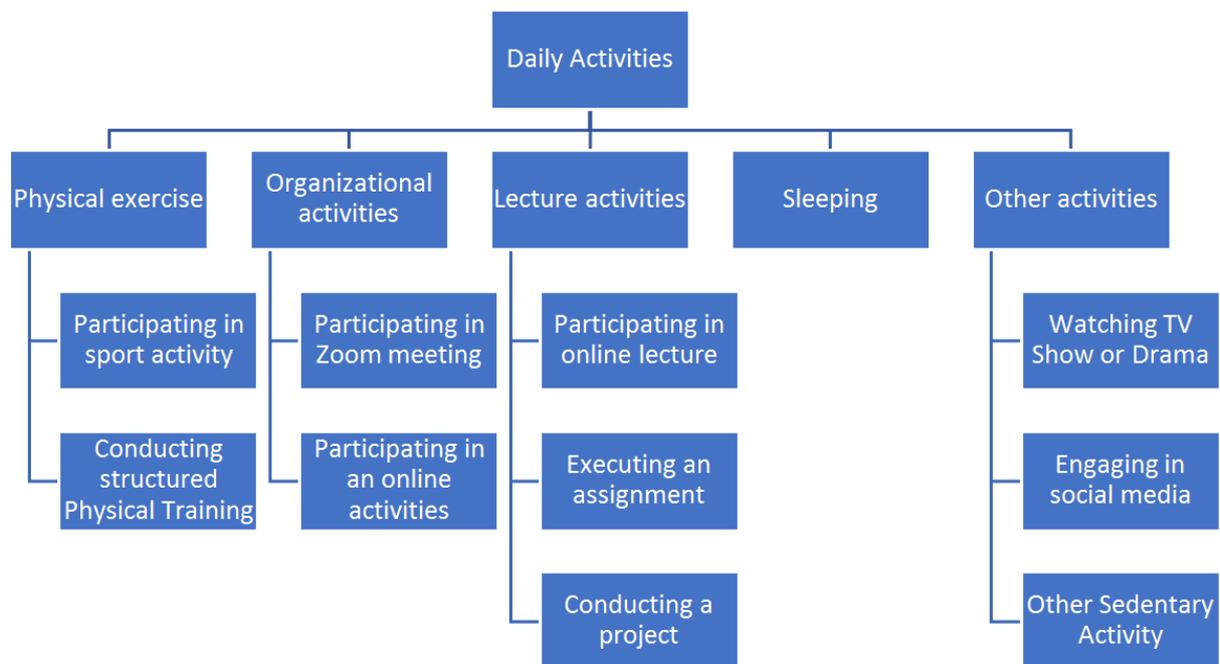


Figure 1. Student Activities during the Pandemic

2. Materials and Methods

A. Types of research

Based on the problems and objectives described previously, this research used comparative and correlational research methods. Thirty students with an average age of 20.19 ± 0.81 years were chosen to participate by purposive sampling. The groups are divided according to study level and gender (Figure 2). There were 13 junior students and 17 senior year students, as well as 15 male students and 15 female students participated in this study. Participants are evaluated between groups based on their VO_2Max , physical exercise, organizational activities, lecture activities, sleeping, and other activities as independent variables (Figure 1). The data were analyzed to determine differences and correlations in students' daily activities and physical fitness using the parametric and non-parametric test in SPSS 24.

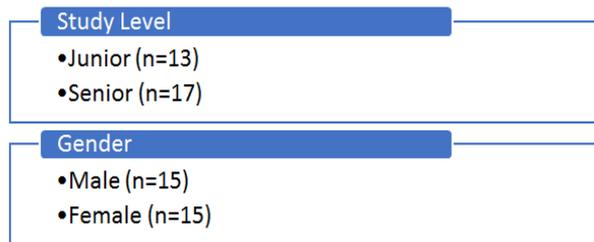


Figure 2. Sample Group

B. Implementation Procedure

Physical fitness was measured using a multistage fitness stage (MFT) to see VO_2Max in ml/kg/min. Physical exercise is measured by the duration of participating in sports activity and conducting structured physical training. Daily activities were measured using a workload form that

identifies daily activities into five categories: physical exercise, organizational activities, lecture activities, sleeping, and other activities. The workload form is filled out every day for one week by calculating the duration of the activity in hours. Furthermore, independent t-test, Mann-Whitney U test, and one-way ANOVA test were carried out to determine differences among sample groups. Correlation and regression tests were also conducted to see the relationship between physical activity and daily activities on physical fitness.

3. Results and Discussion

Based on the normality test results, the data on sports activities, organization activities, other activities, and VO_2Max had a normal data distribution. On the other hand, the data on lecture activities, sleeping activities, and other activities do not have a normal data distribution (Table 1). The parametric test is performed for data with a normal distribution, and non-parametric is used for data that is not normal.

The difference test was conducted to see the differences in the sample groups by semester (Table 2). From the independent t-test and Mann Whitney test analysis, it can be seen that there is no significant difference between early semester students and final semester students in VO_2Max , sports activities, organizational activities, lecture activities, and other activities. Different tests to see differences in sample groups based on gender showed a significant difference in VO_2Max and sports activities ($sig < 0.05$). Male students spent more time exercising (17.87 ± 11.1) than female students (10.80 ± 6.04). And male students had a higher average VO_2Max (42.38 ± 7.53) than female students (29.36 ± 6.07).

Table 1. Research Sample

Variable	N=30	Average					
		Physical exercise	Lectures	Organization	Sleeping	Other	VO_2Max
Junior	13	15.30±10.5	35.53±15.11	15.00±7.34	55.00±4.34	40.15±19.16	36.52±9.27
senior	17	13.58±8.92	38.70±24.93	15.35±12.75	57.25±6.75	38.88±19.17	35.37±9.8
Man	15	17.87±11.1	34.00±21.16	15.20±9.57	54.70±9.57	36.60±16.53	42.38±7.53
Woman	15	10.80±6.04	40.66±20.98	15.20±11.86	56.31±7.86	42.26±21.16	29.36±6.07
Normality test		0.200*	0.001	0.060*	0.008	0.060*	0.200*

*Data declared normal (Sign. > 0.05)

Table 2. Different Test Based on Semester and Gender of Students

Variable	Semester		Gender	
	Sig.	Description	Sig.	Description
VO_2Max	0.784	Not significant	0.000	Significant
Physical exercise	0.632	Not significant	0.039	Significant
Organization	0.400	Not significant	0.632	Not significant
Lectures	0.660	Not significant	0.280	Not significant
Sleeping	0.120	Not significant	0.230	Not significant
Other	0.858	Not significant	0.420	Not significant

Regular physical activity is related to one's physical fitness [17]. So that in the different test results between groups of women and men, it can be seen that differences in exercise duration impact physical fitness. Moreover, previously published research established that gender differences in VO₂Max were due to differences in BMI, Body Fat, Hemoglobin levels [30], and cardiac size difference between genders [31]. Physical fitness is not only influenced by physical activity but also daily activities carried out [19]. During a pandemic, physical activity is also helpful in activating the work of immune components [32]. Sports activities directly contribute to the element of physical fitness [33]. Several studies described a significant reduction of physical activities and increased sedentary behavior during the pandemic [34], [35]. In our investigation, activities like online lectures and other activities can be considered sedentary. There is no significant difference in other daily activities, online classes, sleeping, and organizational activities across genders and study levels in this study. There is also no meaningful relationship between these variables with physical fitness.

On the contrary to this study, one study demonstrated that a sedentary lifestyle during a pandemic appears to have a negative relationship with cardiorespiratory fitness [36]. These differences might be due to the low number of samples and the duration of the students' physical exercise weekly. Weekly exercise duration affected VO₂Max, resting metabolic rate, and anaerobic threshold, all indications of an individual's physical capabilities and health. These levels grew in proportion to the quantity of exercise performed individually [37]. According to physical activity standards, adults are urged to engage in moderate aerobic physical activity for at least 150 minutes each week, or 75 minutes of high-intensity exercise [38].

Physical fitness can support adolescents' level of attention and concentration [39]. Physical fitness also impacts cognitive abilities and autonomic functional capacity [6]. This cognitive ability is closely related to lecture activities. However, no significant difference was found between the male and female sample groups in lecture activities. This lecture activity is related to the time allocated for lectures, either taking online classes or doing college assignments. Although no significant difference was found, the sample group of women spent more time (40.66 ± 20.98) doing recovery activities than men (34.00 ± 21.16). The characteristics of lecture activities dominated by sedentary activities also can potentially cause the VO₂Max of the female sample group to be lower than that of the male sample.

Regression tests were carried out to see the relationship between variables, especially student workloads, during the pandemic on VO₂Max (Table 3). Based on the data analysis results that have been carried out, there is only a significant value between sports activities and VO₂Max (sig. 0.001) and sleeping duration with VO₂Max (sig. 0.027). One previous study demonstrated variances in

VO₂Max when subjected to different amounts of exercise during regular hours. Different exercises performed regularly have a beneficial effect on VO₂Max and resting metabolic rates [37]. Moreover, another study concluded that the intensity, frequency, and duration of leisure-time physical activity are linked with VO₂Max [40]. On the other hand, no significant value was found between organizational activities, lectures, and other activities on VO₂Max (sig. > 0.05).

Table 3. Test the Relationship between Variables

Variable	Sig.	Description
Physical exercise - VO ₂ Max	0.001	Significant
Sleeping - VO ₂ Max	0.027	Significant
Organization - VO ₂ Max	0.614	Not significant
Lectures - VO ₂ Max	0.314	Not significant
Other - VO ₂ Max	0.290	Not significant

Although physical activity is essential in managing the body's fitness level, it is necessary to pay attention to its capacity so that fatigue does not occur and the body avoids further damage [41]. Our study showed that aside from Physical exercise, sleeping duration also has a meaningful correlation with VO₂Max (sig. 0.027). The investigation regarding the correlation between sleeping and VO₂Max showed the varied result. Our finding is in line with a previous study that demonstrated that quality and duration of sleep also impact a person's physical fitness [18]. Moreover, another research showed that sleep length and quality are linked to performance during the maximal incremental test in healthy males [42]. In another study, it was stated that in middle-aged men, there was a moderate but statistically significant correlation between insomnia and reduced VO₂Max [43]. Sleep deprivation was connected with a reduced CRF [44]. However, according to another study, there was no significant link between sleep duration and VO₂Max values [45]. This varied result might be due to the low number of samples and differences in the methods. A more detailed study with a more significant sample is needed to elucidate the relationship between sleeping and cardiorespiratory fitness as measured by VO₂Max.

The ability possessed by the body plays a vital role in supporting daily activities. By having the maximum ability of the body, any activities and activities carried out can run smoothly [46]. The ability of the human body to carry out its activities is influenced by the structure of its physical condition [47]. A person with a low level of physical fitness will be susceptible to disease [48] and interfere with daily activities [49], which in turn can reduce the quality of life [50]. Therefore, cardiorespiratory capacity needs to be supported by physical activity [51]. During physical activity, maximal oxygen uptake (VO₂Max) occurs, which is limited by the ability of the cardiorespiratory system to deliver oxygen to the exercising muscles [52]. The uptake

of oxygen in working muscles affects the maximum volume (VO₂Max) processed by the body [53]. When dealing with the present and ongoing COVID-19 pandemic, university students can benefit from a series of practical tips on how to stay active both outside and inside their buildings [54]. On a practical level, universities might advise or encourage students to participate in physical activity to maintain their physical fitness during the epidemic.

4. Conclusions

There were no differences in student physical activity and daily activities, especially between junior and senior students. Differences in physical activity and VO₂Max were found based on gender, particularly VO₂Max and physical exercises (sig < 0.05). Male students spent more time exercising (17.87 ± 11.1) than female students (10.80 ± 6.04). Furthermore, male students had a higher average VO₂Max (42.38 ± 7.53) than female students (29.36 ± 6.07). Moreover, the relationship between daily activities and physical activity on student physical fitness was a significant correlation between physical exercises and sleeping toward VO₂Max capacity, especially during a pandemic.

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