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#### **Kenneth Samonte**

College of Education, Nueva  
Ecija University of Science and  
Technology, San Isidro, Nueva  
Ecija, 3106, Philippines

#### **Pastora de Guzman**

College of Education, Nueva  
Ecija University of Science and  
Technology, San Isidro, Nueva  
Ecija, 3106, Philippines

#### **Maria Theresa dela Cruz**

College of Education, Nueva  
Ecija University of Science and  
Technology, San Isidro, Nueva  
Ecija, 3106, Philippines

#### **Neriza Suarez**

College of Education, Nueva  
Ecija University of Science and  
Technology, San Isidro, Nueva  
Ecija, 3106, Philippines

#### **Rosenell Flores**

College of Education, Nueva  
Ecija University of Science and  
Technology, San Isidro, Nueva  
Ecija, 3106, Philippines

#### **Glexim del Rosario**

College of Education, Nueva  
Ecija University of Science and  
Technology, San Isidro, Nueva  
Ecija, 3106, Philippines

#### **Corresponding Author:**

##### **Kenneth Samonte**

College of Education, Nueva  
Ecija University of Science and  
Technology, San Isidro, Nueva  
Ecija, 3106, Philippines

## **Body mass index in relation to level of physical exercise of teacher education students**

**Kenneth Samonte, Pastora de Guzman, Maria Theresa dela Cruz, Neriza Suarez, Rosenell Flores and Glexim del Rosario**

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### **Abstract**

Covid-19 pandemic measures, including lockdown and school closure, possibly affect students' physical activity status. This study aims to describe the body mass index to the level of physical exercise of teacher-education students. The study used the descriptive correlational design method. Pearson  $r$  was used to measure the relationship between body mass index and level of physical exercise. A total of 630 students participated in the study. Body mass index revealed that 53.4% and 51.3% were normal for male and female respondents, respectively. Among males, the prevalence of underweight, overweight, and obesity was 24.4%, 15.3%, and 6.9%, while females were 36.9%, 9.2%, and 2.6%. Male students reported exercising two to three times a week (27.5%), while females reported exercising once a week (31.9%). In contrast, 14.5% and 14.6% among male and female respondents, respectively, reported that they never exercised. The study showed a positive correlation between the level of physical exercise and body mass index  $r=0.094$ ;  $p<0.018$ . It is recommended that continuous exercise at home is highly encouraged until such government measures are lifted. Moreover, further studies are conducted on other factors associated with BMI.

**Keywords:** body mass index, physical exercise, underweight, overweight, obesity

### **1. Introduction**

The Covid-19 pandemic brought a massive change in people's lives worldwide. Extensive social distancing programs are in place around the world <sup>[1]</sup>, restricting people's everyday activities <sup>[2]</sup>, and governments are instructing everyone to maintain safety and remain at home <sup>[3]</sup>. This ensures that the majority of the people will spend their time at home. Moreover, in response to the COVID-19 pandemic, worldwide actions and measures were employed by the government, including lockdown, school closures, social distancing recommendations, and quarantine, aiming to limit the spread of the virus as well as a reduction in the pressure on the government health care systems <sup>[4]</sup>. Therefore, more than 2.6 billion individuals were forced to home quarantine <sup>[5]</sup>. Those circumstances led people to change their lifestyle, consuming a large amount of food, and fewer chances to be active physically, particularly if the government is restricting these activities such as walking, jogging, and going to the gym to limit the spread of the COVID-19. The forced lockdown, resulting in the shutting of public places, activity centers, fitness, and social life, has hampered various facets of people's lives, including fitness routines. Moreover, these actions also make it so much easier to be inactive at home for long periods. The influence of this physical inactivity may be resulted in other health concerns <sup>[6]</sup> and could be associated with overweight and obesity <sup>[7]</sup>.

Research studies on obesity and overweight show that the prevalence has amplified worldwide over the last decades <sup>[8]</sup>. Overweight people currently account for one-third of the world's population, and all indicators point to an increase in the coming years <sup>[9]</sup>. Given the many and extensive adverse health effects, what may be referred to as the global obesity epidemic is an apparent public health issue, particularly in this time of the pandemic.

According to World Health Organization <sup>[10]</sup>, obesity is better reflected by either an inability to regulate energy intake or a failure to allocate adequate energy. While the perceived importance of these factors is constantly being discussed <sup>[11]</sup>, there's a widespread agreement that a

sedentary lifestyle is among the most significant predictors for an increase in Body Mass Index (BMI) [12]. Amidst health promotion efforts to encourage people to exercise and eat healthy food, no country has managed to change the levels of obesity observed for the last three decades [13]. Moreover, due to the COVID-19 pandemic happening worldwide, the obesity rate rises due to lockdown; thus, prevention of obesity and promotion of physical activity is at least as necessary [14].

Undergraduate students may be highly susceptible to a sedentary lifestyle, as much of their education consists of online and remote learning. Undeniably, research studies have recommended that university students are equally highly sedentary [15], and highly active [16]. However, most studies in this area have been performed on young university students, emphasizing the change among late adolescence and young adulthood. The degree to which the relationship between physical activity and BMI varies in the student population is less known. Strengthening our understanding of these issues in college populations may be incredibly significant, as sedentary behavior during this age could cause a risk of poor health. Therefore, this study aims to: 1) assess the current level of physical exercise among teacher education students; 2) measure the Body Mass Index (BMI), and; 3) examine the relationship between the body mass index and the level of physical exercise.

## 2. Materials and Methods

### 2.1 Design and subjects

This study used a descriptive correlational design to examine data through quantitative methods [17]. The study population included students from the College of Education programs at the Nueva Ecija University of Science and Technology-San Isidro Campus. The study sample was calculated using non-probability sampling, particularly quota sampling. Accessible primary data from student-respondents was used in this study until the requested sample size (N=630) was reached. This type of sampling method was chosen since it was the most suitable and convenient method to collect data during this pandemic. A total of 630 teacher education students participated in the study. The Data was collected utilizing an electronic questionnaire, mainly google forms disseminated to students through Facebook and Messenger groups. This study was permitted by the chairperson of the College of Education. The researchers used informed permission from the

respondents and applied the confidentiality of the information.

### 2.2 Instruments

The instrument consists of three (3) sections. The first section focuses on the respondents' demographic information such as age, sex, academic program, and year level. The second section measures the Body Mass Index (BMI). The BMI was calculated by dividing the reported body weight (kg) over the squared height (m<sup>2</sup>) [18, 19]. The BMI was divided into four groups: underweight (< 18.5), normal weight (18.5–24.9), overweight (25.0–29.9), and obesity (≥ 30). The third section measures the level of physical exercise of teacher education students. Physical exercise was assessed using three (3) sets of questions that have been used in the large population-based study, measuring the average number of times exercising (weekly), the average intensity. The average hours [20]: 1) "How regularly do you exercise?" (1- Never, 2- Less than once a week, 3- Once a week, 4- 2–3 times per week, 5- Almost every day); 2) Duration - "If you do such exercise as regularly as once or more times a week: How hard do you push yourself? (I take it easy without breaking into a sweat or losing my breath, I push myself so hard that I lose my breath and break into a sweat, I push myself to near-exhaustion); and 3) Intensity - "How long does each session last?" (Less than 15 minutes, 15–29 minutes, 30 minutes to 1 hour, More than 1 hour".

### 2.3 Statistical analysis

Researchers used IBM Statistical Package for Social Sciences (SPSS) 24 and Microsoft Excel 2019 for all data analysis. The demographic profile of the student-respondents and their level of physical exercise were described using Frequency and Percentage. The Pearson r was applied to investigate the relationship between the computed BMI and the level of physical exercise.

## 3. Results & Discussion

### 3.1 Demographic Profile

A total of 630 teacher education students participated in the research study. According to the demographic profile, 499 were females, and 131 were males. Most of the students were 16 to 20 years old (70.30%). The highest number of populations were from Bachelor of Secondary Education (49.20%), while 43.30% of the study population were second-year level (Table 1).

**Table 1:** Demographic profile of the study population (N = 630)

Variable	Number (%)
<b>Age</b>	
16-20	443 (70.30)
21-25	167 (26.5)
26-30	7 (1.10)
31 and above	13 (2.10)
<b>Sex</b>	
Male	131 (20.80)
Female	499 (79.20)
<b>Academic Program</b>	
Bachelor of Secondary Education (BSEd)	310 (49.20)
Bachelor of Elementary Education (BEEd)	160 (25.40)
Bachelor of Physical Education (BPEd)	113 (17.90)
Bachelor of Science in Industrial Education (BSIE)	47 (7.50)
<b>Year Level</b>	
First Year	188 (29.80)
Second Year	273 (43.30)
Third Year	152 (24.10)
Fourth Year	17 (2.70)

### 3.2 Body Mass Index

The body mass index results revealed that 53.40% and 51.30% were normal for male and female respondents, respectively. Among 131 males, the prevalence of

underweight, overweight, and obesity was 24.40%, 15.30%, and 6.90%, while in 499 females, the prevalence was 36.90%, 9.20%, and 2.60% (Figure 1).

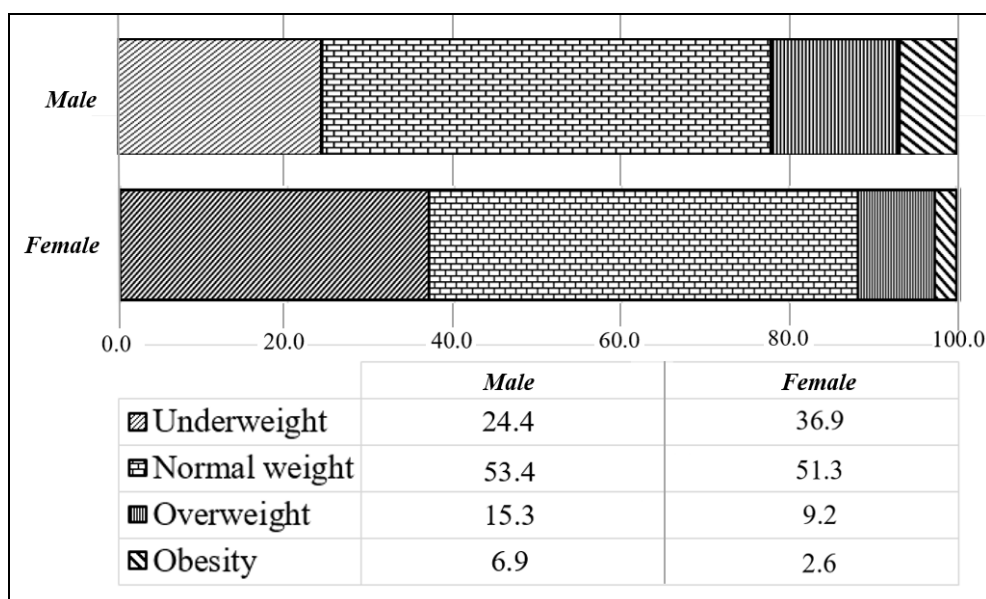


Fig 1: Body Mass Index (BMI) of the study population

### 3.3 Level of Physical Exercise

About 27.50% of male students reported exercising two to three times a week, while 31.90% of females reported exercising once a week. In contrast, 14.50% and 14.60% among male and female respondents, respectively, reported that they never exercised. In terms of intensity of exercise, nearly half of the students (40.50% in males and 47.90% in females) reported "taking it easy without breaking into a sweat or losing their breath." Additionally, 33.60% and 30.30% of the male and female respondents reported "pushing

themselves so hard," while 11.5% of males and 6.80% of females reported "pushing themselves to near-exhaustion." With regards to the duration of exercise, 31.30% of male student-respondents reported an average exercise duration of 15 to 29 minutes, whereas 40.30% of females reported a duration of fewer than 15 minutes. Only 5.3% and 0.6% among male and female students, respectively, reported an average exercise duration of more than 1 hour (see Figure 3 for details).

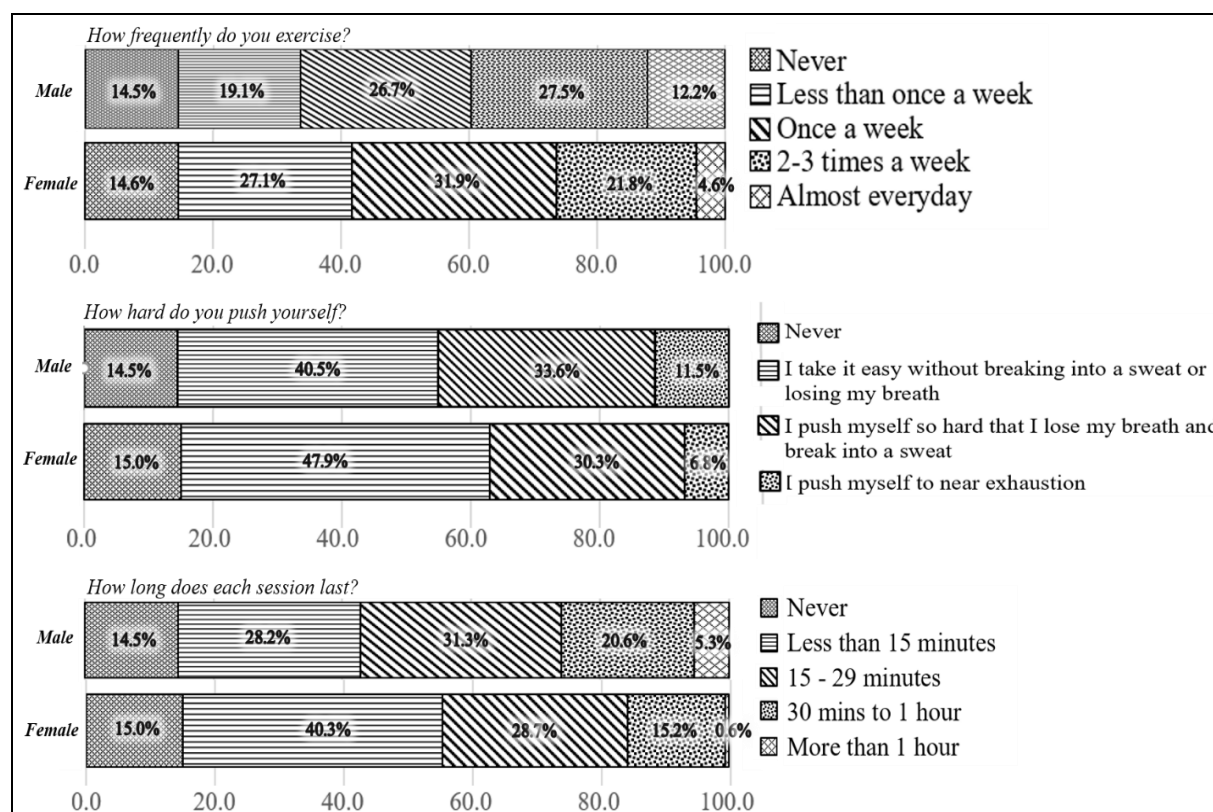


Fig 3: Level of Physical Exercise



### 3.4 Correlational Analysis between body mass index and level of physical exercise

Table 2 revealed the correlational analysis between the student's body mass index and their level of physical exercise. The results of Pearson's  $r$  revealed a positive correlation between the BMI and the level of physical exercise ( $r = .094$ ,  $p < .018$ ).

**Table 2:** Correlational analysis between body mass index and level of physical exercise

Variable	Level of Physical Exercise		
	r-value	p-value	I
Body Mass Index (BMI)	.094*	.018	P

\*Correlation is significant at the 0.05 level (2-tailed).

### 4. Discussion

Physical exercise among students is an essential element to improve physical health level and self-health ability and minimize the risk of serious health concerns during the pandemic. This study evaluated the body mass index (BMI) to the physical exercise of teacher education students.

The present data established that half of the student participants have normal BMI. The prevalence of underweight in female students (36.9%) was high compared to male respondents (24.4%). Slimness is a significant unnoticed phenomenon with wide variation in prevalence across industrialized countries [21]. Other researchers found out that the prevalence of underweight in university students is high [22]. The high prevalence proves that it is still present among adolescents and young adults [23]. This result in the prevalence of underweight for female participants was similar to the study conducted by Subhaluksuksakorn [24] on the prevalence of underweight among First-Year University Students in Thailand.

Nevertheless, there are different results in studies conducted in industrialized nations [25, 26] where male participants had higher prevalence rates of overweight and obesity than females. For this study, the prevalence of overweight and obesity was high in male participants with 15.3% and 6.9%, respectively, compared to female participants with 9.2% and 2.6%. This is comparable to a study conducted by [27] among students in Romania. The gender difference is common around the world. First, it is because of lifestyle factors. Males were even more likely to engage in unhealthy habits, including binge eating and excessive drinking [28]. Second, Females are much more concerned with their body composition and physical appearance, which led them to engage in activities to maintain and keep their weight [29]. Furthermore, most females desired to be slim by dieting [30]. On the contrary, only females in South Africa were becoming more overweight and obese [31].

Moreover, the findings of the current study showed that more than half of students frequently performed exercise. Only a few never performed exercise at least less than once a week, which implied that most students find a way to become physically active during pandemics. These exercises mean that students example go for a simple walk, jog, swim or participate in a sport. This result contradicted the study conducted by Puccinelli [32], where students' physical exercise was low during the pandemic. Moreover, Chen [33] believed that regular physical exercise is also considered to be effective in addressing the health outcomes of the COVID-19 pandemic while taking safety measures. In addition, since physical exercise is an effective form of medicine for promoting good health, preventing disease, and bolstering

immune function [34], immediate action is required to facilitate the COVID-19 pandemic [35].

The result of BMI was significantly correlated with the level of physical exercise, with the data showed a positive correlation ( $r = .094$ ,  $p < 0.05$ ). Since half of the participant's BMI was normal, this can be seen in their moderate exercise per week. This correlation may exist because those students may find it easier to be involved in regular physical activity despite pandemics despite their BMI. With the prevalence of underweight, overweight, and obesity among students, other factors should be considered. According to Nejadsadeghi [36], lifestyle factors affected BMI results and were directly related to obesity. One possible explanation is that university students have bad eating habits and insufficient nutrient intake, and a higher rate of underweight among university students. [37]. Additionally, other factors such as socioeconomic status [38], age, gender, and eating habits [39] are related to underweight among young adults and adolescents.

### 5. Conclusions and Recommendations

Following a thorough analytical study of the findings, most of the study population has a normal BMI. However, the prevalence of underweight in female participants was high compared to male counterparts. In contrast, male participants had higher prevalence rates of overweight and obesity than females. More than half of students frequently performed exercise, and only a few never performed exercise at least less than once a week. BMI was positively correlated to the level of physical exercise of students.

Furthermore, given that underweight, overweight, and obesity prevalence was present and observed, students who have an illness should consult a doctor concerning the most suitable exercises to help them recover strength and recommend the acceptable types of activity. Underweight students should start gaining weight and body mass by lifting weights, performing cardiovascular exercise, eat a high-calorie diet without turning to unhealthy fats and sugars, and aiming for a variety of nutrient-rich foods. Rates of students overweight and obesity and the diseases associated with them are highly preventable. WHO suggested limiting energy intake from total fats and sugars, increase consumption of fruit and vegetables, and engage in regular physical exercises (150 minutes a week for adults). More than half of the students reported exercising continuous physical exercise at home is highly encourage until such government measures are lifted. Moreover, further studies are conducted on other factors associated with BMI, such as socioeconomic status, lifestyle, food intake, age, and gender.

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