

The Relationship between Student Involvement with Sports Activities and Academic Achievement with Body Mass Index. : Case Study in Female Teacher Training College in Malacca, Malaysia

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Abstract

This study was conducted to investigate the relationship between BMI and student involvement in sports activities and the relationship between BMI and academic achievement. This case study was conducted in the PGK Malay with respondents consisting of 130 people. Findings were obtained with respondents filling in questionnaires that were distributed. This quantitative study was analysed using SPSS 26.0 using descriptive analysis and Pearson correlation analysis. The value of the coefficient $r = -0.043$ between BMI with academic achievement and the value of $r = 0.013$ between BMI with involvement in sports indicates that there is a very weak relationship between BMI with academic achievement and involvement in sports.

Keywords: Body Mass Index, academic achievement, involvement in sports

Introduction

The Malaysian Ministry of Health found that 5.5 million or 30.6% of Malaysians are overweight and obese. This worrying trend will further increase non-communicable

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diseases such as high blood pressure, diabetes, and cardiovascular disease and will further burden the country's finances to cover the expenses of the national health system (NHMS, IKU, MOH, 2016). The statistics have placed Malaysia as 10th in the world with the number of diabetics. The World Health Organization (WHO) has an objective to reduce that number to 800,000 by 2025. Hadi & Radzani, 2018). This shows that the trend of obesity among the people can be categorized as worrying. The level of obesity can be measured by obtaining the body mass index (BMI) of individuals using height and weight (Amira et al., 2019). The BMI calculation method is the weight of the individual in kilograms divided by the square height ($BMI = kg / m^2$). Based on the BMI value obtained, individuals will be categorized into four categories namely underweight, ideal weight, overweight and obese (Refer to Table 1: BMI Interpretation by Hadi and Radzani, 2018)

Literature Review

Malaysians are now advised to lead a healthy lifestyle with the slogan "Healthy Body, Smart Brain". Individuals who exercise or do physical activity to some extent can enlighten their minds. The intelligent mind is synonymous with the active body. According to Azrina et al. (2017), individuals who do daily exercise and stretching activities will not get tired quickly and will always be active in co-curricular activities at school, college, or university. This statement says that there is a relationship between physical intelligence and mental intelligence. In addition, obese children face physical problems that can reduce academic achievement (Allen, 2005; Tan, 2006). Previous studies have reported that athletes in schools achieve better grades (Syed et al., 2018). Although athletes at school spend a lot of time with physical activity, their achievement in exams is also very satisfactory.

Suxing et al. (2015) found that BMI is related to physical ability. If students have a high BMI, students tend to have poor physical fitness due to constraints from weight while doing physical activities. Physical activities such as athletics, hiking, and extreme activities are known to have a positive influence on concentration, memory, and behavior and improve one's mental intelligence.

Physical activity performed by individuals will have an impact on academic performance and personality (Syed, et al., 2018). This shows that physical activity can affect a person's academic performance and personality. The personality in question is to have an ideal body shape with a good BMI. Students with a good BMI are often said to be healthy and have good physical intelligence compared to obese students (Suxing et al, 2015).

BMI is also influenced by eating patterns and metabolic rate (Khaled, 2017). Therefore, researchers argue that BMI is not the only measure that can be used to measure the level of intelligence. In other words, a person with a good BMI does not necessarily have a good level of intelligence and therefore good academic achievement. Tan (2006) found that

there is no significant relationship between BMI and academic achievement. However, that study is dated and further research is required to study the relationship between BMI and the current academic achievement of students.

This study investigated the relationship between BMI, academic achievement, and achievement in sports activities of students at the Institute of Teacher Education, Malaysia Kampus Perempuan Melayu (IPGK PM).

Objectives of the study

- i. Study the BMI distribution of IPGK PM students.
- ii. To study the involvement of IPGK PM students in physical and sports activities.
- iii. To study the relationship between BMI and academic achievement of IPGK PM students
- iv. To study the relationship between BMI and the involvement of IPGK PM students in sports activities.

Research Methodology

1. Population and Study Sample

1.1 Study Population

Researchers selected IPGK PM students enrolled in academic years 2016 and 2018 who were in their third and fourth year studying in the Bachelor of Teaching Program (PISMP) at IPGK PM in 2020. The justification of selection of these two groups of students was because they were at IPGK PM more than four years and can represent the PM's IPGK in sports activities at the Melaka and National levels. There are a total of 105 students taken in the 2016 cohort and 84 students in the latter for a total population sample of 189.

1.2 Study Sample

Based on the table of Krejic and Morgan (1970), the minimum number of samples required to represent the study population was 127 respondents. Therefore, the researchers have collected a total of 130 respondents.

Table 1

Respondents based on years

	Frequency	Percentage	Cumulative Percentage
Year 3	54	41.5	41.5
Year 4	76	58.5	100.0
Total	130	100.0	

Based on Table 1, there are 54 respondents consisting of 41.5% of the total sample in year 3 and 58.5% in year 4.

Table 2

Sample based on class

	Frequency	Percentage	Cumulative Percentage
Special Education	48	36.9	41.5
History	35	26.9	63.8
Arabic	12	9.2	73.1
Pre School	28	21.5	94.6
Recovery	7	5.4	100.0
Total	130	100.0	

Data Analysis

Data collected through the distribution of questionnaires were analysed using Statistical Package for Social Science 26.0 to study the relationship between student achievement in academics with BMI as well as student involvement in sports activities with BMI. Therefore, researchers used the interpretation of BMI according to Amirul Hadi and Ahmad Radzani (2018) as follows.

Table 3

BMI Interpretation by Amirul Hadi and Ahmad Radzani (2018)

Interpretation	BMI
Under Weight	< 18.5
Normal Weight	18.5 – 24.9
Over Weight	25.0 – 30.0
Obese	> 30.0

For data analysis, the researchers used Table 3 in interpreting the BMI of the respondents in this study.

Normality Distribution Analysis

At the first stage of data analysis, the researchers conducted a normality distribution test to determine which test to use (a parameter test or a non-parameter test). The normality distribution test was used on the dependent variables i.e. involvement in sports activities and the latest examination results of the study respondents.

There are two normality tests used, namely the Kolmogorov-Smirnov test and the Shapiro-Wilk test. The Kolmogorov-Smirnov test for is for respondents less than 200 (Khaled, 2017). Since only 130 samples were used, the researchers chose the results of the Kolmogorov-Smirnov test.

Table 4

Normality Test Involved in Sports

Involvement in sports	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
	.343	130	.000	.753	130	.000

Based on the Kolmogorov-Smirnov normality table, the researchers found that the statistical value of .343 with a significant value of 0.000 showed that the distribution of data of respondents' involvement in sports activities is fulfilling the normal distribution.

Table 5

CGPA Normality Test

CGPA	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
	.079	130	.048	.973	130	.012

Based on the Kolmogorov-Smirnov normality table, the researchers found a statistical value of .079 with a significant value of 0.048. Since the significant value is less than .050 meals, the distribution of respondents' examination achievement data meets the normal distribution.

Since both dependent variables meet the normality distribution, the researchers proceeded to analyse the study findings using descriptive analysis and inference analysis using parameter tests. Descriptive tests were used to show data such as student BMI distribution, student achievement, and involvement in sports activities. Inference tests were used to study the relationship between BMI and academic achievement as well as the relationship of BMI with student involvement in sports activities.

Data Analysis

Based on the results of the Kolmogorov-Smirnov normality test , the researchers found that the data collected met normality distribution. Therefore, the researchers used the parameter test, which is the Pearson correlation test to study the relationship between BMI and students' academic achievement.

Descriptive Analysis

Table 6

Student BMI Distribution

	Frequency	Percentage	Cumulative Percentage
Under weight	30	23.1	23.1
Normal weight	76	58.5	81.5
Over weight	16	12.3	93.8
Obese	8	6.2	100.0
Total	130	100.0	

Based on table 6, of the 130 respondents, there were 30 students who were categorized as underweight representing 23.1% of the study sample. Seventy-six respondents were categorized as having an ideal weight (58.5%).

Sixteen respondents representing 12.3% were overweight while eight respondents (6.2%) were obese.

Table 7

Student Involvement with Sports Activities

	Frequency	Percentage	Cumulative Percentage
1. Non Involvement	37	28.5	28.5
2. IPG level	73	56.2	84.6
3. State Level	4	3.1	87.7
4. National Level	16	12.3	100.0
Total	130	100.0	

Based on table 7, 37 respondents (28.5%) were not involved in sports activities during their studies at IPGK PM. These students can be considered inactive students because during the three to four years of study at IPGK PM, they were not involved in sports activities organized at the IPG level. These students will be categorized with a value of 1 in the correlation analysis.

There were 73 respondents (56.2%) involved in sports activities at the IPGK PM level such as inter-netball competitions between classes, IPGK PM Annual Athletics Tournament, and sports carnivals organized at IPGK PM. This group will be categorized as value 2 in the next correlation analysis. For state level sports activities, there were four respondents (3.1%) involved in Melaka State Athletics and Racing Championship, Melaka State Netball Competition, and Melaka State Volleyball Championship.

A total of 16 respondents (12.3) participated in sports activities at the national level such as the Malaysian Teachers Carnival (KAGUM), Orphan Sports Carnival, and E-Sport organized by IPGM. These 16 respondents were categorized as students who were very active in sports and were given a score of 4 in this study.

Table 8

Student Academic Achievement

		Statistic	Std. Error
CGPA	Mean	3.699	.00958
	Median	3.710	
	Variance	0.012	
	Std. Deviation	0.109	
	Minimum	3.40	
	Maximum	3.89	
	Range	0.49	

For academic achievement, researchers use descriptive tables. Based on table 8: (Student Academic Achievement), the minimum CGPA value is 3.40 while the maximum CGPA value is 3.89 making the CGPA score range 0.49. This shows the CGPA value of all study respondents scattered between 3.40 to 3.89. The mean for the CGPA value is 3.69 and the median is 3.71. The standard deviation value is 0.109, indicating the distribution of CGPA values close to the mean and median values.

Inference Analysis

There are several inference tests that can be used, namely T-Test, Correlation Analysis, Kruskal-Wallis Test, and Median Sample Test. Before conducting the correlation test, the researchers conducted a normality test to identify whether to use inference analysis with a parameter test or non-parameter test. Based on table 8 and table 9, both variables met the distribution of normality. Therefore, the researchers chose the Pearson Correlation analysis, which is a parameter test to identify the relationship between BMI with involvement in sports activities and the relationship between BMI and CGPA.

Table 9

Pearson Value Interpretation

R	Interpretation
0.00 – 0.19	Very weak
0.20 – 0.39	Weak
0.40 – 0.59	Medium
0.60 – 0.79	Strong

0.80 – 1.00	Very strong
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Source: Amira, Sarina and Suhana (2019)

There are various interpretations of Pearson correlation values according to previous studies. To adapt this study to the interpretation obtained, the researchers referenced the study of Amira, Sarina, and Suhana (2019) as a benchmark for the interpretation of Pearson values. The researcher analysed the relationship between the dependent variable and the independent variable using the Pearson Correlation Interpretation value based on Table 10.

Table 10

Pearson BMI Correlation Value with CGPA

		CGPA
BMI	Pearson Correlation	-0.043
	Sig. (2-tailed)	0.627
	N	130

Based on table 10, the Pearson correlation value between student CGPA value and student BMI is $r = -0.043$ based on $N = 130$ and significant value, $p = .627$ shows no significant relationship between student BMI and student CGPA. In addition, the very low value of the coefficient r between BMI and CGPA shows that CGPA is not influenced by students' BMI.

Table 11

Pearson BMI Correlation Values with Sports Participation

		Involvement in Sports
BMI	Pearson Correlation	0.013
	Sig. (2-tailed)	.887
	N	130

Based on table 11, the Pearson correlation value between student CGPA value and student BMI is $r = 0.013$ based on $N = 130$ value and significant value, $p = .887$ there is no significant relationship between BMI and involvement in sports activities. The value of $r = 0.013$ also indicates a very weak relationship between BMI and student involvement in sports activities.

In conclusion, based on the correlation value between BMI and academic achievement ($r = -0.043$) and the correlation value between BMI with involvement in sports ($r = 0.013$) there is a very weak relationship between BMI with academic achievement and involvement in sports. The results of this correlation test will be discussed in more depth.

Discussion

In the literature review section of this study, researchers found several studies indicating a relationship between physical intelligence and student knowledge (Syed, et al., 2018; Allen, 2005; Suxing et al, 2015). In addition, Suxing et al. (2015) found a relationship between BMI and a person's level of physical intelligence. Therefore, the researcher conducted this study to study the relationship between BMI and students' academic achievement to combine the two findings of the previous study.

Based on the data that was analysed using the Pearson correlation analysis test, the researchers found no significant relationship between BMI and student involvement in sports activities. This finding is supported by Tan (2006) who found no significant relationship between achievement in sports activities with BMI.

The value of the coefficient p on the relationship between academic achievement represented by the CGPA value with BMI also showed no significant relationship between these two variables. These findings also support the findings of Rees and Sabia (2010) that there was no clear correlation between sports and academic performance.

Syed et al. (2018) also found a small correlation between physical activity and academic performance. This study also found that BMI did not affect students' academic achievement and student involvement in sports activities.

However, according to Azrina et al. (2017) most intelligent and talented students who have high marks in biology subjects, have a level of physical fitness of the active category. This shows that students who have a healthy level of physical fitness to some extent help students in achieving good results. The researchers found that the study of Azrina et al. (2017) was conducted in a Smart Gem Center that gathers a group of intelligent students. Thus, it is certain that their study sample consisted of intelligent students and found correlation value between physical fitness and achievement in biology subjects.

Suxing et al. (2015) claimed BMI is related to physical ability. If students have a high BMI, then students will have difficulty doing physical activities thus making it difficult for them to get good academic achievement. However, a good BMI is not a determinant of an individual's level of physical fitness. An individual can have a good BMI with nutritional patterns or have a high metabolic rate, but in terms of fitness, students need to engage in sports activities to have a healthy body and brain.

Conclusion

The "Healthy Body Healthy Brain" slogan is always highlighted to encourage Malaysians to engage in physical activity and sports in living a healthy life. Many think that individuals with a good BMI have a good level of health. However, based on this study,

the researchers found that the BMI of the respondents did not have a significant relationship with academic achievement and involvement in sports activities.

Therefore, a good BMI is not a determinant of an individual's fitness level because BMI is not only influenced by physical activity alone, but also influenced by a person's metabolic rate and eating patterns. Therefore, to get a healthy body and a healthy brain, students need to engage in sports activities despite having a normal BMI because BMI does not influence physical intelligence, involvement in sports activities, and academic achievement of students.

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