The Impact of School-Based Physical Activity on Academic Performance Among Middle School Students in Excellent School at Shah Alam

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DOI: https://dx.doi.org/10.47772/IJRISS.2026.10200134

Received: 08 February 2026; Accepted: 13 February 2026; Published: 26 February 2026

ABSTRACT

This paper examines how physical activity in schools affects the academic achievement of middle school children in Shah Alam, Malaysia. In particular, the study examines the ability of the frequency, intensity, and the nature of physical activities to have an impact on cognitive abilities, emotional well-being, and general achievement in school. Through quantitative research approach, the study collected data of 169 students in the middle classes through standardized data collection methods like Physical Activity Questionnaire of Adolescents (PAQ-A) and academic performance indicators. The results show that academic performance especially with regard to memory, attention and problem-solving skills are positively correlated with physical activity and are important in academic success. The paper also investigates the importance of socio-economic status of students in the participation of school based physical activities, which is that students with higher socio-economic status enjoy more resources and can therefore engage in physical activities on a more regular basis. In addition, the study also finds that well-organized physical exercises, such as team sports, play a major role in boosting the ability of the students to be more focused, motivated, and in control of their emotions, which in turn has a positive impact on their academic performance. The study reaches a conclusion that inclusion of physical activity in the school curriculum has the potential to improve the physical health and academic performance of the students and makes recommendations to the educators, school administrators and policymakers on how the physical education programs can be improved to allow all students, irrespective of their socio-economic status, equitable access to physical activities.

Keywords: Physical Activity, Academic Performance; School-Based Physical Activity, Socio-Economic Factors, Middle-School Students, Malaysia.

INTRODUCTION

The positive effects of physical activity (PA) are extensive, as they do not merely limit their impact on rehabilitation and alleviating stress but also include self-esteem and overall well-being. The World Health Organization (WHO, 2020) recommends that lack of physical activity is one of the major health risks, which leads to the rising prevalence of cardiovascular diseases, diabetes, obesity, and other preventable conditions. Indeed, 81 percent of children aged between 11 and 17 years were reportedly being inadequately active across the world and the highest proportions were reported in the developed countries (WHO, 2019). In addition to promoting health, PA has also been linked to positive academic achievement among children and adolescents. According to recent research (e.g., Dills et al., 2021), students with regular PA demonstrate improved classroom behavior, longer attention span, and more favorable memory recall all of which lead to academic success. On top of that, exercise promotes the necessary cognitive skills that are paramount to education and academic success in schools.

New studies have strongly emphasized the beneficial association that exists between physical exercise and academic related cognitive skills. The modern evidence indicates that physical exercises performed regularly help improve the main cognitive areas like the executive function, attention, and speed of information processing which are critical in learning. A meta-analysis and systematic review by Alvarez-Bueno et al. (2020) showed that physical activity interventions, especially those with moderate-vigorous intensity, significantly correlated with improvements in executive functioning and academic performance of children and adolescents. Likewise,

it was also found by Esteban-Cornejo et al. (2021) that the greater the aerobic fitness, the better the cognitive control and working memory were associated with these elements contributing to planning, problem-solving, and switching tasks at school. These cognitive improvements have been thought to be in place by physiological processes, including rising cerebral blood flow, neural efficiency and neurogenesis, in particular brain areas that relate to learning and memory. Altogether, the recent evidence supports the importance of physical activity, in particular, aerobic exercise, as a significant factor in cognitive growth and academic performance.

In the Malaysia region, the problem of physical inactivity among students also exists. The Ministry of Health (2017) Newsletter indicated an invincible trend that raised concerns saying that more than 60 % of students were physically inactive because of excessive television viewing, internet use, and low participation in physical education classes. Moreover, the surveys conducted by NHMS (2019) indicated that very few 34 % of adolescents in Malaysia were able to achieve the target of 60 minutes per day of moderate to vigorous physical activity. This scenario is quite alarming in school in Shah Alam, a developing township containing students of different ethnic communities. Although the area has put up different sports facilities and school programs, very little research has been conducted to show the effect of these strategies on residential academic performance.

The education system of Malaysia usually places more emphasis on academic performance, which in some cases replaces physical education (PE). Research indicates that PE is often sidelined and there are schools that have occupied the PE time with other subjects. As an example, research by Lee et al. (2021) reported that forty-seven percent of the participants missed PE classes because of the academic pressure or competing educational options. This is a worrying trend because it has to do with the effects of lack of exercise on the well-being and development of the students. Recent research (e.g., McLellan et al., 2020) demonstrated the beneficial effects of the engagement in structured PE programs and extracurricular sports that positively influence academic success, enhance physical fitness, and promote social integration and group dynamics, which are all crucial to succeed at school.

Physical activity in relation to cognitive and academic performance does not only have benefits but also affects the emotional and social development. Studies conducted by Zhang et al. (2020) revealed an increase in anxiety and depression symptoms and a reduction in classroom engagement and emotional health when the number of physical activity sessions increased. Moreover, group sports provide students with important life-related skills, like collaboration, leadership, and communication, which are also important in the holistic development of a student. These results indicate that physical activity is not only an effective way to improve academic achievements, but also emotional and social development through integrating it into the fundamental structure of the educational process.

Moreover, the idea of having physical activity in the school curriculum is not limited to UK. As an illustration, a program of schools in the US known as Active Schools showed considerable positive results in test scores and physical fitness following the introduction of physical activity breaks 9 into the daily routine (CDC, 2021). Such nations as Finland are particularly focused on active education, and their performance on educational scales is much better across the world, which can also point to the possible advantages of combining physical activity and academic challenge. This fact sharply proves that schools like excellent school in Shah Alam should balance the workload of academic work and physical activity. This will be better understood by knowing how these factors are related to each other and using this knowledge to enable educators and policymakers to create programs aimed not only at improving physical health but also academic performance.

LITERATURE REVIEW

The association of physical activity with academic performance has received growing concern because of its ability to aid in a holistic development of students, nevertheless, even though the empirical evidence that physical activity at a regular frequency boosts cognitive functions that are critical to learning, such as attention, memorizing and executive control, physical education remains a periphery course in most educational programs. Studies have consistently shown that physical activity enhances academic performance by both cognitive, psychological and biological processes, such as stress alleviation, better mental well-being and increased neurogenesis in brain parts related to learning. However, most of the available literature is based on Western context, and little consideration is paid to socio-economic disparity and contextual impediment that determine access to physical activity in Malaysian school settings, especially in places like Shah Alam. Such lack of correspondence between evidence and practice underscores the impetus to use context-specific studies to guide

equitable, evidence-based educational policy to acknowledge physical activity as a core part of academic growth and not a marginal activity.

THEORETICAL FRAMEWORK

The present research paper is anchored in the Cognitive Activation Theory of Stress (CATS) and the Neuropsychological Theory, which describe the effects of physical activity (PA) on academic performance via psychological and biological processes. According to CATS, physical activity on a regular basis can help students manage stress and have better ability to cope with the academic demands, which results in better concentration and learning. In the meantime, the Neuropsychological Theory emphasizes that exercise improves the functioning of the brain by means of neurogenesis, neuroplasticity and elevated levels of brain-derived neurotrophic factor (BDNF) which promote memory and attention as well as executive functioning. These theories combined can be used as a good basis to study how school-based physical activity can be used to enhance academic achievement among the middle school students in Shah Alam.

General Issue of the Research Topic

The association between physical activity and performance in school among students in middle schools has been a growing concern in many countries across the world and Malaysia is no exception. Available literature confirms that physical activity can positively affect the cognition, focus, and grades of students (Singh et al., 2012), and Malaysian investigations also prove the necessity of including physical education and sports in the school program as a way to promote academic and social growth (Chia and Wong, 2018).

Nevertheless, academic pressure, poor facilities, and socio-economic barriers to physical activity still persist in Shah Alam among students (Fauzi and Khalid, 2019). It has been shown that moderate-vigorous and regular engagement is the most important in the frequency and intensity of physical activity because it produces more cognitive benefits, especially on attention, memory, and executive functioning (Hillman et al., 2009). The levels of participation are also influenced by the parental support, peer pressure, and the quality of the programs (Chia and Wong, 2018), and socio-economic differences are important factors that impact access to physical activity opportunities, as disadvantaged students belong to lower-income groups (Dagkas and Armour, 2012; Trost and Loprinzi, 2013). The findings reveal the necessity of specialized school-based policies and interventions to help provide equal access to physical exercise to facilitate not only academic success but also ensure a healthy student population.

Conceptual Framework

The paper discusses the association between school-based physical activity (PA) and academic performance of middle school students in Taman Sri Muda as being based on the Cognitive Activation Theory of Stress (CATS) and the Neuropsychological Theory. These theories indicate that physical activity improves cognitive functions like attention, memory and executive functions by balancing stress reactions and neurogenesis and neuroplasticity, hence leading to improved academic outcomes. Organized physical activities in Structured Physical Education (PE) programs are important in the promotion of executive functioning, classroom behaviour and academic investments with motivation and social support further strengthened by the Self-Determination Theory and Social Cognitive Theory. Socio-economic status (SES) is another major determinant of access to physical activity opportunities, with high-income households (above RM10,960 per month) having a higher availability of physical activity opportunities, facilities and programs than students of middle- (RM4,850-RM10,959) and low-income households (RM4,849 and below), as the latter are limited by both financial and environmental factors (Department of Statistics Malaysia, 2021). Such differences emphasize the establishment of fair school-based policies on physical activities so that no student can be left out in experiencing the benefits of regular physical activity either cognitively or academically.

RESEARCH METHODOLOGY

The chapter on methodology is critical in providing the perspective of the study and providing its validity and reliability. This paper aims to use a quantitative methodology to investigate the correlation between physical activity in schools and academic performance among middle school children in one of the fine schools in Shah Alam that comprise research design, population and sample, tools, data collection, and analysis practices.

Quantitative methods are appropriate because they enable collection of numerical data and testing of relationships which are statistical. Accuracy and consistency were ensured by using such validated instruments as the Physical Activity Questionnaire for Older Children (PAQ-C) and self-reported academic performance measures. The students sampled were 169 students aged between 13-15 years with stratified random sampling selected using Cochran formula in a bid to reduce biasness. Data were gathered within school time with all due ethical considerations as approved by the school, parental consent as well as confidentiality which ensured a standard and credible research process.

Participant Inclusion

The study focuses on the population of middle school students, 13 to 15 years, in one excellent school in Shah Alam, Malaysia in public schools. This specific age is chosen because this is the period of early adolescents, that is an important developmental period of early adolescence, when development of both motor and cognitive-academic aspects can take place, determine preferences, interests and habits which can impact physical activity and academic achievement. Participants must meet the following conditions to be included:

1. Mix-genders: Both male and female students can participate
2. Aged 13 years until 15-year-old
3. Students enrolled in physical and health education classes

Participant Exclusion

To maintain the validity and reliability of the study results, the following exclusion criteria are applied:

1. Students under 13 years old or above 15 years old
2. Students who unenrolled in physical and health education classes
3. Students unwilling to join.

Research Design

The research design that are used in this study are quantitative, cross-sectional research design. Cross- sectional research design is adopted for this study because it effectively provides an estimation of the selected population at the time of data collection concerning physical activity and academic performance of middle schools in Shah Alam. This design allows for the efficient collection of data on both physical activity levels and academic outcomes at a single point in time, providing a clear picture of their association (Fauzi & Khalid, 2019). As it involves collecting data from a diverse sample of students, the study can establish what kind of patterns and relationships already exist as this is essential to identify how physical activity can affect academic performance today.

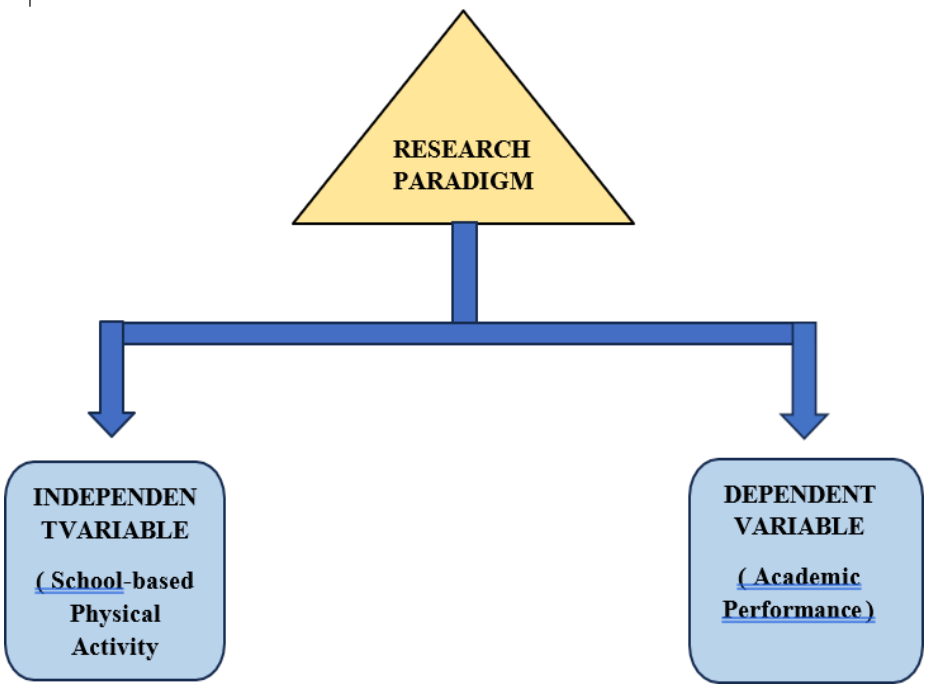
Besides, cross-sectional studies are convenient and inexpensive because they rely on data collected at a single time point only. This efficiency makes it possible to gather a large amount of data relatively quickly, which is particularly useful for examining the current state of physical activity and academic performance (Chia & Wong, 2018). While this design does not permit causal conclusions, it offers practical information on what should be done in the short term to improve learners' achievements and offers insights that can be used to inform policy measures in the long term. Its results can also be used as the foundation for further research endeavors. Specifically, the identified correlations and patterns can be used to develop hypotheses for longitudinal studies that investigate the causal effects of physical activity on academic performance over time (Abdullah & Jamil, 2021). In this study, cross-sectional design is well suited due to the strengths of this research method that includes a capability to capture the current state of affairs and other practical benefits over other approaches.

Research Paradigms

The research paradigm followed in the current study is positivism where knowledge is presented in a measurable and observable manner. What characterizes positivism as an approach is its view that reality is measurable as it

can be accessed through observation and computation. This paradigm is appropriate for the quantitative research design used in this study, given that it consists of a plan of the study that makes it possible to examine the correlation between school-based physical activity and academic performance (Cohen et al., 2007). In avoiding the pitfalls of positivism, the study seeks to ensure that it generates findings that are trustworthy and which can be replicated in other populations.

Figure 1. Shows The Application of Research Paradigms



The figure above shows the research paradigm model as adopted in this study. The model consists of three main components: the independent variable (school-based physical activity), the 38 dependent variable (academic performance). This framework aids in the structuring and mapping of the relationships under analysis and keeps the study anchored on its main goals. The independent variable in this study is school-based physical activity which consists of physical education, sports and active recess. These activities are assessed using the Physical Activity Questionnaire for Older Children (PAQ-C), a standard tool that offers a more definitive evaluation of children's PA levels (Kowalski, Crocker & Donen, 2004). To achieve the above objective, the study will examine the extent to which increased participation in school physical activities translates into better academic outcomes.

Other than that, the dependent variable being examined in this study is academic performance, which has been assessed through the students' academic performance in their class and their scores in standardized tests. Standardized academic self-report measures are adopted in conjunction with school records to increase precision and validity. This two-pronged strategy facilitates accurate evaluation of performance and reduces bias arising from students' self- appraisals (Duckworth & Seligman, 2005). This cross-sectional study aims at comparing academic achievement of students with high physical activity level to those with low physical activity level. In sum, socio-economic status, parental support, school resources, and other mediating factors are also accounted for in the research model. These variables can affect both physical activity and academic achievement, and need to be included as control variables in the model. In their study, Carlson et al. (2015) explained that socio-economic factors could affect a child's level of physical activity and academic achievement. Therefore, controlling for these variables the study will be in a better position to determine the direct influence of physical activity on academic performance

Population and Sample

For this study, the targets of the research are middle school students from one excellent school in Shah Alam in Malaysia. This group is particularly important because middle school is a vital period for development of academic and physical activity behaviors. The study aims at obtaining information concerning the link between physical activities at schools and academic achievement, with a specific focus on middle school students in the region there are about 1500 middle school students in the region and thus the study will sample a proportionate

sample to obtain data. Based on the (Krejcie & Morgan, 1970) population size of 300, the sample size taken in this research is 169 respondents in an effort to attain statistically significant outcomes while at the same time, ensuring that the data collection and analysis processes can be easily accomplished. By Cochran 's estimation, it is possible to get a good sense of the population with such a sample size, particularly if the researcher employs stratified random sampling methods. Through this method, gender, socio- economic status and other factors such as students' average performances in their classes are well represented in the sample.

The sampling technique used in this study is the stratified random sampling. This is a method that partitions the population of interest into homogenous groups called strata using factors that are useful in the study. Samples are then taken randomly from each of the strata in a bid to increase the chances of the final sample to be an actual representation of the overall population (Kumar, 2019). The population in the study is the middle school students of one excellent school in Shah Alam that is specifically focused on a population between the age of 13-15. In order to make the study representative of the general student community, they are stratified randomly. The stratification is defined as the grouping of the population into specific subgroups or strata according to the appropriate features like gender, socio-economic status (SES), and academic performance. As an illustration, the students are grouped into strata in terms of gender (male and female) in order to have equal representation of both sexes.

More so, the socio-economic status is regarded as a decisive stratifying variable because it has the potential to shape students access to physical activity opportunities, in and out of school. With the development of strata on these variables, the sampling process will strive to make the sample representative of the student population diversity enabling a 40 much better analysis of the way various groups are involved in the physical activity and its impact on academic performance. The stratified random sampling approach contributes to reducing the bias and makes sure that all subgroups of the population are represented proportionally, which gives a more detailed and dependable picture of the correlation between physical activity and academic performance of different student groups (Kumar, 22019; Creswell, 2014; Cohen et al., 2017).

This approach is important in minimizing other factors that may influence the results, thereby, increasing the internal validity of the study. In order to achieve accurate and statistically significant results, the sampling process will be carried out through strict procedures. Firstly, school in Shah Alam will be approached to seek for permission to conduct the study. After that they will be randomly selected from the list of participants in each stratum to have a target of 169 students. This systematic approach is consistent with several principles outlined for educational research by Creswell (2014), which insisted on the use of rigorous sampling to increase credibility and transferability

Sampling Technique

The stratified random sampling is used in this study to come up with a representative sample of middle school students aged between 13 to 15 years in Shah Alam. These different strata of population exist in respect to gender and socio-economic background, and hence the study has been able to capture differences that would affect physical activity participation and academic performance. Such sampling technique will provide equal presentation of dissimilar subgroups and enhance internal validity of the research.

Once the strata are drawn, a lottery or a random selection process will be used to select the participants belonging to each group in order to reduce sampling bias. This process assists in controlling the possible confounding factors and the sample characteristics are similar to those of the population. Consequently, the study results are more valid and may be applied to other educational settings.

Instruments

The data were using standardized questionnaires to measure the level of physical activity and academic performance of students. The Physical Activity Questionnaire of Older Children (PAQ-C) was used to determine physical activity because it is a validated and reliable tool that measures the habitual physical activity of adolescents (Bervoets et al., 2019). The performance in academics was measured by the self-reported examination results, the results were backed by the evidence that self-reported academic data are trustworthy when compared with school records (Putwain et al., 2020). Such a combination improves the validity of the data and allows conducting an accurate analysis of the correlation between physical activity at school and academic

performance.

Reliability and Validity in Quantitative Research

The reliability and validity are important in order to guarantee right measurement in quantitative research. The Physical Activity Questionnaire of Older Children (PAQ-C) was applied in the study to evaluate the physical activity levels of students and showed high internal consistency (= 0.82), which is greater than the acceptable level of reliability (= 0.70) (Nunnally, 1978). PAQ-C has significant construct validity and past reports indicate a strong correlation between PAQ-C scores and physical activity objective measurements (Saelens et al., 2017; Sallis et al., 2018; Robinson et al., 2019). The validity of its content is supported by covering both school-based and leisure physical activities in a comprehensive manner. Despite the fact that the PAQ-C is based on self-reported data, and is therefore vulnerable to recall and social desirability bias, it is still a reliable and valid tool to gauge physical activity among adolescents in case this limitation is put in consideration.

Procedure for Conducting the Study

The study was conducted in three stages: pre-, during, and post-research to ensure methodological rigor and ethical compliance. In the preparatory stage, ethical approval and parental consent were obtained, instruments were piloted, and 169 students aged 13–15 years were selected using stratified random sampling. During data collection, questionnaires were administered in a controlled school setting following ethical procedures. In the final stage, data were screened and analyzed using statistical software to examine the relationship between physical activity and academic performance while controlling for relevant variables, and findings were systematically reported.

A Stratified Random Sampling Approach

This paper will use stratified random sampling as a strategy of acquiring a representative sample of students in the middle-school at Shah Alam. The population is stratified into gender, socio-economic status (SES) and academic performance with all stratum participants being randomly chosen to balance the proportion between them. This will manage the possible confounding variables and improve the validity and transferability of the results of the association between school-based physical activity and academic performance (Cohen et al., 2018; Creswell and Creswell, 2017).

Table 1. Proposed Sample Used

Source Author	Sample Size	Demographic Details	Analytical Method
Kowalski et al.	150	Middle School Students	Correlation Analysis
Duckworth & Seligman	200	Adolescents	ANOVA
This study	169	Middle School Students	Descriptive and Correlation

The features of the proposed sample are summarized in Table 1 are constituted of 169 middle school students of both sexes aged between 13-15 years. The relationship between school-based physical activity and academic performance is analyzed with the help of descriptive and correlation analyses because the given approaches enable distinguishing patterns and correlations between variables. The demographic information is also present to put findings in context and provide meaningful interpretation of results. The variation of the sample makes the study stronger as it will capture variations in physical activity involvement and student academic results among the student groups and hence increases the strength and implications of the findings (Cohen et al., 2007).

Propose Data Collection

1. First Step: random 169 students
2. Second Step: distribute questionnaires
3. Third Step: student's complete questionnaires

4. Fourth Step: collect complete questionnaires

5. Final Step: enter data into statistical software analyze

Questionnaires were used to collect data on 169 students in the middle school located in Shah Alam. The level of physical activity was assessed with the help of the Physical Activity Questionnaire of the Older Children (PAQ- C) and academic performance was measured in terms of self-reported grades and test scores, which gave a complete profile of the correlation between physical activity and academic performance. A pilot study was done to raise the level of clarity and reliability of the instruments and the required revisions were done before the full administration. The questionnaires were distributed in the school hours and with the help of teachers, and ethical concepts such as voluntary participation, the non-disclosure of information, and anonymity were also adhered to (Kumar, 2019). After data collection, the data was coded and analyzed with the help of statistical software where correlation and regression analysis was used to investigate the correlation between academic performance and physical activity (Field, 2013).

Proposed Data Analysis

The analysis of data in the current study is aimed at discussing the correlation between school-based physical activity (PA) and academic achievement of middle school students through SPSS. Demographic characteristics, PA levels, and academic performance are summarized using descriptive statistics (means and standard deviations) and the correlation analysis is done to establish the strength and direction of the relationships between variables. All data is first cleaned before analysis to correct missing data and discrepancies and assumptions such as normality are verified. The results have been provided in the form of tables and graphs, and the effect sizes are stated to justify the interpretation of practical meaning. The use of SPSS is attributed to its effectiveness in quantitative data analysis and being very popular in educational studies hence it is effective and reliable in analysis.

Table 2. Shows Data Analysis for Research Objectives

Research Objective	Instrument	Respondent	Type of Analysis
To evaluate the level of physical activity among middle school students in one excellent school in Shah Alam	Questionnaire	Middle School Students	Descriptive Statistics (Mean, Standard Deviation)
To assess the academic performance of students participating in school-based physical activities	Questionnaire	Middle School Students	Descriptive Statistics (Mean, Standard Deviation)
To investigate the relationship between the frequency of physical activity and academic performance	Questionnaire	Middle School Students	Correlation Analysis (Pearson Correlation)
To determine the influence of socio-economic factors on students' access to participating in school-based activities	Questionnaire	Middle School Students	Descriptive Statistics (Mean, Standard Deviation)

RESULT

The study presented in this chapter describes the findings of the research on the impact of the school-based physical activity on the academic performance of middle school students in a single excellent school in Shah Alam. Structured questionnaires were used to collect data on 169 students aged 1315 years and analyzed with the help of SPSS. They summarized the demographic data, physical activities, and academic achievement and conducted correlation analysis between the variables of physical activity, academic performance, and socio-economic factors. The presentation of results is done in tables and figures within the objectives of the study.

Table 3. Demographic Data of Respondent

Gender	Frequency	Percentage %
Male	85	50.3
Female	84	49.7
Age		
13	35	20.7
14	54	30
15	80	47.3
Ethnic Group		
Chinese	6	3.6
Indian	55	32.5
Malay	99	58.6
Others	9	5.3
Current Family Situation		
Both parent	164	97.0
One parent	5	3.0
Family Income Level		
Low	30	17.8
Middle	139	82.2

Out of the total respondents 169 (50.3) students were males and 84 (49.7) students were females, representing an almost matching gender mix and a well-balanced sample in the study. Regarding age, the largest proportion of the respondents were 15 years old (80 students) representing 47.3 percent, then 54 students, 32.0 percent and 35 students, 20.7 percent respectively. In general, the age distribution is in line with the targeted age group of the middle school of the study.

In reference to ethnicity, the majority of the respondents were Malay with 99 students (58.6%), then there were Indian students who were 55 (32.5). There were 9 representatives of other ethnic groups (5.3%), and 6 representatives of Chinese students (3.6%), which implies the ethnic diversity of the middle school students in Shah Alam. Moreover, majority of the respondents lived with both parents and they numbered 164 students (97.0%), and only 5 students (3.0%), were living with one parent. This implies that most of the respondents had intact family, which could be reliable in terms of support on the participation of physical activities as well as in academics.

Findings for Research Question

Kolmogorov Smirnov and Shapiro Wilk tests gave a result of normality that all the variables were not normally distributed since the p-values were less than 0.05. As a result, parametric tests (t-tests and ANOVA) were considered unsuitable in this study. Rather, non-parametric statistical procedures were used. The level of physical activity and academic performance of the participants were summarized with descriptive statistics (mean, median, standard deviation and frequency) to give an overall picture of data distribution although it was not normal. Spearman rank correlation was used to investigate the correlation between physical activity and academic performance since it is appropriate to use when the data is not normally distributed and to determine the magnitude and the direction of the relationship. These non-parametric analyses were used to guarantee the validity and reliability of the results in the non-parametric conditions of data distribution.

Table 4. Shows The Data of Descriptive Test Questionnaire

Descriptive Statistic Item	N	Mean	Std. Deviation
Frequency and Intensity			
Active 30 minutes	169	2.97	.53
Most enjoyed sport	169	3.22	.63
Activities at home	169	2.05	.60
Activity with family	169	1.89	.69
Fit and healthy	169	2.90	.62
Comparison of Academic			

Performance			
Study better now	169	3.15	.38
Academic result improves	169	3.16	.39
Study habits inconsistent	169	3.16	.52
Manage exam pressure	169	3.23	.42
Maintain better grades	169	3.30	.50
Socio Economic Factor			
Parents' job	169	3.70	.45
Family can afford	169	2.20	.72
School provides assistance	169	2.80	.45
Higher economic student	169	3.67	.47
Less confident	169	3.16	.60

Table 5. Shows The Data of Correlation Test

Correlation Item		**Frequency (IV)**	**Academic Performance (DV)**
Frequency (IV)	Correlation Coefficient	1.000	.341**
	Sig. (2-tailed)		< .001
	N	169	169
Academic Performance (DV)	Correlation Coefficient	.341**	1.000
	Sig. (2-tailed)	< .001	
	N	169	169

The results show that the probability of students to participate in a moderate amount of physical activity is high, as at least 30 minutes of physical activity are spent daily (M = 2.97, SD = 0.53). Team sports (M = 3.22, SD = 0.63) was the most popular activity, home-based (M = 2.05, SD = 0.60) and family-based activities (M = 1.89, SD = 0.69) were less popular, meaning that sports activities were primarily school-based. Students also felt like physically fit and healthy (M = 2.90, SD = 0.62).

Students expressed their favorable academic performance by having participated in the physical education and physical activities such as having improved study habits, better examination stress management (M = 3.23, SD = 0.42) and better grades (M = 3.30, SD = 0.50). The socio-economic factors were also observed to change the participation of students in the physical activities. The increased parental occupation and socio-economic status were related to higher participation, and the lack of financial means decreased access to sports equipment (M = 2.20, SD = 0.72) and confidence in participation (M = 3.16, SD = 0.60). These results prove the importance of the socio-economic background to the participation of students in physical activity.

There was a moderate positive correlation between the frequency of physical activity and academic performance ($r = 0.341$, $p < 0.001$), which implies that the more people are engaged in physical activity, the higher the academic performance.

DISCUSSION AND RECOMMENDATION'S

This section will critically analyze the research results of the relationship between school-based physical activity and academic performance among middle school students in Shah Alam in respect to the objectives of the research and extant theoretical and empirical studies. Generally, the results indicate a strong and positive correlation between the engagement in school-based physical activities especially organized Physical Education (PE) and team sports and academic-related achievement among students. But the quality of this association is mediocre meaning that physical activity is a supportive and not a control factor of academic achievement.

The findings indicate that the level of physical activity of the students was moderate in general and most school-based, which pointed to the key position of school environment in enabling regular involvement. Although formal PE sessions are effective in facilitating the regular involvement of students, the level of activity was usually moderate, which indicates that adherence instead of optimal effortfulness is a characteristic feature of most lessons. This observation is consistent with the existing researches which found that students, in the absence of explicit instructional techniques, will work at comfortable levels of effort, which may restrict the potential

mental benefits of exercise. However, school-based activity was linked to increased concentration, emotional regulation, and motivation, which supports the pedagogical significance of PE as an independent variable to physical health.

The results also indicate the Cognitive Activation Theory of Stress and the Neuropsychological Theory. Exercise seems to alleviate stress and improve the executive abilities including attention and memory, vital in learning. Students who engaged with physical activity more and more often showed superior academic-related behaviours, which confirms the opinion that physical activity does not generate academic benefits but only cognitive preparation. Notably, the positive changes were noticed more in perceived learning behaviours whereas objectively measured academic outcomes showed less evidence of the relationship which implies that motivational and self-regulatory processes might mediate the relationship.

The socio-economic status was a very powerful moderating factor. Students who were more socio-economically endowed said that facilities, equipment, and extracurricular activities were more accessible to them, and thereby enabled them to participate more and gain more academic advantages. Conversely, lower socio-economic students experienced financial and resource-based obstacles that restricted participation that could have restricted the cognitive and academic benefits of physical activity. This observation highlights the fact that access and not motivation alone influence patterns and outcome of participation.

Overall, this paper affirms that physical activity in schools is beneficial in promoting academic achievement via cognitive and emotional mechanisms and also indicates that the success of this intervention depends upon the quality of the activity, school specifics and socio-economic status. These results necessitate focusing on the inclusion programs in the PE programs in schools and by the policy makers to ensure the inclusion and the well-structured PE programs in schools that would provide equitable access to physical activity and the most benefits of physical activity to educational and cognitive gains.

Research Contribution

The research helps in studying the association between physical activity at school and academic achievement in middle school students by availing empirical data that indicates that the higher the frequency and intensity of the physical activity, the higher the academic-related achievements. It emphasizes the fact that physical activity is not a secondary activity but a part of the school curriculum. Throughout, it is important to note that the study has also pinpointed socio-economic status as one of the main factors contributing to whether students have access to physical activity opportunities or not, which finds structural inequalities that influence not only the participation but also the academic gains. The findings substantiate the applicability of the Cognitive Activation Theory of Stress and Neuropsychological Theory and prove that physical activity improves the cognitive functioning and emotional regulation. On the whole, this study can inform educational policy and practice by informing the need to use inclusive and equitable school-based physical activity programs and a basis of future longitudinal and context-sensitive studies.

Research Gap

Despite the fact that many studies have determined the positive association between physical activity (PA) and academic performance, there are some critical gaps. Majority of the current studies have been done on the Western population leaving non-western societies like Malaysia with little representation. There are some significant differences between Western and non-Western societies in terms of educational systems, family systems and physical education patterns, which restricts the generalizability of the previous results. This study will fill this gap by targeting middle school students in a superb school in Shah Alam which will provide context-specific evidence on how socio-economic and cultural factors mediate the interrelationship between PA and academic achievement that must be directly related to local educational policy and practice.

In addition, although other literature has already investigated the effect of the socio-economic status (SES) on physical activity, little has focused on the compounding effect of family support, school resources, and school climate on the participation in physical activity and academic achievement. How SES interacts with institutional and familial support systems is rarely considered in the existing literature which mostly views SES as an independent predictor. This research paper is more holistic because the researchers focus on the way in which a combination of different socio-economic factors can influence the adoption of school-based physical activity

among students and their future academic achievement, especially in the Malaysian context.

Moreover, previous studies have mostly considered physical activity as one construct, and there is little distinction of the types of activities. Very little research has been conducted on the differences between structured school-based activities like team sports versus individual or recreational activities in terms of their academic and cognitive impact. Besides, the majority of studies focus on the short-term relationships but little is known about the long-term effect of continuous PA attendance. The research is relevant as it has differentiated between different forms of physical activity, the short-term and the long-term academic outcomes of physical activity, and the importance of family support in promoting PA in non-Western environment. In general, the research bridges key contextual, methodological, and conceptual gaps, and the evidence presented can be used to create more inclusive and culturally responsive policies regarding physical education in Malaysia.

Recommendation for Future Research

According to results of this study, a number of recommendations may be offered to further research of the topic of physical activity participation and academic performance among high school students. To begin with, future research must use a bigger sample to increase the power of the research and raise the generalizability of the results since, in the present study, students in one school were the focus of the research. Moreover, the inclusion of schools based in different environments (urban and rural, different socio-economic background) would enable making more constructive comparisons and gain a deeper insight into the contextual factors about physical activity involvement and academic success.

Mixed-method designs are also recommended in future studies. Although the given study was based on quantitative data, the use of qualitative methods (interviews or focus group discussions) would be useful to gain a better understanding of the motivations of students, their experiences, and the perceived barriers to physical activity. Moreover, the application of the same investigations on other levels of education such as high school and university students would assist in establishing whether the correlation between academic performance and physical activity is a constant phenomenon in development levels. It is also necessary to conduct longitudinal studies to investigate the long-term consequences of the continuing physical activity on the cognitive functioning and academic performance over the long-term.

Further studies should also be conducted regarding the variety of types of physical activities and their different effects on academic performance such as aerobic exercises, team sports, individual sports, and fitness-based exercises. Socio-economic conditions, school environment, peer influence, and gender differences also should be noted as the possible moderating factors that should be paid more attention to. A more detailed analysis of variables including teaching techniques, parental assistance, learning environment, and mental health of students would offer a deeper insight into the processes of the connections between physical activity and academic performance. Together, the directions would enhance the evidence base and help to create more successful, inclusive, and equitable school-based physical activity programs.

Research Justification

The study used questionnaire as the major form of data collection as it is effective and has a broad acceptance in the study of physical activity (PA) and academic performance. Questionnaires are more effective and efficient than an interview or observation; in this case, it is possible to collect data on a vast number of students of middle schools in Shah Alam, thereby increasing the generalis ability. This technique is especially appropriate when conducting research in a school as it allows a greater participation with minimum time and resource limitations.

Also, the questionnaire is structured, which guarantees that all respondents will provide a structured response, and such responses will be more objective and do not have impartiality. The measuring tool would record both objective information, including the frequency of PA and academic achievements, and qualitative knowledge using some open-ended questions chosen to investigate the perceptions of students on the impact of PA on their learning process. Such a combination will provide a deeper insight into the correlation between physical activity and academic performance.

Moreover, this study is consistent with the theoretical frameworks that form the basis of the study such as Cognitive Activation Theory of Stress, Neuropsychological Theory, Self-Determination Theory and Social

Cognitive Theory because a questionnaire is utilized. The tool will allow measuring the PA participation, academic performance, stress levels, motivation, and social support systematically. A pilot testing was conducted to guarantee the validity and reliability of the questionnaire whereby it was established that the questionnaire measured the required constructs appropriately. All in all, the questionnaire is a valid and reliable instrument that can be used to explore the connection between physical activity and academic success.

CONCLUSION

In a conclusive manner, this paper has discussed the relationship between physical activity and student academic performance in Shah Alam, middle schools. The results suggest that frequent participation in physical activity especially in school-based activities is linked with favourable academic related behaviours of better concentration, motivation, emotional control and engagement in learning. Although physical activity does not solely define academic success, it is a significant contributor to this achievement in its interaction with cognitive preparedness, emotional health, and conditions of learning.

The report also brings out the importance of socio-economic and health related factors in determining the attitude and physical activity among the students. Availability of resources, school equipment, health education and family support were also reported as some of the key factors that determine the confidence of the students and their participation in physical exercise. These results indicate that physical activity promotion cannot be considered the individual task, but instead, schools, educators, and educational authorities must collaborate to offer equal opportunities and favoring conditions. With a middle-school student population in Shah Alam, this study is able to offer context-related findings to the Malaysian education environment, and fill research gaps in literature on socio-economic determinants of effect on physical activity and academic performance. Though the study provides good pieces of evidence which are short term, there is need to conduct longitudinal studies later to take a look at long term academic and cognitive gains. On the whole, the results have highlighted the significance of the inclusive physical activity programs implementation in the school curriculum to facilitate the comprehensive development of students and decrease socio-economic gaps in educational results.

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