The Effect of Physical Activity Level Towards Motivation Among Secondary School Students and Implications on Pre-Service Teacher Education

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Abstract: The modern framework for education should be viable in defining the complex relationships between physical activity and motivation among secondary school students. The study aims to determine how physical activity level influences motivation among secondary school students. This study aims to address the implications of physical activities on youngsters' motivation from the standpoint of an educational institution. Moreover, it strives to determine motivation levels through physical activity, compare the differences between male and female students' motivation levels, and identify correlations between secondary school students' motivations. Thus, this study adopts the quantitative approach in its research design using the random questionnaire sampling technique to determine secondary school students' activity levels and motivation. The results reflected a positive correlation between physical activity and motivation among secondary school learners and that higher physical activities lead to higher motivation among the students. The research also revealed differences in physical activity levels between male and female students. However, the detailed nature of these differences is yet to be explored. Another aspect highlighted is that a dynamic interaction may occur between physical activity and motivation, whereby student involvement in the exercise might promote their level of motivation or otherwise. The results of this study can be applied by educators, policymakers, and health professionals in practical educational settings to enhance motivation and engagement among secondary school students in several ways.

Keywords: educational establishment, motivation, physical activity, secondary school, pre-service teacher education

1. Introduction

Physical activity and motivation are interrelated, and many studies have been done to identify motivational factors that help students stay active in physical activity. Here the teacher's role is seen as important in ensuring that students' motivation to engage in physical activity continues because previous research found that physical activity habits formed during childhood will continue into adulthood, indicating the importance of healthy lifestyle practices, including sufficient physical activities during childhood (Schmidt et al., 2017). From the point of view of sport and exercise

psychology, actual physical fitness and the individual's perception of physical fitness, or physical fitness self-concept or perceived physical fitness (Dreiskamper et al., 2018), are the most important factors for physical activity starting in middle childhood. According to Malaysian Blueprint (2013-2025), students spend more than a quarter of their time in school from the age of seven to seventeen. For that reason, teachers or future teachers should understand the concept of motivation that can be used in schools to promote the involvement of physical activities among students because of the advantages found in every physical activity they do.

The World Health Organisation (WHO) defines physical activity (PA) as any movement that causes skeletal muscle contractions and increases energy expenditure beyond resting levels (Hussey & Gupta, 2023). Generally, children and adolescents aged 6 to 17 should engage in 60 minutes (1 hour) or more of moderate-to-vigorous physical activity every day. Regular physical activity is frequently linked to physical health (e.g., fitness and bone health; Boreham & McKay, 2011; Robinson et al., 2015), psychological health (e.g., global self-worth; Andermo et al., 2020), and social health (e.g., health-related quality of life; Fainardi et al., 2020). Despite the benefit of physical exercise for health, many children and teens lack physical activities, and about 80% do not meet the WHO's physical activity recommendations. This evidence is supported by research that found that the level of involvement of children and adolescents in physical activity is still at a low level (Grao-Cruces et al., 2020; Jaafar et al., 2020; Naqiq et al., 2021; Shahril et al., 2023; Thapa et al., 2019). According to the Malaysia 2022 Physical Activity Report Card for Children and Adolescents, the indicator of overall physical activity was in indicator D- which represents only 19.8% of Malaysian Adolescents who are physically active. In addition, there is also an increasing trend of sedentary behavior from 47.3% in 2012 to 50.1% in 2017 (Shahril et al., 2023; Awaluddin, S. M. 2017). This trend is worrying because it can cause adverse effects on them, relating to poor health outcomes and decreased quality of life.

Several studies examined the relationship between physical fitness and health-related outcomes, including physical activity (Mora-González et al., 2019). Previous research has tested the relationship between actual and perceived physical fitness to determine how they are related and to what extent they impact physical activity. In infancy and adolescence, perceived physical fitness influences the relationship between actual physical fitness and physical activity. 17 to 23% of the variance in physical activity could be accounted for (Jaakkola & Washington, 2011; Jekauc et al., 2017). Most studies have used a variable-centered approach to examine the main effects of actual and perceived physical fitness on outcome variables. This represents the average association between these variables (Howard & Hoffman, 2018). Therefore, actual and perceived physical fitness are less consistent in younger age groups than in seniors. Consequently, it is essential to investigate the accuracy of the effect.

Realizing the importance of increasing involvement in physical activity from the school level, health organizations have introduced numerous initiatives, such as health programs, to encourage elementary, middle, and high school students and adults to engage in physical activity. As schools are part and parcel of our lives, responsible organizations should significantly promote public health by fostering healthy behaviors and encouraging individuals to engage in the recommended physical activity levels. However, some questions need to be answered such as why do people start participating in sports? What motivates them to continue or expand their practice? The answers to the questions that arise can provide information to teachers, pre-service teachers, and also related parties about factors that can be used to ensure that the involvement of physical activity among students will be more extensive and long-lasting.

One of the common factors that can have an impact on increasing involvement in physical activity is motivation. (Borges et al., 2021; Deci & Ryan, 2000; Duncan et al., 2010; Mandolesi et al., 2018; Sherwood and Jeffery, 2000; Rodrigues et al., 2021). Motivation is the core of all human behavior which can influence or shape an individual's willingness to volunteer, including its direction, intensity, and persistence. (Siddiky & Haque, 2024). Physical activity is motivated by a variety of factors, including age, life objectives, values, health status, and activity selection or length. (Grajek et al., 2021). An example, older people may prioritize the importance of health aspects and physical benefits to be involved in physical activity or physical appearance for the younger generations. This could lead to a higher motivation to engage in physical activity to counter the increase in sedentary behavior and physical inactivity, as well as their ill effects.

Based on the Self Determination Theory (STD) by Deci & Ryan (1985), individuals are more likely to initiate and sustain behavioral changes based on their level of motivation, including extrinsic and intrinsic motivation. For example, the individual's awareness regarding health benefits and improving the quality of life while actively involved in physical activity is a relevant component to maintain the motivation to keep active in physical activity. SDT organizes the internal and external elements that drive sustained health behavior (Geller et al., 2018). Both components are internal such as interest or inner rewards and external such as money or outside of inner elements both are expected to be the reason for the motivation to support long-term habitual behaviors. The SDT suggests that people who prioritize intrinsic motivation are more likely to maintain healthy behaviors than those who prioritize extrinsic motivation.

Coherent with the SDT, Markland, and Ingledew developed the Exercise Motivation Inventory -2 (EMI-2) to assess the reason for motivation to exercise. According to the developer, the inventory is suitable for exercisers and non-exercisers to discover their motives for engaging in physical activity. The use of this inventory to assess the motives varies among adolescents, adults, and older adults, such as studies by Boone and Brausch (2016), who use the EMI-2 to identify the motives among the youth sample. Furthermore, Quindry et al. (2011) studied the engagement motives in exercise among adolescents and adults and stated that there are significantly different motives based on age. There is also a reported study on the level of PA difference between genders (Dan et al., 2007; Elumalai et al., 2022; Thapa et al., 2019). Another study by Egli et al. (2011) discovered the differences in motives for engaging in the exercise. According to (Pope et al., 2021) it is crucial to investigate the role of motivation and PA because there is always a different motivation reason for someone to start engaging with someone who regularly participates in an activity.

Concerning the above discussion, Pre-service teachers should be trained to understand the importance of physical activity in fostering student motivation. Beyond traditional physical education classes, they should learn strategies to integrate physical activity into the curriculum. Future teachers should be equipped to promote a holistic approach to student development, which includes physical, emotional, and academic growth. Understanding the connection between physical activity and motivation can help teachers create more engaging and supportive learning environments. Regarding classroom management, teachers who recognize the benefits of physical activity may better manage classroom dynamics, as physically active students tend to exhibit better behavior and focus (Wilson & Suthagar, 2019).

This can indirectly help pre-service teachers gain a deeper understanding of the importance of physical activity and motivate them to participate more actively. This involvement can contribute to their health, emotional regulation, stress reduction, and preparedness for future teaching responsibilities (Ortillo et al., 2021). Additionally, the transition from high school to university life is challenging, with many students struggling to cope with stress, and challenges, and adjust to university life (Novel et al., 2019; Schwitzer et al., 2018). This is also true for pre-service teachers attending courses at IPG or IPTA, which can impact mental health. Therefore, prospective teachers need to understand the concept of motivation for physical activity, as continuous involvement can help them manage challenges related to emotions, health, and social stability.

Physical fitness and physical activity are closely related. Although not entirely, physical activity patterns over the previous weeks or months determine the level of physical fitness. Previous research has demonstrated that engaging in physical activity has numerous advantages and benefits for an individual, such as a child or adolescent, such as improved psychophysiological health, increased cardiovascular and muscular function, physical fitness, cognitive and mental functioning, and a reduction in depression, anxiety, and obesity.

Accordingly, this study was conducted to identify the motives for students' and adolescents' involvement in physical activities. These motives can help in understanding the factors of students and adolescents engaging in physical activity and give an overview to the teachers and pre-service teachers in the future to promote physical activity to them.

2. Methodology

This study applied the quantitative method, specifically a survey questionnaire, to determine the effect of physical activity levels on school students' motivation. The questionnaire is divided into

three sections- section A is related to the demographic profile of the participants, section B is related to the level of physical activity, and section C is associated with the level of motivation that affects the participants. Section A contains four items to help the researcher ascertain the respondents' age, gender, the amount of daily exercise they feel sufficient for, and how they describe their general physical activity. Section B focuses on measuring students' level of physical activity. The items were adopted and adapted from The International Physical Activity Questionnaire (IPAQ), a widely used and validated self-report instrument designed to assess physical activity levels among individuals. The International Physical Activity Questionnaire (IPAQ) is a standardized questionnaire designed to assess physical activity habits in various countries and circumstances. (Maddison et al., 2007) and is suitable for assessing Malaysian participants (Shamsuddin et al., 2015).

Moreover, Section C investigates the motivation impacting the lives of school students. Data were collected using a questionnaire adopted and adapted from The Exercise Motivations Inventory - 2 (EMI-2) to study the physical activity level and type of motivation affecting each student. According to (Kim & Cho, 2022) The EMI-2 scale has been used to assess exercise motivation in several fields and demographics, including kids, college students, adults, and older persons. Therefore, the researcher used the EMI-2 as an instrument to assess the motivation among the research sample. In addition, the EMI-2 consists of a 14 sub scale which gives space to the sample to have many options that are compatible with motivational factors in doing physical activity. The samples comprised secondary school students from SMK Sultan Salahuddin Abdul Aziz Shah.

3. Statistical Analysis

The researchers used Statistical Package for Social Sciences (SPSS) version 27 for this study to analyze the data. The data from the pilot study were analyzed for its reliability and validity values. The overall reliability for all domains was above 0.60, which the researcher set. 148 SMK Sultan Salahuddin Abdul Aziz Shah students were randomly selected for the pilot test. The table shows the results of the Kolmogorov-Smirnov and Shapiro-Wilk test of normality. The n > 50, Kolmogorov-Smirnov test had been used. From the table above, physical activity and motivation are the dependable variables based on male and female students. For physical activity, p = 0.71 for male students and p = 0.186 for female students indicates normality for both genders. For motivation, p = 0.56 for male students and p = 0.59 for female students indicates normality for both genders.

Table 1. Normality Test

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Genders	Statistic	df	Sig.	Statistic	df	Sig.
Physical	Male	.100	72	.071	.944	72	.003
activity	Female	.091	76	.186	.965	76	.036
Motivation	Male	.103	72	.056	.955	72	.012
	Female	.100	76	.059	.955	76	.009

4. Results and Discussion

This research was conducted to study the Effect of Physical Activity Levels on motivation Among Secondary School Students in SMK Sultan Salahuddin Abdul Aziz Shah in Shah Alam, Selangor. One hundred forty-eight students answered the questionnaires using random sampling. This study involved students of forms 3, 4, and 5 in SMK Sultan Salahuddin Abdul Aziz Shah.

The questionnaire to identify the effect of physical activity levels on motivation among secondary school students was divided into three sections: the demographic profile, the International Physical Activity Questionnaire, and the Exercise Motivations Inventory. Items in the Demographic section help clarify the information during the analysis. After the analysis, the data were summarised and presented in tables, followed by conclusions based on the results. SPSS was used to analyze descriptive statistics. The data are first interpreted using descriptive data to determine the overall mean for each segment.

Table 2. Demographic Data

Statistics		**N**	**%**
Age	15 Years Old	42	28.4%
	16 Years Old	59	39.9%
	17 Years Old	47	31.8%
Gender	Male	72	48.6%
	Female	76	51.4%
How Many Hours of Exercise Do You Feel Enough in One Day	< 30 Min	37	25.0%
	1 – 2	89	60.1%
	3 - 4	22	14.9%
How Would You Describe Your General Physical Activity	Low Phys	40	27.0%
	Moderate	74	50.0%
	High Phys	34	23.0%
		148	100%

Demographic data were collected to examine the effect of physical activity level on motivation among secondary school students in SMK Sultan Salahuddin Abdul Aziz Shah. The demographic section included age, gender, daily exercise duration, and general physical activity level.

The table shows the statistics on the students' ages as respondents. One hundred forty-eight students from SMK Sultan Salahuddin Abdul Aziz Shah of Form 3, Form 4, and Form 5 were involved as respondents. Of the 148 respondents, 28.4% (42 respondents) were 15, 39.9% (59 respondents) were 16, and 31.8% or 47 were 17.

Regarding gender, 72 respondents (48.6%) were male, while 51.4% (76) were female. Next, the percentage of the exercise duration sufficient in a day by the respondents. 25.0%, or 37 respondents, had chosen that less than 30 minutes of exercise was enough daily. Then, 60.1% of the total 89 students feel that 1 to 2 hours of general physical activity is enough daily, the highest percentage in the table. In comparison, 3 to 4 hours of exercise became the lowest percentage chosen, with a rate of 14.9% and 22 respondents.

Finally, the table shows how the respondents describe their level of participation in physical activity in their daily lives. 27.0%, or 40 respondents, had low physical activity, which became the intermediate selection for the respondents. The highest number of respondents—50.0% (74 respondents)—had chosen moderate physical activity, while the lowest had a high physical activity level, with 23.0%, or 34 respondents.

What is the school students' motivation level based on physical activity?

Table 3. How Would You Describe Your General Physical Activity Effect Your Emotion?

	N	Minimum	Maximum	Mean	Std. Deviation
I exercise (or might exercise) because it helps reduce tension.	148	1	5	3.77	1.004
I exercise (or might exercise) to help manage stress.	148	1	5	4.14	1.024
I exercise (or might exercise) to release tension.	148	1	5	3.91	1.049
I exercise (or might exercise) because I feel at my best when exercising.	148	1	5	3.63	1.071
Valid N (listwise)	148				

The table above presents a comprehensive descriptive analysis showing the relationship between general physical activity and its impact on emotional well-being. The mean and standard deviation values are reported for individuals who indicated engaging in exercise or those considering exercise due to its perceived benefits in managing emotions. For respondents who answered exercise (or might exercise) because it helps to reduce tension, the mean is 3.77, with a standard deviation of 1.004. Those who answered exercise (or might exercise) to help manage stress showed a mean of 4.14, followed by a standard deviation of 1.024. Additionally, participants responded that exercise (or might exercise) to release tension has a mean of 3.91, with a standard deviation of 1.049. Lastly, individuals selected exercise (or might exercise) because I feel at my best when exercising, with a mean of 3.63 and a standard deviation of 1.071. These results provide an understanding of the various emotional advantages related to multiple reasons for participating in physical activity.

Table 4. How Would You Describe Your General Physical Activity Effect Your Physical Appearance

	N	Minimum	Maximum	Mean	Std. Deviation
I exercise (or might exercise) to stay slim	148	1	5	3.75	.982
I exercise (or might exercise) to have a healthy body.	148	1	5	3.99	.800
I exercise (or might exercise) to lose weight.	147	1	5	3.91	1.046
I exercise (or might exercise) to have a good body.	148	1	5	3.95	.871
Valid N (listwise)	147				

The table above presents a comprehensive descriptive analysis of the relationship between general physical activity and its impact on physical appearance. The mean and standard deviation values are reported for individuals who indicated engaging in exercise or those considering exercise due to its perceived benefits in managing their physical looks. For respondents who answered exercise (or might exercise) to stay slim, the mean is 3.75, with a standard deviation of 0.982. Those who answered exercise (or might exercise) to have a healthy body showed a mean of 3.99, followed by a standard deviation of 0.800. Additionally, participants answered that exercise (or might exercise) to lose weight has a mean of 3.91, with a standard deviation of 1.046. Lastly, individuals who selected exercise (or might exercise) to have a good body had a mean of 3.95, with a standard deviation of 0.871. These results provide an understanding of the variety of appearance advantages related to various reasons for participating in physical activity in general.

Table 5. How Would You Describe Your General Physical Activity Effect on Your Physical Ability

	N	Minimum	Maximum	Mean	Std. Deviation
I exercise (or might exercise) to build my strength.	148	1	5	3.75	1.036
I exercise (or might exercise) to stay/become more agile.	148	1	5	3.86	1.021
I exercise (or might exercise) to increase my endurance.	148	1	5	4.14	.911
I exercise (or might exercise) to get stronger	148	1	5	3.85	.899
Valid N (listwise)	148				

The table above presents a comprehensive descriptive analysis showing the relationship between general physical activity and its impact on physical ability. The mean and standard deviation values are reported for individuals who indicated engaging in exercise or those considering exercise due to its perceived benefits in managing their physical ability. For respondents who answered

exercise (or might exercise) to build their strength, the mean is 3.75, with a standard deviation of 1.036. Those who answered exercise (or might exercise) to stay/become more agile showed a mean of 3.86, followed by a standard deviation of 1.021. Additionally, participants answered that exercise (or might exercise) to increase their endurance have a mean of 4.14, with a standard deviation of 0.911. Lastly, individuals who selected exercise (or might exercise) to get stronger had a mean of 3.85, with a standard deviation of 0.899. These results provide an understanding of the different physical advantages related to various reasons for participating in physical activities.

Is there any significant difference between age and physical activity among secondary school students?

A One-way ANOVA test was conducted to see if there was a significant difference in physical activity scores between students aged 15, 16, and 17 years. The analysis shows that there is a significant difference at the $p < .05$ level, $F(2,145) = 15.515$, $p = <.001$. Post Hoc comparison using Tukey's test shows the mean score of physical activity of students aged 15 ($M = 4.48$, $SD = .56$) and 17 ($M = 5.15$, $SD = .47$). While there is a significant difference between students aged 16 ($M = 4.72$, $SD = .66$) and 17 ($M = 5.15$, $SD = .47$). There is no significant difference between students aged 15 ($M = 4.48$, $SD = .56$) and 16 years ($M = 4.72$, $SD = .66$).

Table 6. One Way ANOVA test between age and physical activity

Total Physical Activity Post Mean

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.291	2	5.146	15.515	<.001
Within Groups	48.091	145	.332		
Total	58.383	147			

Dependent Variable: Total Physical Activity Post Mean

			Mean Difference			95% Confidence Interval	
	(I) Age	(J) Age	(I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Tukey HSD	15 years old	16 years old	-.23701	.11627	.107	-.5123	.0383
		17 years old	-.66560*	.12228	<.001	-.9552	-.3760
	16 years old	15 years old	.23701	.11627	.107	-.0383	.5123
		17 years old	-.42860*	.11260	<.001	-.6952	-.1620
	17 years old	15 years old	.66560*	.12228	<.001	.3760	.9552
		16 years old	.42860*	.11260	<.001	.1620	.6952
Dunnett C	15 years old	16 years old	-.23701	.12160		-.5311	.0571
		17 years old	-.66560*	.11015		-.9330	-.3982
	16 years old	15 years old	.23701	.12160		-.0571	.5311
		17 years old	-.42860*	.10971		-.6932	-.1640
	17 years old	15 years old	.66560*	.11015		.3982	.9330
		16 years old	.42860*	.10971		.1640	.6932

*. The mean difference is significant at the 0.05 level.

What is the relationship between physical activity level and motivations among secondary school students?

Pearson correlation test was conducted to determine the relationship between post-physical activity and motivation. The relationship between the two variables is significant ($r = .223^*$, $n = 148$, $p = .007$). This means a significant relationship exists between physical activity and motivation. In other words, as the level of physical activity increases, the level of motivation also increases.

Table 7. Pearson Correlation Test

		Total Physical Activity	Motivation
Total Physical Activity Post Mean	Pearson Correlation	1	.223**
	Sig. (2-tailed)		.007
	N	148	148
Motivation Post MEAN	Pearson Correlation	.223**	1
	Sig. (2-tailed)	.007	
	N	148	148

**. Correlation is significant at the 0.01 level (2-tailed).

Are there any significant differences between female and male students in the type of motivation chosen?

To determine whether the mean score between two groups is significantly different depending on the value of sig. 2-tailed where the same value and below .05 indicates a significant difference, while the value above .05 does not have a significant difference. Ten motivational constructs are significantly different between genders: stress management, enjoyment, social recognition, affiliation, competition, health pressure, ill health pressure, appearance, strength endurance, and nimbleness (sig. 2 tailed = <.05). Three constructs are not a significant difference between genders which are revitalisation, challenge, positive health, and weight management.

	Gender	N	Mean	Std. Deviation	Sig. (2-tailed)
Stress Management	Male	72	4.2361	.53716	
	Female	76	3.5263	.92698	<.001
Revitalisation	Male	72	3.9444	.73372	.058
	Female	76	3.6667	1.00664	
Enjoyment	Male	72	3.9340	.48931	
	Female	76	3.5428	1.03633	.004
Challenge	Male	72	3.9583	.51218	
	Female	76	3.8257	.99249	.305
Social Recognition	Male	72	3.9410	.66673	
	Female	76	3.2303	1.10436	<.001
Affiliation	Male	72	4.0347	.58938	
	Female	76	3.4013	.87757	<.001
Competition	Male	72	4.3715	.56449	
	Female	76	3.3553	.93029	<.001
Health Pressure	Male	72	4.0833	.65899	
	Female	76	3.1579	1.02917	<.001
Ill Health Pressure	Male	72	4.4028	.47120	
	Female	76	3.8991	.80373	<.001
Positive Health	Male	72	4.1111	.60255	.459
	Female	76	4.1228	.76757	
Weight Management	Male	72	3.8576	.39545	
	Female	76	3.8651	.89484	.474
Appearance	Male	72	4.0903	.50926	
	Female	76	3.5592	.80090	<.001
Strength Endurance	Male	72	4.1528	.55753	
	Female	76	3.6776	.85714	<.001
Nimbleness	Male	72	4.0139	.53203	
	Female	76	3.7763	.99835	.036

5. Discussion

The results obtained from the study concerning the relationship between levels of physical activity and motivations among secondary school students studying at SMK Sultan Salahuddin Abdul Aziz Shah provide significant contributions to our knowledge of the complex relationships among exercise patterns, psychological state, and motivational determinants.

The first part of the research investigated how students clarify the influence of their physical exercise on their psychological well-being. According to the findings, students participate in physical activity for different motivational reasons, including to manage stress, healthy body, and endurance This is consistent with established psychological theories, including the Self-Determination Theory (SDT), which places significant emphasis on the influence of intrinsic motivation on human conduct. Intrinsic motivation refers to acts done "for their own sake," or for personal satisfaction. (Ryan & Deci, 2020), thus it is the most important factor to ensure continued participation in physical activity. Emphasis on intrinsic motivation is also seen as important to formal education, but many past studies show that the emphasis on intrinsic factors is decreasing. This shows that formal education no longer uses intrinsic factors to help students achieve success when it is the biggest factor in individual motivation. (Ryan & Deci, 2020) suggested that for more autonomous student motivation, the need-supportive classroom teaching behaviors are important because it is seen as promoting both autonomy and relatedness satisfaction. Thus the finding suggests that teachers and pre-service teachers need to support the students in various ways to encourage the students to be actively involved in physical activity.

This finding aligns with the idea that physical activity offers a beneficial means of releasing tension and promotes a more mutually beneficial way of life. The study highlighted the potential of leisure activities to manage stress and enhance overall well-being. In the second section of the study, students' perceptions of the effects of exercise on their physical appearance are investigated. The third part of the study examined the relationship between exercise and physical ability. The results suggest that students engage in physical activities with varying motivations for building strength, agility, and endurance. The observed differences in individual priorities indicate that motivations for exercise are diverse as personal preferences and contextual factors influence them.

The second research question explored age differences in physical activity. The study found that there is a difference between age levels in terms of physical activity, where 15-year-old students are found to be more active than 16-year-old students, and 17-year-old students are found to be more active than 16- and 15-year-old students. This situation may occur due to the calendar of sports activities that are taking place at the school level. At this point, many sports activities at the district or state level take place based on the categories of those under 15 years and those under 17 years. 16-year-old students had to compete with 17-year-old students. This may cause the involvement of 16-year-old students in physical activity to a lesser extent because they have to compete with older students to participate in sports tournaments at the school level. According to (Lu et al., 2023; and Stemberger et al., 2023), the decline in physical activity with the increase in age needs to be adequately addressed by determining the type of motivation for them to be actively involved in physical activity.

The third research question suggests that individuals with higher physical activity levels tend to exhibit higher motivation levels and vice versa. This correlation aligns with the Self-Determination Theory (SDT) principles, which posits that social factors, autonomy-supportive behavior, and intrinsic motivation shape individuals' motivation toward specific activities (Kalajas-Tilga et al., 2020). However, there is also a previous study that indicates that motives for participation are related to both intrinsic and extrinsic motivation (Aaltonen et al., 2012; Borges et al., 2021; Dan et al., 2007; Duncan et al., 2010; Elumalai et al., 2022; Jakobsen & Evjen, 2018; Rodrigues et al., 2022). Therefore it is important to determine the type of motivations related to the participation involved in physical activity as every individual is different. This shows that not only intrinsic factors play a role but also extrinsic factors.

According to the expectancy-value theory of motivation, gender role expectancies and schemas directly impact motivating beliefs and engagement. (Jakobsen & Evjen, 2018; Wigfield & Eccles, 2000). Therefore, it is important to measure the motive behind involvement in physical activity based on gender. Based on the result, there is a significant difference between genders in ten

of fourteen. Based on (Rodrigues et al., 2022; Vlachopoulos et al., 2013), the crucial differences are based on the different characteristics in individuals towards the motives of exercising. The study underscores the importance of intrinsic motivation derived from the pleasure and satisfaction experienced during physical activities. Moreover, support from social networks is highlighted as a crucial factor for enhancing motivation levels, fostering a sense of connection, and promoting a commitment to an active lifestyle.

Concerning teacher education in higher education institutions, there is a need for more research to explore the specific ways in which physical activity influences motivation among secondary school students. This research could inform teacher education programs and help shape policies that encourage integrating physical activity into the school day. Insights from this research can guide the development of programs and interventions to improve student motivation through physical activity. These programs could be incorporated into pre-service teacher education curricula.
In conclusion, the discussion emphasizes the intricate interplay between emotional well-being, physical appearance, physical ability, gender differences, and motivations in shaping the exercise behaviors of secondary school students. The findings underscore the need for holistic approaches that consider psychological, social, and environmental factors to promote physical activity and motivation among students. Understanding the nuanced factors influencing exercise behaviors can inform targeted interventions to foster a lifelong commitment to health and well-being.

5. Conclusion

Overall, the results emphasize a complicated relationship between physical activity levels and motivation among secondary school students. The positive correlation highlights the significance of developing motivation to encourage a physically and emotionally healthy lifestyle. The recommendations based on the findings suggest adopting self-determination theory (SDT) principles into educational settings to cultivate internal motivation, promote pleasurable physical activities to maintain involvement, and utilize social support networks to enhance motivation. To effectively address gender differences in physical activity patterns, adopting a comprehensive approach that considers biological, cultural, and psychosocial factors is necessary. To promote equal opportunities for physical activity, it is essential to improve access to resources, establish supportive environments, and prioritize individual autonomy and enjoyment. Schools can empower students to develop a lifelong dedication to health and well-being by implementing these recommendations, which encourage regular participation in physical activity. Teacher education programs in higher education institutions might consider incorporating modules on the benefits of physical activity, equipping future teachers with the tools to motivate students through active learning techniques. In conclusion, schools and educational policymakers could use the findings to advocate for increased physical activity opportunities within schools, recognizing their role in enhancing student motivation and overall well-being. This topic is highly relevant for educational theory and practice, highlighting the importance of interdisciplinary approaches in teacher education.

6. Co-Author Contribution

The authors affirmed that there is no conflict of interest in this article. Author 1 carried out the fieldwork, prepared the literature review, and overlooked the whole article's write-up. Authors 2,3,4 and 5 wrote the research methodology, did the data entry, and conducted the statistical analysis and interpretation of the results.

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