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Relationship Between Physical Activity and Learning Outcomes: A Case Study of Bachelor's Students in Health Services Academy (HSA)

Parsa Hamid[1], Dr. Shaheer Ellahi khan[2], Dr. Mahvish Fahim[3], Iqra Ghazanfar[4]

[1] BSPH Scholar, Health Services Academy, Islamabad, Email: parsahamid2003@gmail.com
[2] Associate professor, Health Services Academy, Islamabad. Government of Pakistan, https://orcid.org/0000-0002-7215-5541, Email: shaheer@hsa.edu.pk
[3] MSPH Scholar, Health services academy, Islamabad, Email: faheemmahvish01@gmail.com
[4] Project Officer, Association of Social Development, Islamabad, https://orcid.org/0009-0005-2459-9817, Email: iqra@asd.com.pk

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Abstract

This study investigates the relationship between physical activity and learning outcomes among undergraduate students at the Health Services Academy (HSA), Pakistan. Using an exploratory research design, data were collected from 65 students through surveys and open-ended questions. Findings revealed a strong positive association between regular physical activity and academic performance, with 67.7% of respondents reporting improved grades, 70.3% experiencing better focus, and 78.4% noting enhanced stress management on days they exercised. Walking emerged as the most common activity, followed by sports and gym workouts. Despite these benefits, challenges such as lack of motivation (32.3%), time limitation (24.6%), and academic workload (20%) limited student participation. The results show that the cognitive, emotional, and productivity-related benefits of physical activity while underscoring the need for institutional policies that integrate exercise into academic routines. By addressing these barriers, universities can develop healthier, more productive learning environments. This study contributes localized evidence from Pakistan, supporting global research on the pivotal role of physical activity in enhancing student well-being and academic success.

Introduction

Physical activity refers to any bodily movement produced by skeletal muscles that requires energy expenditure (1). It includes all forms of movement, whether during leisure time, domestic chores, transportation, or occupational tasks. In the modern world, physical activity plays a vital role not only in enhancing physical health but also in promoting mental well-being and improving academic performance (2). Global research has consistently demonstrated a strong link between regular physical activity and improved learning outcomes, including enhanced memory, attention span, self-management, and interpersonal skills. Despite this evidence, schools and universities in many developing countries, including Pakistan, often fail to prioritize or promote such activities (3). Physical activity can take many forms from light aerobic exercises such as running and swimming to strength training, stretching, sports, and even everyday tasks (4). The World Health Organization recommends that young people engage in at least 60 minutes of physical activity each day. Among adolescents, regular activity has been shown to lower the risk of cardiovascular disease, hypertension, depression, and anxiety, while also improving overall health and sleep quality (5). Learning outcomes, such as academic achievement and skill development, are crucial in shaping a student's future benefits. However, the current education system tends to emphasize sedentary learning environments rather than integrating physical activity into daily routines (6). This issue is particularly

prevalent among high school and university students, who often face heavy academic demands, leading to a sedentary lifestyle and reduced physical activity levels (7). This study, which focuses on the unique instance of Bachelors students of Health Services Academy (HSA), aims to investigate the association between physical activity and learning outcomes in the setting of a rigorous health sciences curriculum (8). Students seeking a Bachelor of Science degree sometimes face strenuous schedules that include lectures, practical sessions, and research assignments (9). These pressures can cause increased stress, decreased physical activity, and negative effects on cognitive performance. This study will fill a vacuum in local knowledge by investigating how physical exercise improves HSA student's academic results, giving light on both the challenges and potential in this particular academic and cultural environment (10). This study aims to add to the current body of information by looking into the association between physical activity and learning outcomes in the setting of HAS (12). It seeks to address key questions: Is physical exercise associated with improved academic achievement among BS students? Which specific sorts of physical exercise have the most impact? How can institutions like HSA use these insights within their academic framework? (13) This study addresses these topics, not only filling a vacuum in the current literature but also paving the way for evidence-based treatments that prioritise students' physical and cognitive well-being (15). Finally, this case study might serve as a model for other academic institutions, emphasizing the transformational power of physical exercise in improving learning results and cultivating a culture of health and quality in education (16).

Objectives

- To explore the different factors affecting the physical activities of BS students.
- To understand the impact of physical activity on the learning outcomes of BS students.
- To recommend productive physical activities for the improvement of BS students' overall performance.

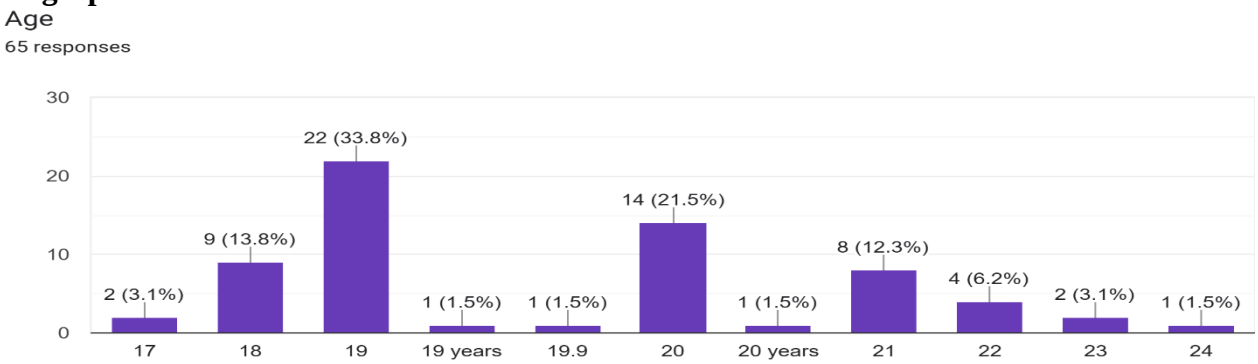
Methodology

This study used a survey-based approach to examine the link between physical activity and academic outcomes among Bachelor students at the Health Services Academy (HSA), Pakistan. A purposive sampling method categorized students by self-reported activity levels (low, moderate, high). Data were collected through a Google Form and analyzed to identify key patterns in student experiences and achievements.

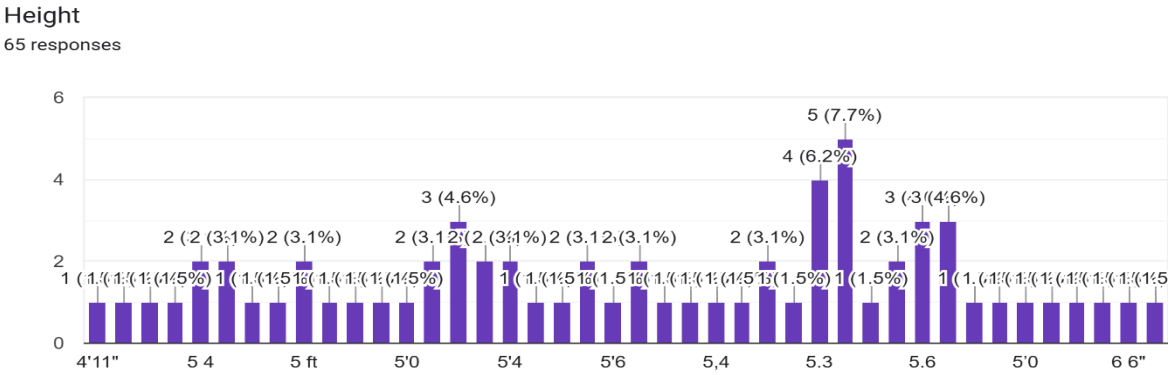
Results

The following are the results obtained after the survey was completed. The results will be explained individually, considering all facts and figures. A total of 65 responses were being collected. The survey was completed in 4 stages, including demographic information, physical activity profile, academic/learning outcomes, and open-ended questions.

Demographic Information

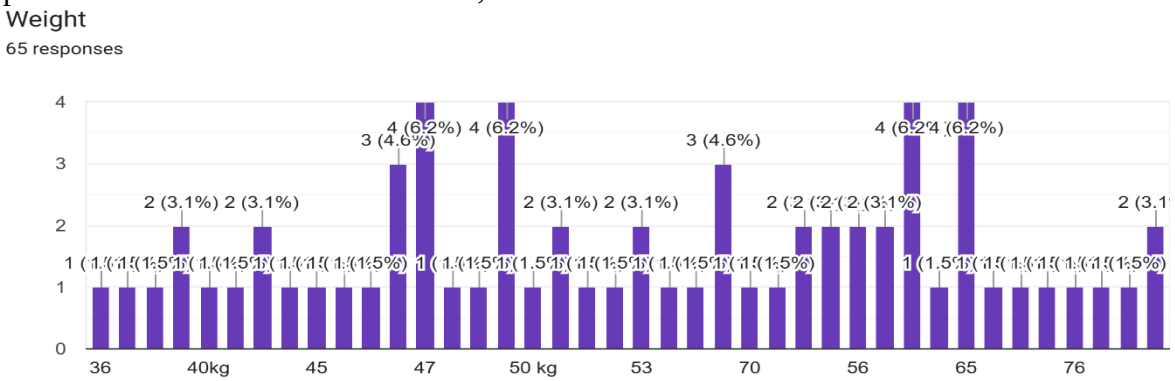


The survey population mainly consists of young adults, specially in the **age range 18-21 years.** There is a **peak at age 19**, making up **33.8% (22 people)** of the total.



5′3″ is the most frequently reported height with **5 respondents (7.7%). 5′2″** follows with **4 respondents (6.2%). 5′6″** has **3 respondents (4.6%).**

The range spans from **4′11″** to **6′6″**, showing a **wide variation in height**. Majority of respondents fall between **5′0″ and 5′6″**, which seems to be the central cluster.



This chart is a bar graph showing the distribution of weights (in kilograms) from a survey of 65 responses.

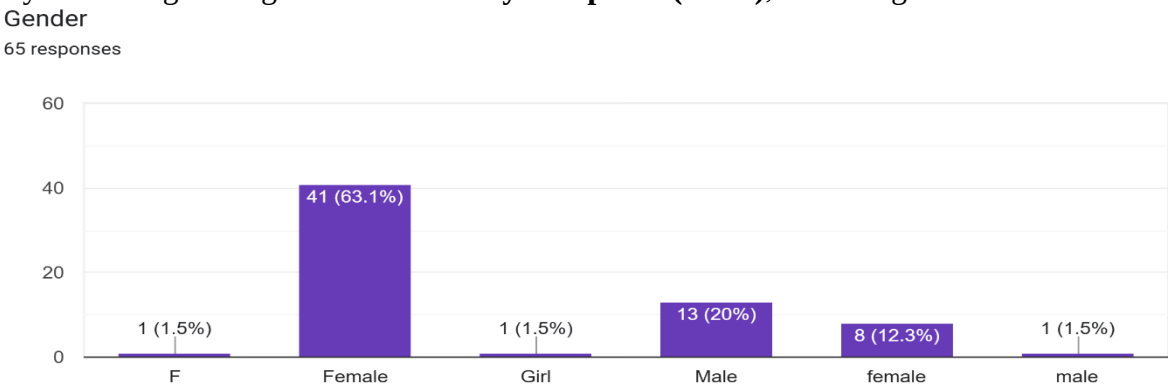
X-axis (horizontal): Represents weight values in kilograms (kg), ranging from 36 kg to 76 kg.

Y-axis (vertical): Shows the number of people who selected each weight, from 0 to 4.

The most common weights (with **4 responses each**, or **6.2%** of the total) are: **47 kg, 50 kg and 65 kg.**

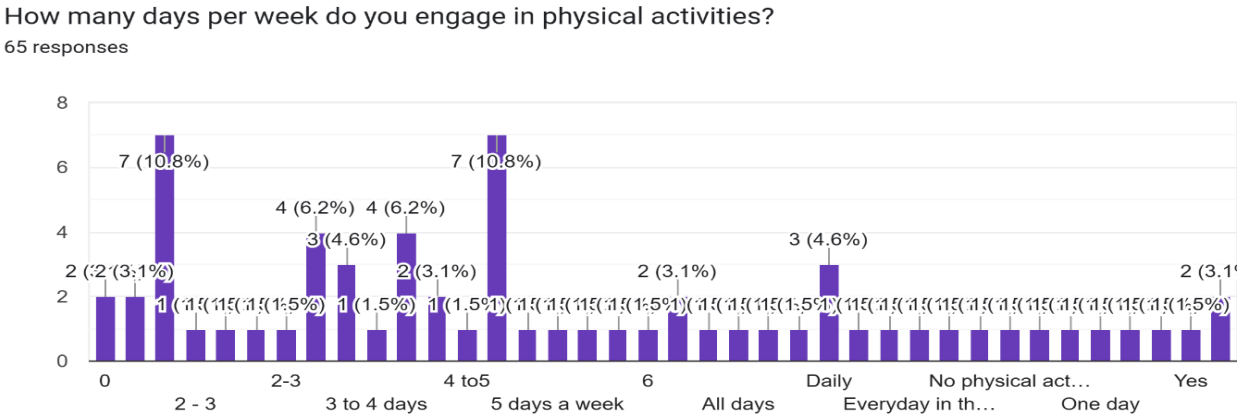
Other relatively frequent weights include: **46 kg** and **70 kg** (3 responses each, 4.6%).

Many other weight categories received **only 1 response (1.5%)**, indicating a broad distribution.

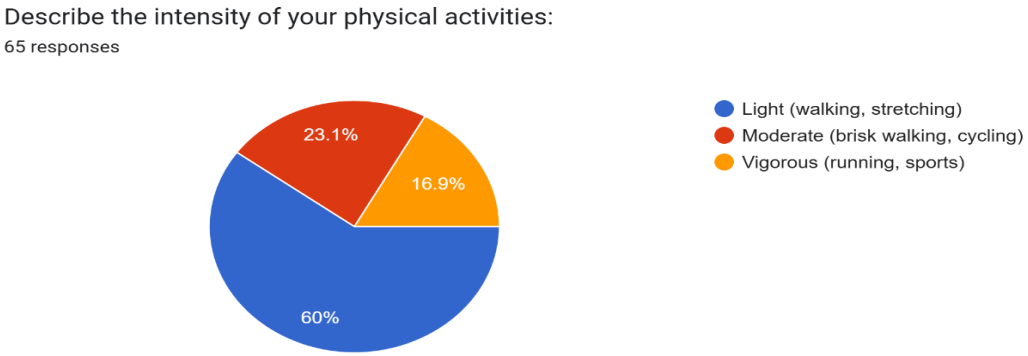


This graph explains the distribution of males and females' respondents who contributed in the survey. The total percentage of **female respondents** is **78.4%** and that of **male** is **21.5%**, indicating dominance of female over males.

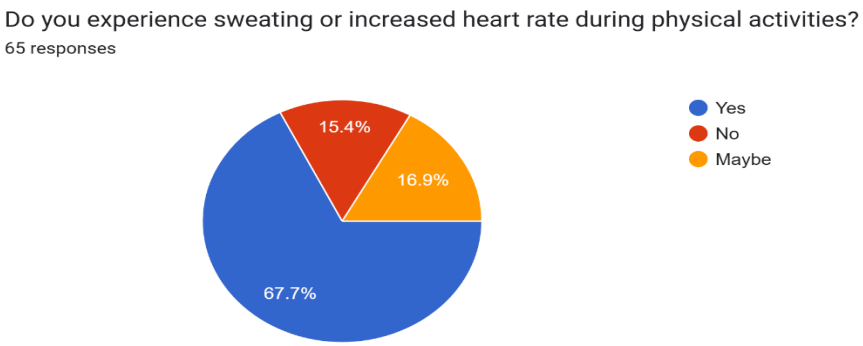
Physical Activity Profile



This graph explains the answer to the question **"How many days per week do you engage in physical activities?"** The x-axis lists various categories of responses, and the y-axis indicates the number of responses for each category. Each bar also shows the exact number of responses and the corresponding percentage. There were merely 2 responses of doing no physical activity at all, and 7 or 8 responses of doing physical activities throughout the week. On average, people were doing physical activities 4-5 days per week. The next question asked in this category was open-ended: **"How much time do you usually spend on physical activities?"** The responses also varied in this category. Upon the breakdown of responses, the following results were obtained: Most people were spending 30 mins to 2 hours of their daily routine on physical activities. 3-4 hours of physical activity were also present. One odd response of 6-8 hours of daily physical activity was also seen. Other responses included 15 minutes, 20 minutes and 45 minutes or 0 hours of physical activity.

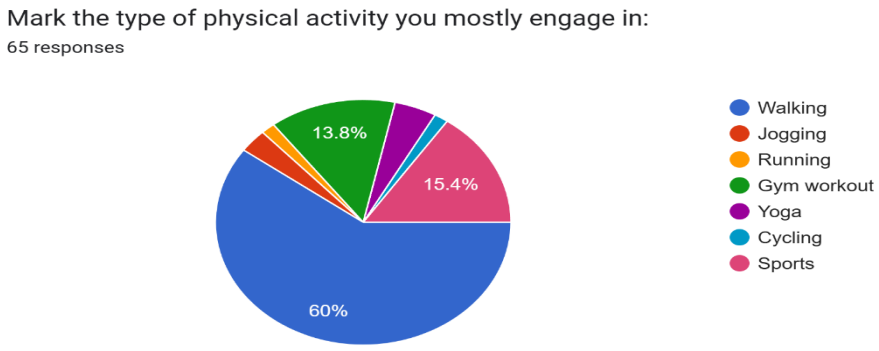


The pie chart explains the percentage of intensity of physical activities done by respondents.
Blue colour: Light physical activity **(60%)**, indicating that a high number of respondents prefer light physical activities in their daily life.
Red colour: Moderate physical activity **(23.1%)**
Yellow colour: Vigorous physical activity **(16.9%)**

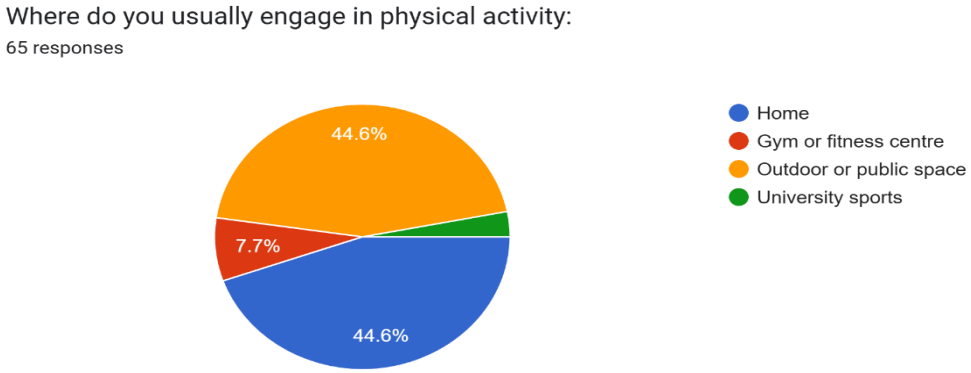


The pie chart explains the percentage of sweating or increased heart rate respondents experience during physical activities.

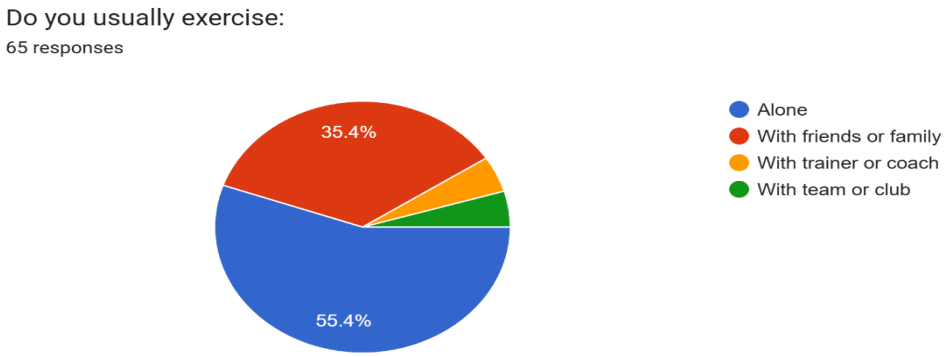
Blue colour: **67.7%,** indicating a a major proportion of respondents experiencing sweat or increased heart rate.
Red colour: 15.4% respondents don't experience such things at all.
Yellow colour: **16.9%** respondents may or may not be experiencing such things.



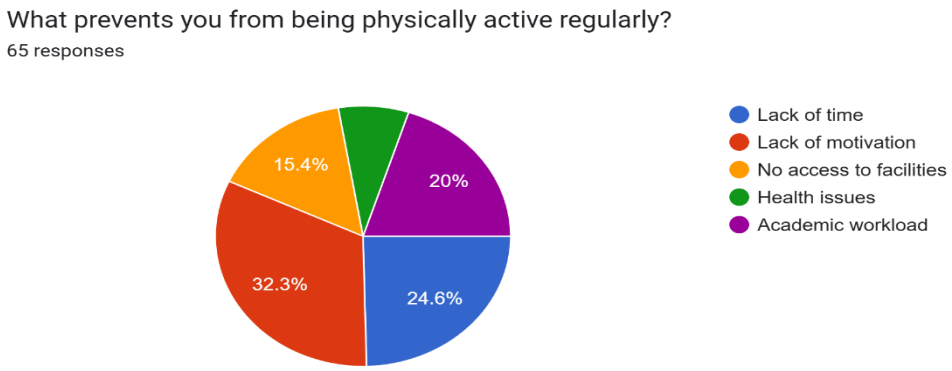
The pie chart explains the type of physical activity which respondents usually engage in. Breaking it down, we get three major types:
Blue colour: Walking **(60%)**
Pink colour: Sports **(15.4%)**
Green colour: Gym workout **(13.8%)**
The other types of physical activities share a minor contribution of **10.8%** including:
Orange colour: Jogging
Yellow colour: Running
Purple colour: Yoga
Light blue colour: Cycling



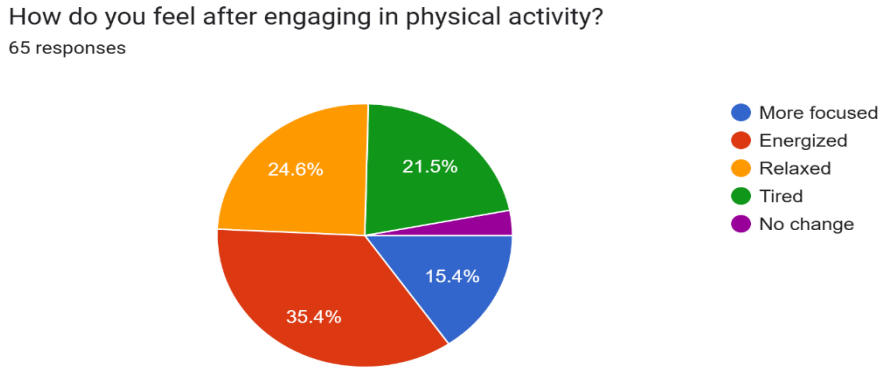
The pie chart shows the percentage of different places where respondents usually engage in physical activities. They are:
Blue colour: Home **(44.6%)**
Yellow colour: Outdoor or public space **(44.6%)**
Red colour: Gym or fitness centre **(7.7%)**
Green colour: University sports, giving minor contribution of **3.1%.**



The pie chart is divided into four segments, each representing a different way people exercise, along with their respective percentages:
Blue colour: Alone **(55.4%)**, indicating that respondents mostly prefer to exercise alone rather than with others.
Red colour: With friends or family **(35.4%)**
Orange colour: With trainer or coach **(4.6%)**
Green colour: With team or club **(4.6%)**



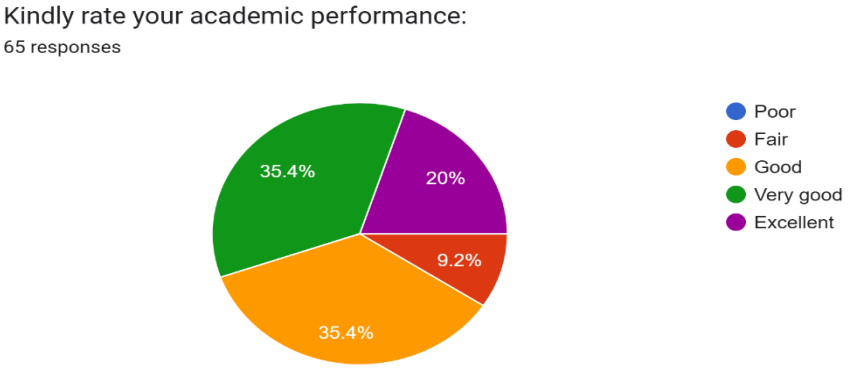
The pie chart explains a few things that prevents the respondents from being physically active regularly. These include:
Red colour: Lack of motivation **(32.3%),** indicating that laziness acts as a hurdle between respondents and physical activities.
Blue colour: Lack of time **(24.6%)**
Purple colour: Academic workload **(20%)**
Yellow colour: No access to facilities **(15.4%)**
Green colour: Health issues **(7.7%)**



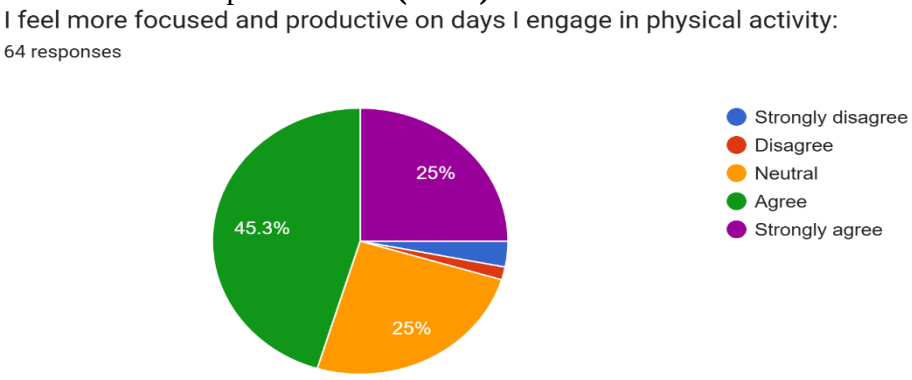
The pie chart is divided into five segments, each representing a different feeling after physical activity, along with their respective percentages:
Red colour: Energized **(35.4%)**
Yellow colour: Relaxed **(24.6%)**
Green colour: Tired **(21.5%)**
Blue colour: More focused **(15.4%)**
Purple colour: No change **(3.1%)**
This indicates that, physical activity predominantly leads to feelings of being energized, relaxed, or more focused. While tiredness is a significant outcome for some, a lack of change in feeling is rare.

Academic/ Learning Outcomes
In the third stage of survey, respondents were asked about their last semester's Gpa. 8 respondents were in their first semester. Few said that their results had not announced yet. Those in the senior semesters had their Gpa ranging between 3.4 – 4. Only 1 student has 2.84 Gpa in their last semester. Secondly, they were asked that how many hours per day do they

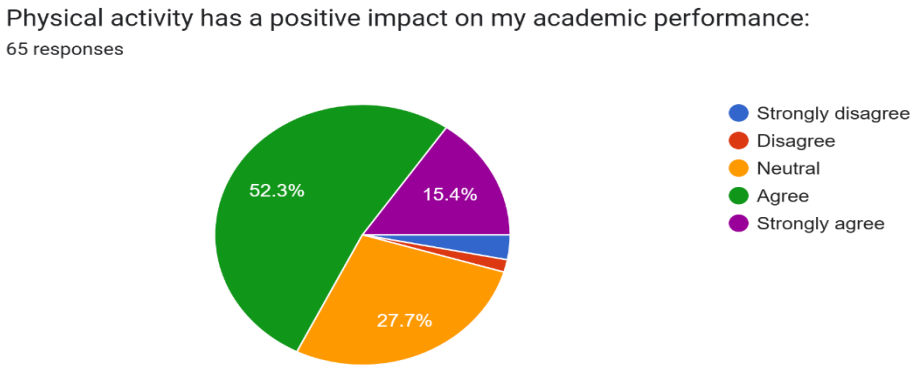
spend on studying. 5 respondents replied with zero hours, saying that they don't need to study daily. A few respondents were studying for 7-8 hours per day and 4-5 hours per day also. On average, most of them were studying for 2-3 hours on daily basis.



This pie chart explains the academic performance of respondents. According to this:
Yellow colour: Good performance **(35.4%)**
Green colour: Very good performance **(35.4%)**
Purple colour: Excellent performance **(20%)**
Red colour: Fair performance **(9.2%)**

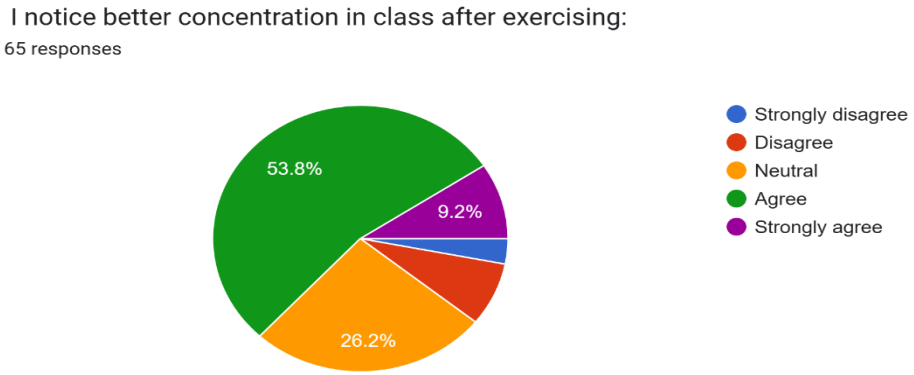


This pie chart summarises the percentage of how focused and productive respondents feel on days they engage in physical activity. Breaking it down, we get:
Green colour: **45.3%** (The largest group of respondents agree that physical activity improves their focus and productivity)
Purple colour: **25%** (A significant portion strongly supports this idea)
Yellow colour: **25%** (Another quarter of respondents neither agree nor disagree)
Red colour: **1.6%** (Only a small number of respondents disagreed)
Blue colour: **3.1%** (A minimal number of respondents strongly disagreed)
In short, **70.3%** of respondents feel that physical activity helps them be more focused and productive.

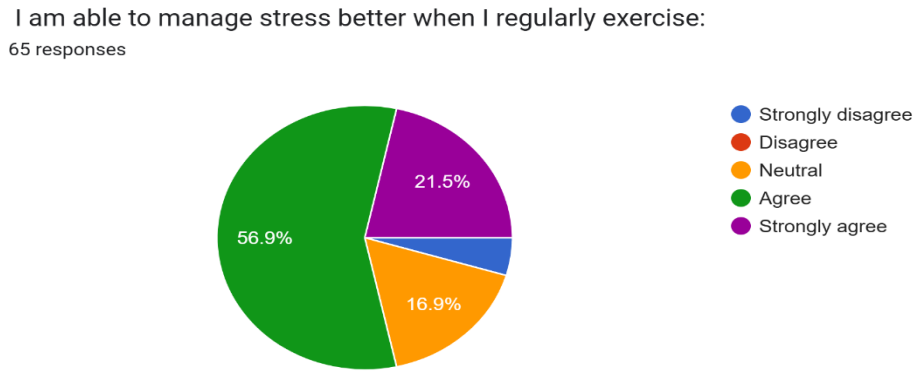


The pie chart explains the percentage of positive impact of physical activity on academic performance of respondents.

Green colour: **52.3%** (More than half of the respondents believe physical activity positively affects their academic performance)
Purple colour: **15.4%** (A significant portion strongly supports this idea)
Yellow colour: **27.7%** (Over a quarter of respondents are undecided or feel indifferent)
Red colour: **1.5%** (Very few respondents disagreed)
Blue colour: **3.1%** (Almost negligible disagreement)
Conclusively, **67.7%** of respondents believe that physical activity benefits their academic performance. A strong majority of students perceive a **positive link between physical activity and academic performance**, indicating that physical well-being may contribute to cognitive benefits and better study outcomes. The high percentage of positive responses suggests support for promoting physical activity as part of academic life.

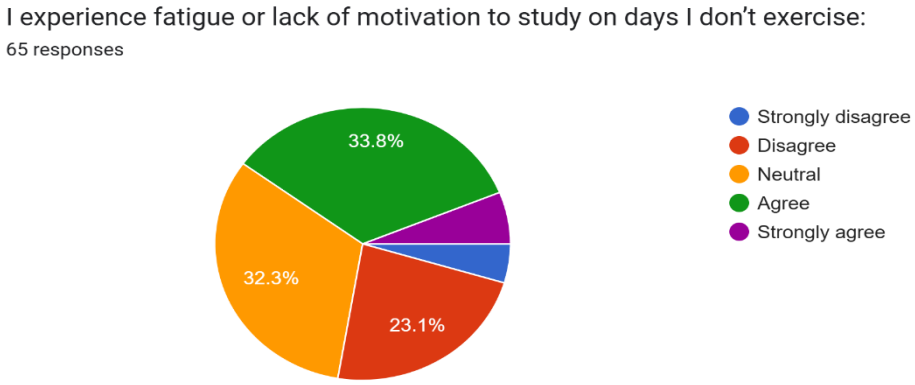


The pie chart represents the results of survey question: “I notice better concentration in class after exercising.” Breaking it down, we get:
Green colour: **53.8%** (More than half of respondents believe that they notice better concentration in class after exercising)
Purple colour: **9.2%** (A fair number of respondents strongly supports this idea)
Yellow colour: **26.2%** (Over a quarter of respondents are undecided or feel indifferent)
Red colour: **7.7%** (Reasonable number of respondents disagreed)
Blue colour: **3.1%** (A minimal number of respondents strongly disagreed)
A total of **63%** of respondents believe that they notice better concentration in class after exercising.

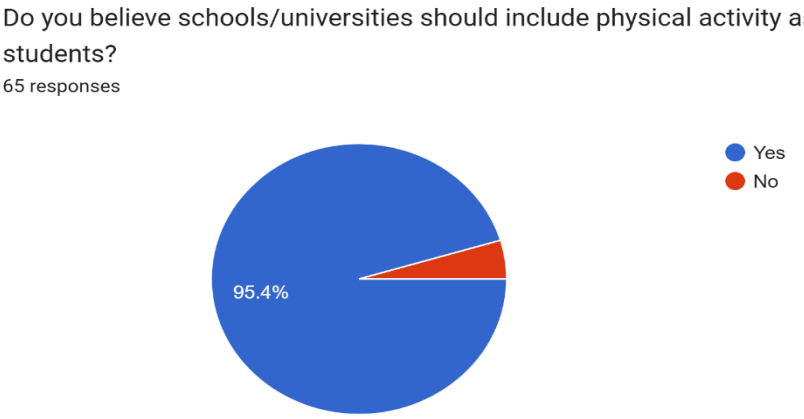


This pie chart presents the results of a survey question: "I can manage stress better when I regularly exercise."
Green colour: **56.9%** (The largest segment of the pie, indicating that over half of the respondents believe they manage stress better with regular exercise)
Purple colour: **21.5%** (A significant percentage of respondents strongly affirm the idea)
Yellow colour: **16.9%** (This portion of the respondents neither agreed nor disagreed with the statement)
Red colour: **0.1%** (It’s the smallest slice, indicating that a very low portion of respondents in this category)

Blue colour: **4.6%** (A minimal number of respondents strongly disagreed to this idea)
A massive percentage of **78.4%** shows that a substantial majority (over three-quarters) of the respondents perceive regular exercise as beneficial for stress management.



This pie chart answers the survey question "I experience fatigue or lack of motivation to study on days I don't exercise." Breaking it down, we get:
Green colour: **33.8%** (Over a third of the respondents agree with the statement)
Purple colour: **6.2%** (It is a small slice that strongly affirms the idea)
Yellow colour: **32.2%** (Almost one-third of the respondents are neutral on this topic)
Red colour: **23.1%** (Nearly a quarter of respondents disagree)
Blue colour: **4.6%** (A very low proportion of respondents strongly disagree with the statement)
The pie chart reveals varied experiences regarding the impact of not exercising on study-related fatigue and motivation. While a considerable number of respondents do experience these negative effects, an equally large or even larger portion either doesn't experience them or holds a neutral view, suggesting that this relationship is not universal among the surveyed group and can be influenced by individual differences or other factors.



This pie chart addresses the question: "Do you believe schools/universities should include physical activity as part of daily routine for students?"
Blue colour: **95.4%** indicating an overwhelming majority of respondents.
Red colour: **4.6%** indicating the minority respondents.
While the chart doesn't provide reasons for the opinions, given the previous questions in this likely series (about exercise improving concentration and stress management), it's highly probable that the strong "Yes" vote is based on the perceived academic, mental, and physical benefits that exercise provides to students. Respondents likely believe that incorporating physical activity would lead to:

- Better concentration in class.
- Improved stress management.
- Overall better physical health.
- Reduced fatigue or increased motivation for studying.

Open-ended Questions

To conclude the survey, two open-ended questions were posed to respondents to elicit their personal perspectives on physical activity and its influence on academic life.

- **In your opinion, how does physical activity impact your academic life?**

Upon analysing all responses to this question, the following key insights were derived:

Physical activity plays a significant role in enhancing various aspects of academic life. Engaging in regular physical exercise improves blood circulation to the brain, which enhances cognitive functions such as memory, attention, and problem-solving skills. It helps reduce stress and anxiety, which are common challenges faced by students, by promoting the release of endorphins natural mood lifters that contribute to emotional well-being. This reduction in stress allows for better focus during lectures, more effective study sessions, and improved sleep quality, all of which are essential for academic success. Moreover, physical activity fosters discipline, time management, and resilience—skills that are equally valuable in an academic setting. Students who maintain a balanced routine that includes physical activity often report increased energy levels, better classroom engagement, and a greater ability to retain information. In essence, regular exercise not only supports physical health but also creates a positive mindset and structured lifestyle that directly contribute to improved academic performance.

- **What kind of physical activities do you find most beneficial for learning focus or motivation?**

According to the respondents, the below given physical activities are beneficial for learning focus or motivation:

Walking, sports (football, volleyball, cricket), yoga, running, cycling, jogging, swimming, stretching. According to respondents, all these physical activities must be included in the daily routine of university, which can help them in reducing stress and focusing more on their studies.

Discussion

This study explored the relationship between physical activity and learning outcomes among undergraduate students at the Health Services Academy (HSA). The findings reveal a significant positive association between regular physical activity and improved academic performance, cognitive focus, and stress management. Most participants reported engaging in light to moderate physical activity, with walking being the most common form (17). Notably, 67.7% of students believed that physical activity had a positive impact on their academic performance, while 70.3% felt more focused and productive on days they exercised. Additionally, over 78% of respondents agreed that regular exercise improved their ability to manage stress factors directly contributing to enhanced learning outcomes (18). The results suggest that physical activity plays a multifaceted role in supporting academic achievement. The psychological and physiological benefits of exercise such as improved mood, enhanced brain function, better sleep, and reduced stress appear to translate into tangible improvements in students' academic lives. Students engaging in regular physical activity reported not only higher productivity but also better concentration in classes. These outcomes are likely the result of increased blood flow to the brain, improved neural efficiency, and the release of endorphins, which enhance emotional and cognitive performance. Additionally, the study highlights key barriers to physical activity, including lack of motivation (32.3%), limited time (24.6%), and academic workload (20%). These challenges reflect the demanding nature of the students' academic environment and suggest that without institutional support, many students may struggle to incorporate physical activity into their routines. The findings of this study align with existing literature emphasising the cognitive and emotional benefits of physical activity. For instance, Best (2010) and Castelli et al. (2014) demonstrated that aerobic exercises improve executive functions like memory and attention, which are crucial for academic success (9, 10). Similar to the results presented here, Tamminen et al. (2020) and Rosenbaum et al. (2014) found that regular physical activity is associated with better stress management and positive mental health outcomes among students. Furthermore, this study adds localized evidence to the

global discourse by focusing on Pakistani students, a demographic often underrepresented in physical activity research (13,14). It reinforces Hallal et al.'s (2012) concerns that educational systems in underdeveloped countries often neglect physical activity as part of the academic environment (11). These findings have important implications for educational policy and practice. First, they suggest that integrating structured physical activity programs into university curricula could enhance student academic performance and well-being (19). Institutions like HSA should consider promoting on-campus recreational facilities, scheduled physical activity breaks, or compulsory physical education sessions (20,21). Second, addressing common barriers such as lack of time or motivation requires institutional-level interventions (22). This could include flexible class schedules, awareness campaigns, and incorporating physical activity as a credit-bearing academic component (23,24). Given that a vast majority of students expressed support for including physical activity in their daily routine, there is clear readiness for such policy interventions (25).

Conclusion

This study set out to explore the relationship between physical activity and learning outcomes among Bachelor students at the Health Services Academy (HSA). The findings reveal a clear and positive association: students who engage in regular physical activity tend to experience better academic performance, improved focus, and enhanced stress management. Walking, light exercises, and sports emerged as the most commonly practised and beneficial forms of physical activity, with the majority of respondents expressing strong support for the integration of such activities into daily academic routines. Importantly, the study highlights not only the benefits but also the challenges students face in maintaining an active lifestyle, chief among them being lack of motivation, time constraints, and academic workload. These findings underscore the need for institutional support and policy reform to foster environments that prioritise physical well-being alongside academic achievement. By offering insight into student experiences within a rigorous health sciences curriculum, this research contributes to the limited body of evidence from developing countries like Pakistan. It supports the growing consensus that physical activity is not merely a component of physical health but a fundamental contributor to cognitive performance and academic success. Educational institutions must now recognize this vital connection and take proactive steps to incorporate physical activity into their academic framework. Doing so has the potential to not only enhance student learning outcomes but also promote a more balanced, healthy, and productive student life.

Limitations

While the study offers valuable insights, several limitations must be acknowledged. Firstly, the reliance on self-reported data introduces the possibility of response bias, particularly in the reporting of physical activity levels and academic performance. Secondly, the sample size (n = 65) was relatively small and drawn from a single institution, limiting the generalizability of the results to other academic settings or disciplines. Additionally, this study did not account for other confounding variables that may influence academic performance, such as socioeconomic status, diet, or sleep habits. The cross-sectional nature of the data also limits the ability to establish causality between physical activity and academic outcomes.

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