

The Role of Physical Activities in Enhancing the Academic Performance of University Athletes in Selected Universities in Lusaka District, Zambia

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ABSTRACT

Physical activity is increasingly recognised as an important component of student development because its potential benefits extend beyond physical fitness to cognitive functioning, psychological well-being, academic productivity and the management of competing university responsibilities. This article presents findings from a study that assessed the role of physical activities in enhancing the academic performance and holistic development of university athletes in selected universities in Lusaka District, Zambia. The study adopted a descriptive survey design and a mixed-methods approach. A total of 160 valid questionnaire responses were obtained, comprising 140 student athletes, 12 Physical Education and Sport (PES) lecturers and 8 university administrators, while interviews were conducted with 12 PES lecturers from six selected higher learning institutions. Quantitative data were analysed using SPSS version 29 and Microsoft Excel, while qualitative data were analysed thematically. The findings showed a positive, moderate and statistically significant association between frequency of physical activity and academic performance among student athletes (Spearman's $\rho = .426$, $p < .001$, $n = 140$). Cognitive-function measures also produced a significantly positive mean response ($M = 4.17$, $SD = 0.63$; $t(139) = 21.95$, $p < .001$). In relation to psychological well-being, participation in physical activity for managing academic stress and anxiety was moderately and significantly associated with psychological readiness for examinations and coursework ($\rho = .512$, $p = .001$). In addition, frequency and intensity of physical activity jointly explained 45.2% of the variation in academic productivity and study balance ($R^2 = .452$). The findings indicate that structured physical activity can form a meaningful component of the academic experience of university athletes, particularly when supported by appropriate scheduling, academic monitoring and institutional support. The article recommends coordinated dual-career support, structured exercise programmes and balanced training schedules within higher education institutions.

Keywords: Academic performance; physical activity; university athletes; cognitive functions; academic stress; psychological readiness; exercise intensity; study balance.

INTRODUCTION

University education requires students to manage demanding academic schedules, independent learning, assessment requirements and, in the case of student athletes, substantial sporting commitments. Within this environment, physical activity may be viewed either as an additional demand on students' time or as a resource that supports learning and well-being. The present study was concerned with the latter perspective and examined how regular physical activity relates to academic performance, cognitive functioning, psychological readiness and the ability of university athletes to balance sporting and academic responsibilities.

The literature reviewed in the source study suggests several pathways through which physical activity may support university learning. Physical exercise has been associated with brain and cognitive processes relevant to learning, including attention, memory, executive functioning and mental alertness (Hassevoort et al., 2018; López-Vicente et al., 2019; Stillman et al., 2020). Exercise-related neurobiological processes, including changes associated with brain-derived neurotrophic factor (BDNF), have also been discussed as possible mechanisms linking physical activity with learning and memory (Chen et al., 2023). More broadly, systematic and empirical studies have reported relationships between physical activity, cognitive functioning and academic outcomes

among university students (Lipošek et al., 2018; Mazzoli et al., 2023; Rosales-Ricardo & Cáceres-Manzano, 2024).

The psychological dimension is equally important. University students frequently encounter academic pressure associated with examinations, coursework, deadlines and competing responsibilities. Previous research cited in the dissertation indicates that exercise participation can be associated with improved mental health, stress management and academic engagement (Alghadir et al., 2020; Kim et al., 2021; Ahmed et al., 2024). For student athletes, however, physical activity is also part of their sporting identity and routine. Consequently, its academic contribution cannot be considered separately from the demands of training, competition, travel and recovery. Research on student athletes has highlighted the importance of time management, self-discipline, institutional support and dual-career arrangements in determining how sporting participation interacts with academic responsibilities (Agyekum & Boateng, 2020; Adeyeye & Mohammed, 2023; Lupo et al., 2022).

The Zambian context adds an important dimension to this discussion. The source dissertation notes that university athletes must navigate academic and sporting responsibilities within institutional environments where support systems, facilities, scheduling and coordination may vary. Earlier Zambian work cited in the study suggests that institutional support can influence student athletes' ability to combine sport and education successfully (Phiri, 2019), while research conducted in a Lusaka-based university has reported perceptions of sports participation as relevant to academic engagement and personal discipline (Mulenga, 2022). There was therefore a need for context-specific evidence concerning the relationship between physical activity and academic performance among university athletes in Lusaka District.

The study was guided by four objectives: to identify the correlation between regular physical activity and Grade Point Average (GPA) and overall academic achievement; to examine the impact of physical exercise on cognitive functions required for university-level learning; to assess the role of physical activity in mitigating academic-related stress and anxiety; and to determine how exercise frequency and intensity relate to academic productivity and study balance. The study also considered lecturers' observations concerning discipline, concentration, emotional regulation and institutional support.

CONCEPTUAL AND THEORETICAL BASIS

The study drew on complementary explanations of how physical activity may relate to academic outcomes. The Neurobiological Framework provided a basis for understanding the possible role of increased cerebral circulation, oxygen availability and neurochemical processes in cognitive functioning. The dissertation particularly linked exercise with BDNF, neuronal growth and hippocampal functioning, which are relevant to memory and learning (Chen et al., 2023; Stillman et al., 2020).

The Cognitive Resource Allocation Model was used to explain the relationship between physical activity, mental readiness and academic pressure. Within this perspective, physical activity may help students restore cognitive resources following periods of academic demand and may support concentration and psychological readiness. The source study also incorporated Self-Determination Theory, which emphasises autonomy, competence and relatedness as motivational conditions influencing sustained behaviour and performance (Deci & Ryan, 2020). For student athletes, these concepts relate to the ability to regulate training and study schedules, develop confidence through sporting competence, and obtain support from teams, coaches and university communities.

The conceptual position underlying the study was that physical activity frequency and intensity may influence academic performance through cognitive, psychological and behavioural pathways. These pathways include concentration and memory, stress regulation, confidence, discipline, time management and energy management. At the same time, the study recognised that institutional support, academic motivation, learning conditions and personal circumstances may also influence academic outcomes. Thus, the observed relationships were interpreted as associations rather than proof of direct causation.

METHODOLOGY

A descriptive survey design was used with a mixed-methods approach. The design allowed the study to collect quantitative information concerning physical activity participation and academic-related outcomes while also

obtaining qualitative perspectives from PES lecturers. The use of quantitative and qualitative evidence enabled the researcher to examine statistical relationships alongside lecturers' practical observations concerning student athletes.

The study was conducted in six selected higher learning institutions in Lusaka District. The target participants comprised university student athletes, PES lecturers and university administrators. The initial sampling plan targeted 167 respondents. Of the 167 questionnaires distributed, 160 were successfully returned, giving an overall response rate of 95.8%. The achieved sample used for questionnaire analysis therefore consisted of 160 respondents. The student-athlete analysis was based on 140 students, while the study also included PES lecturers and university administrators. In addition, interviews were conducted with 12 PES lecturers from the six selected institutions.

Questionnaires were used to collect quantitative data. The instrument included items concerning frequency of organised physical activity or sports training, academic performance or GPA, perceived physical fitness, concentration, memory retention, mental alertness, academic stress and anxiety, psychological readiness, weekly exercise duration, exercise intensity and the ability to balance physical activity with academic responsibilities. Likert-scale items used a five-point response format ranging from strongly disagree to strongly agree. Semi-structured interviews were used to obtain lecturers' perspectives on academic performance, cognitive functions, stress management, exercise scheduling and institutional support.

Quantitative data were analysed using SPSS version 29 and Microsoft Excel. Descriptive statistics were used to summarise responses, while Spearman's rank-order correlation was used to examine associations between variables. One-sample t-tests were used to assess composite perceptions against the neutral midpoint of the five-point scale. Multiple linear regression was used to examine the contribution of physical activity frequency and intensity to academic productivity and study balance. Qualitative interview data were analysed thematically. Ethical procedures included voluntary participation, confidentiality, anonymity, informed participation and protection of respondents from unnecessary harm.

RESULTS

Spearman's Rank-Order Correlation between Regular Physical Activity and Academic Performance

			Frequency of Physical Activity	Academic Performance
Spearman's rho	Frequency of Physical Activity	Correlation Coefficient	1	.426**
		Sig. (2-tailed)	.	0
		N	140	140
	Academic Performance	Correlation Coefficient	.426**	1
		Sig. (2-tailed)	0	.
		N	140	140

The findings indicated that regular physical activity was common among the university athletes. In the broader respondent group, 61 respondents (38%) reported participating in organised physical activity four to five times per week, while 52 (33%) reported participation two to three times per week. Most respondents also reported moderate to high levels of physical fitness; 61 respondents (38%) rated their fitness as high and 57 (36%) as moderate. Collectively, 136 respondents (85%) rated their fitness as moderate, high or very high.

Academic performance results showed that 74% of student athletes reported academic performance of 60% and above. The correlation analysis based on 140 student athletes found a positive, moderate and statistically significant relationship between frequency of physical activity and academic performance ($\rho = .426$, $p < .001$). Students reporting more frequent participation in organised physical activity or sports training tended to report higher academic performance categories. The moderate size of the coefficient also indicates that physical activity did not account for all variation in academic achievement.

The cognitive-function findings were also positive. A composite measure of cognitive functions relevant to university learning produced a mean of 4.17 (SD = 0.63), which was significantly above the neutral midpoint, $t(139) = 21.95$, $p < .001$. In the concentration item, 123 of the 140 student athletes (88%) reported that they experienced improved concentration sometimes, often or always after participating in physical exercise. Similarly, the memory-retention findings indicated that most respondents experienced improvement at least sometimes, with 50 respondents (36%) reporting improvement often and 27 (19%) reporting it always.

Physical activity was also associated with the management of academic-related stress and anxiety. The composite mean for physical activity, academic stress, anxiety and psychological readiness was 4.20 (SD = 0.65), significantly above the neutral midpoint of 3.00, $t(159) = 23.38$, $p < .001$. A Spearman correlation showed a positive, moderate and statistically significant relationship between participation in physical activity for managing stress or anxiety and psychological readiness for examinations and coursework ($\rho = .512$, $p = .001$, $n = 140$). The results therefore indicate that students who reported more frequent use of physical activity as a coping strategy tended to report greater psychological readiness.

The findings also showed that physical activity did not eliminate academic stress. Although 82% of respondents reported using physical activity to manage stress and anxiety, 86% indicated that they experienced academic-related stress sometimes, often or very often. This suggests that exercise functioned primarily as a coping or supportive mechanism rather than as a complete solution to academic pressure.

With respect to exercise duration and balance, 80% of respondents reported spending between two and ten hours per week on physical activity, training or individual exercise. The most common category was five to seven hours per week, reported by 35% of respondents. Respondents agreed that exercise intensity provided sufficient physical and mental energy for academic work, with a mean of 4.18 (SD = 0.77).

Multiple Linear Regression Analysis of Physical Activity Frequency and Intensity as Predictors of Academic Productivity and Study Balance

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	0.672	0.452	0.444	0.582		
ANOVA						
Model	Sum of Squares	df	Mean Square	F	Sig.	
Regression	28.734	2	14.367	42.39	0.001	
Residual	34.783	137	0.254			
Total	63.517	139				
Coefficients						
Predictor		B	Std. Error	Beta (β)	t	Sig.
Constant		1.842	0.286		6.44	0.001
Frequency of physical activity		0.318	0.071	0.351	4.48	0.002
Intensity of physical activity		0.402	0.078	0.405	5.15	0.001

The findings showed that the multiple regression model produced a strong positive relationship between physical activity frequency and intensity and academic productivity and study balance, with $R = 0.672$. The model explained 45.2% of the variation in academic productivity and study balance, as indicated by $R^2 = 0.452$. The adjusted R^2 value of 0.444 indicated that the model retained substantial explanatory power after accounting for the number of predictors included. The remaining 54.8% of the variation was attributable to other factors not included in the model.

The ANOVA results showed that the regression model was statistically significant, $F(2, 137) = 42.39, p < 0.001$. This indicated that frequency and intensity of physical activity, when considered together, significantly predicted academic productivity and study balance among student athletes. The null hypothesis that frequency and intensity of physical activity did not significantly predict academic productivity and study balance was therefore rejected.

The coefficient results showed that both frequency and intensity of physical activity made statistically significant positive contributions to the dependent variable. Frequency of physical activity significantly predicted academic productivity and study balance ($\beta = 0.351, t = 4.48, p < 0.002$), while intensity of physical activity also made a statistically significant positive contribution ($\beta = 0.405, t = 5.15, p < 0.001$). The standardised beta coefficients indicated that intensity of physical activity ($\beta = 0.405$) was a slightly stronger predictor than frequency of physical activity ($\beta = 0.351$). The findings therefore suggested that both regular participation and appropriate exercise intensity were important predictors of academic productivity and the maintenance of a balanced study schedule, with intensity showing the stronger predictive contribution in the model.

Multiple regression analysis showed that physical activity frequency and intensity jointly predicted academic productivity and study balance. The model produced $R = .672$ and $R^2 = .452$, indicating that the two predictors accounted for 45.2% of the variation in the outcome. The overall regression model was statistically significant, $F(2, 137) = 42.39, p < .001$. Frequency of physical activity made a significant contribution ($\beta = .351, p = .002$), while intensity also made a significant contribution ($\beta = .405, p = .001$). Within this model, intensity had the slightly larger standardised coefficient.

The qualitative findings from the 12 PES lecturers reinforced the quantitative results. Lecturers generally described structured physical activity as compatible with academic achievement when students managed their responsibilities effectively. They identified discipline, punctuality, time management, concentration, emotional control and confidence as behaviours or outcomes associated with sporting participation. At the same time, lecturers emphasised that excessive sporting commitments could create academic difficulties and that institutional support, appropriate scheduling, access to facilities and coordination between academic and sporting structures were important.

DISCUSSION

The positive association between physical activity frequency and academic performance suggests that regular participation in organised physical activity forms an important part of the academic experience of the student athletes studied. The Spearman coefficient of .426 indicates a moderate relationship rather than a perfect one, supporting the interpretation that physical activity is one contributor among several factors that shape academic achievement. This is consistent with the broader literature cited in the dissertation, which identifies relationships between physical activity, academic performance and psychological factors among university students (Lipošek et al., 2018; Wunsch et al., 2021).

The findings concerning cognitive functioning provide additional context for the academic-performance relationship. Most student athletes reported improved concentration after exercise, while the composite cognitive-function score was significantly above the neutral point. These findings are compatible with literature linking physical activity to executive functioning, attention and memory (López-Vicente et al., 2019; Martínez et al., 2022; Mazzoli et al., 2023). The study's theoretical framework further proposes that physiological and neurochemical processes may provide pathways through which exercise supports learning. Nevertheless, the findings are based substantially on respondents' reported experiences and should therefore be interpreted as evidence of perceived or observed association rather than a direct experimental demonstration of neurobiological change.

The relationship between physical activity and psychological readiness was also notable. The correlation of .512 indicates a moderate association between using physical activity to manage academic stress or anxiety and reported readiness for examinations and coursework. This supports previous research cited in the dissertation linking exercise participation with mental health and academic engagement (Kim et al., 2021; Ahmed et al., 2024). The finding that most respondents still experienced academic stress demonstrates that exercise should not be considered a substitute for broader academic and counselling support. Rather, it may be one component

of a wider student-wellness strategy.

The findings on frequency and intensity highlight the importance of balance. The regression model explained 45.2% of variation in academic productivity and study balance, leaving more than half unexplained by the two exercise-related predictors. This reinforces the study's conclusion that academic outcomes are multidimensional. Institutional arrangements, motivation, time management, study habits, access to facilities and personal circumstances may also influence the ability of athletes to succeed academically. The slightly stronger contribution of intensity in the regression model should therefore not be interpreted as establishing a universally optimal exercise intensity; the study was observational and conducted within a specific university-athlete context.

The qualitative findings are important because they show how physical activity may produce behavioural benefits that are relevant to dual-career demands. Lecturers observed that consistent training can encourage planning, punctuality, responsibility and discipline because athletes must coordinate practices with assignments and assessments. This interpretation corresponds with research on transferable self-discipline and goal-setting skills among university athletes (Akinola & Adeyemo, 2020) and research on motivation toward both sport and studies (Lupo et al., 2022).

At the same time, the lecturers' emphasis on institutional support demonstrates that individual discipline alone may not be sufficient. Student athletes operate within university systems that determine access to facilities, timetables, academic advising, competition arrangements and support services. Evidence cited in the source study indicates that institutional support systems can affect academic outcomes among student athletes (Adeyeye & Mohammed, 2023), while Zambian evidence has highlighted the importance of support structures in balancing academic and sporting commitments (Phiri, 2019).

The study's findings should therefore be understood within a dual-career framework. The objective is not simply to increase exercise participation but to create conditions in which sporting involvement and academic study can coexist. The results suggest that structured activity, manageable exercise duration, appropriate intensity, flexible scheduling and coordinated academic support may help athletes use sport as a resource rather than allowing sporting commitments to undermine academic responsibilities. This interpretation is also consistent with the literature on dual-career support systems cited in the dissertation (European Commission, 2024; Guidotti & Capranica, 2019).

IMPLICATIONS FOR HIGHER EDUCATION PRACTICE

The findings have implications for university management, PES departments, coaches, counselling units and academic departments. First, academic support systems for student athletes can be integrated with sports participation rather than treating the two domains as separate. Academic monitoring, advising and flexible arrangements during demanding competition periods may help athletes maintain progress toward their academic goals.

Second, PES departments can develop structured physical activity programmes that recognise the cognitive and psychological dimensions of exercise. Training schedules can be designed with attention to academic calendars, examination periods and recovery needs. Such an approach may help students maintain regular activity while reducing unnecessary conflict between training and study.

Third, counselling and student-wellness services can recognise physical activity as one possible strategy for managing academic stress and supporting psychological readiness. However, exercise-based approaches should operate alongside broader academic and psychosocial support rather than replacing counselling or other services.

Finally, universities can strengthen dual-career arrangements by improving coordination among sports units, academic departments, coaches and student support services. The source study's qualitative evidence indicates that institutional coordination, facilities and scheduling are central conditions for maximising the academic contribution of physical activity.

LIMITATIONS

The findings should be interpreted in light of the study design and context. The study used a descriptive survey design and therefore identified associations rather than establishing causal effects. Several measures were based on respondents' perceptions or self-reported information. The study was also conducted in six selected higher learning institutions in Lusaka District, which limits the extent to which the findings can be generalised to all university students or athletes in Zambia. In addition, the regression model showed that 54.8% of the variation in academic productivity and study balance was associated with factors outside the two exercise predictors included in the model.

CONCLUSION

The study found that physical activity was positively associated with several dimensions of university athletes' academic experience. Regular participation was moderately and significantly associated with academic performance, while respondents also reported improvements in concentration, memory retention and mental alertness following physical exercise. Physical activity was further associated with stress management and psychological readiness, and exercise frequency and intensity jointly predicted academic productivity and study balance.

The evidence does not indicate that physical activity alone determines academic success. Instead, it suggests that structured and appropriately managed physical activity can be integrated into the university experience as a complementary resource for academic functioning and student well-being. The benefits identified in the study appear most meaningful when sporting participation is supported by effective scheduling, academic monitoring, institutional resources and coordinated dual-career support.

RECOMMENDATIONS

University management should strengthen academic support programmes for student athletes by integrating sports participation with academic monitoring and advising systems. PES departments should promote structured exercise programmes that allow athletes to maintain regular participation while protecting sufficient time for academic work. Counselling units and sports administrators should incorporate physical activity into broader student-wellness initiatives addressing academic stress and psychological readiness. Coaches and sports coordinators should develop balanced training schedules that take account of academic calendars, examination periods, recovery and individual study requirements. Higher education institutions should also establish or strengthen dual-career policies that coordinate academic departments, sports units, coaches and student support services.

Future research should use longitudinal designs to examine changes in physical activity and academic outcomes over time. Further studies could compare different types, frequencies and intensities of exercise and examine their relationships with specific cognitive, psychological and academic outcomes. Research should also investigate institutional support, time management, motivation, access to sports facilities and other contextual factors that may explain the substantial proportion of academic productivity and study balance not accounted for by exercise frequency and intensity in the present model.

REFERENCES

1. Abdullahi, Y., & Bello, A. (2021). Infrastructural challenges and the academic experience of student-athletes in Nigerian universities. *Nigerian Journal of Sports Science and Education*, 8(2), 45–58.
2. Addo, P., & Nyarko, S. (2022). Physical activity, sleep quality, and academic alertness among university students in Ghana. *Journal of Adolescent Health and Wellness*, 6(1), 22–36.
3. Adeyeye, J. O., & Mohammed, S. (2023). Institutional support systems and academic success: A comparative study of student-athletes in two Nigerian federal universities. *African Journal of Educational Management*, 15(3), 101–116.
4. Agyekum, B., & Boateng, R. (2020). A comparative analysis of academic performance and time management skills between athlete and non-athlete students at the University of Cape Coast. Ghana

- Journal of Education and Sports, 12(1), 67–82.
5. Ahmed, S., Khan, R., & Mahmood, A. (2024). Physical activity, psychological well-being and academic engagement among university students. *BMC Psychology*, 12(1), 214.
6. Akinola, B. O., & Adeyemo, C. W. (2020). Self-discipline and goal-setting as transferable skills from sports to academics among Nigerian university athletes. *Journal of Human Kinetics and Sports Research*, 5(2), 39–54.
7. Alghadir, A. H., Gabr, S. A., & Iqbal, Z. A. (2020). Physical activity, mental health and academic performance among university students. *International Journal of Environmental Research and Public Health*, 17(24), 9336.
8. Babbie, E. (2021). *The practice of social research* (15th ed.). Cengage Learning.
9. Chen, L., Wang, Y., Zhang, H., & Liu, X. (2023). Neurogenesis and BDNF: The biological link between exercise and university GPA. *Journal of Cognitive Neuroscience*, 35(6), 1024–1038.
10. Chen, X., Zhang, Y., Liu, H., & Wang, J. (2023). Physical activity, cognitive function and academic performance among university students. *BMC Public Health*, 23(1), 1127.
11. Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
12. Deci, E. L., & Ryan, R. M. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, 61, 101860.
13. European Commission. (2024). *EU guidelines on dual careers of athletes: Implementation in Italy*. EU Sport Policy.
14. Ezeugwu, R. O., & Ede, M. O. (2019). Impact of regular moderate exercise on cognitive function and academic performance of university student-athletes in Enugu. *Journal of Exercise Science and Physiotherapy*, 15(2), 75–89.
15. Gould, D., & Whitley, M. A. (2019). Sources and consequences of athletic burnout among college athletes. *Journal of Intercollegiate Sport*, 12(3), 215–233.
16. Guidotti, F., & Capranica, L. (2019). Dual career of student-athletes: The Italian experience. *Journal of Physical Education and Sport*, 19(4), 2451–2458.
17. Hassevoort, K. M., Khan, N. A., Hillman, C. H., & Erickson, K. I. (2018). Cardiorespiratory fitness is associated with better white matter integrity in young adults. *Frontiers in Human Neuroscience*, 12, 1–10.
18. Johnson, T., Williams, K., & Brown, A. (2025). Physical activity participation and academic resilience among university student-athletes. *Journal of American College Health*, 10(5), 1112.
19. Kim, J., Park, S., & Lee, H. (2021). Exercise participation, mental health and academic achievement among university students. *Healthcare*, 9(10), 1345.
20. Lipošek, S., Planinšec, J., Leskošek, B., & Pajtler, A. (2018). Physical activity of university students and its relation to physical fitness and academic success. *Annales Kinesiologiae*, 9(2), 89–104.
21. López-Vicente, M., Torrent, M., Forns, J., & Sunyer, J. (2019). Physical activity and cognitive function in the digital age: A longitudinal study. *BMC Public Health*, 19, 1–12.
22. Lupo, C., Mosso, C. O., Guidotti, F., Cugliari, G., & Capranica, L. (2022). Motivation toward studies and sport in Italian student-athletes. *Frontiers in Psychology*, 13, 1–11.
23. Martínez, P., Gómez, D., & Ruiz, A. (2022). Physical fitness, executive functioning and academic achievement among higher education students. *Frontiers in Education*, 7, 915642.
24. Mazzoli, E., Koorts, H., Salmon, J., Pesce, C., & Lubans, D. R. (2023). Associations between physical activity, cognition and academic performance in young people: A systematic review and meta-analysis. *Sports Medicine*, 53(4), 847–870.
25. Mazzoli, E., Salmon, J., Teixeira, P. J., & Pesce, C. (2023). The relationship between physical activity, self-efficacy, and academic achievement in higher education. *Psychology of Sport and Exercise*, 65, 102350.
26. Mulenga, J. (2022). Perceptions of student-athlete academic engagement: A qualitative study at a Lusaka-based university. *Zambian Journal of Educational Studies*, 7(2), 55–69.
27. Phiri, S. (2019). *Support systems for student-athletes in Zambian universities: A gap analysis* (Unpublished master's dissertation). University of Zambia.
28. Rosales-Ricardo, Y., & Cáceres-Manzano, V. (2024). Effects of physical exercise on academic performance in university students: A systematic review. *Health Professions Education*, 10(3).

29. Stillman, C. M., Cohen, J., Lehman, M. E., & Erickson, K. I. (2020). Physical activity effects on brain structure and function in young adults. *Journal of Clinical Medicine*, 9(9), 1–18.
30. Teuber, M., Leyhr, D., & Sudeck, G. (2024). Physical activity improves stress load, recovery, and academic performance-related parameters among university students: A longitudinal study on daily level. *BMC Public Health*, 24, 598.