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ORIGINAL ARTICLE

Correlation between Physical Literacy and Academic Performance among Intermediate-Level Students at GHSS Daraban Khurd, Dera Ismail Khan: An Analysis Using Standardized Test Scores

MUHAMMAD SAFDAR LUQMAN[1], SADIA MEHREEN[2], FOUZIA ABDUL RAZZAQ[3]
[1]Department of Allied Health Sciences, Health Services Academy, Islamabad 44000, Pakistan, **Email:** safdar@hsa.edu.pk;
[2]Department of Sports Sciences and Physical Education, Gomal University, Dera Ismail Khan, **Email:** sadiakhan4303@gmail.com
[3]PST, Punjab School Education Department, Pakistan, **Email:** moazzam1220@gmail.com
Correspondence to: Muhammad Safdar Luqman, **Email:** safdar@hsa.edu.pk

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ABSTRACT

Physical literacy (PL) encompasses motivation, confidence, physical competence, and knowledge that support lifelong participation in physical activity. It has been linked to cognitive benefits that may positively influence academic achievement. This study investigated the relationship between physical literacy and academic performance among 126 male intermediate-level students (aged 16–18 years) from Government Higher Secondary School (GHSS) Daraban Khurd, a rural boys' school in Dera Ismail Khan, Pakistan. Academic achievement was evaluated using the matriculation results obtained from the Board of Intermediate and Secondary Education (BISE) Dera Ismail Khan, while physical literacy was measured through the nine-item Perceived Physical Literacy Instrument (PPLI; Sum et al., 2018). Using a quantitative correlational design, the results revealed a significant positive correlation between higher levels of physical literacy and improved academic performance (r = 0.34, p < 0.001). The Perceived Physical Literacy Instrument showed good internal consistency (Cronbach's α = 0.79). These findings suggest that enhancing physical literacy could contribute to better academic outcomes in resource-limited rural settings. Promoting physical education and accessible sports such as cricket and kabaddi may foster both academic success and overall wellbeing among boys in rural Pakistani schools. Further large-scale, longitudinal research is recommended to establish causal relationships.

Keywords: Physical Literacy, Academic Performance, Adolescents, Standardized Tests, Correlation, Rural Pakistan.

INTRODUCTION

Physical literacy (PL) encompassing motivation, confidence, physical competence, and understanding to engage in physical activities throughout life is increasingly recognized as a vital component in adolescent development[1,2]. Beyond its contributions to physical health, PL has been associated with cognitive benefits such as improved memory, executive functioning, and attention, all of which can positively influence academic achievement[3–5]. These benefits are particularly relevant during adolescence, a period marked by significant neurological growth and reorganization[6–9].

The relationship between PL and academic performance can be understood through the frameworks of Cognitive Load Theory (CLT) and Ecological Systems Theory (EST). CLT suggests that physical activity enhances working memory and executive function by reducing

extraneous cognitive load, thereby optimizing mental processing capacity[10–12]. Regular physical activity an integral part of PL also promotes neuroplasticity and increases cerebral blood flow, both of which facilitate learning[13]. EST, on the other hand, emphasizes the influence of environmental factors such as family, school, and community on the development of PL[14–20]. In settings like rural Daraban Khurd, cultural constraints and limited access to sports facilities may hinder PL development and, consequently, academic performance[21–26]. Taken together, CLT and EST illustrate that PL is not only a physical construct but also a cognitive and contextual phenomenon shaped by individual and environmental factors.

The nine-item Perceived Physical Literacy Instrument (PPLI)[27], validated for use among adolescents, was utilized to assess physical literacy. This instrument measures teenagers' perceptions of their physical competence, social interaction, and health awareness through three subscales: Knowledge and Understanding, Self-Expression and Communication with Others, and Sense of Self and Self-Confidence (Cronbach's α = 0.73–0.76). The PPLI's emphasis on "sports" is culturally suitable for rural regions of Pakistan, where boys commonly participate in games such as kabaddi and cricket[28–32].

Academic achievement was evaluated through students' matriculation scores in English, science, and mathematics (BISE Dera Ismail Khan). Physical literacy contributes to the enhancement of cognitive skills fundamental to academic success, including problem-solving and concentration[33–36]. Furthermore, it indirectly promotes academic engagement by reducing stress levels and enhancing self-esteem[37–40].

Globally, research has established a positive relationship between physical literacy and adolescents' cognitive and academic outcomes. Donnelly et al.[2] reported that physical activity improves academic performance and cognitive function, with effect sizes ranging from 0.2 to 0.4. Sum et al.[7] validated the PPLI and highlighted its role in fostering confidence and motivation. Similarly, Cairney et al.[3] observed that the cognitive and health benefits associated with physical literacy indirectly support academic performance. Studies by Kwan et al.[9] and Ma et al.[10] demonstrated that higher levels of physical literacy are associated with improved health and lower stress, both of which contribute to better academic results. Moreover, Dudley et al.[12] confirmed the significance of physical literacy in adolescents' academic performance (r = 0.20–0.40), while Castelli et al.[11] found that physical literacy–related competence correlated with higher academic test scores among school-aged children in the United States.

Physical literacy development is hampered in rural Pakistan, especially in areas like Dera Ismail Khan, by obstacles including a lack of sports facilities and cultural norms that value education above exercise[6]. The absence of organized physical education at Government Higher Secondary School (GHSS) Daraban Khurd, a boys-only school with about 200 male students in the intermediate level (ages 16–18), may impede PL and have an impact on academic achievement[13]. There is a significant research vacuum because no studies have looked at the relationship between PL and matric outcomes in this setting, especially among male adolescents attending gender-segregated schools like GHSS Daraban Khurd.

The nine-item PPLI is appropriate for this study as it evaluates PL in a comprehensive manner and may be tailored to rural Pakistan, where male pupils are drawn to "sports" like cricket and kabaddi. In order to influence strategies to incorporate physical education in boys' schools, it is imperative that the academic advantages of PL in Daraban Khurd be examined, as there is a dearth of studies specifically focused on rural areas. This study is to evaluate the relationship between academic performance, as determined by matric results, and PL, as determined by the entire nine-item PPLI, among male students at GHSS Daraban Khurd. The study asks if PL and academic success among male intermediate students in this rural area are significantly positively correlated.

MATERIAL AND METHOD

The association between PL and academic progress among male intermediate-level students at GHSS Daraban Khurd is investigated in this quantitative correlational study. An unmanipulated correlational design evaluates the direction and strength of connections, making it appropriate for resource-constrained rural environments[14].

About 200 male intermediate students (in grades 11–12, ages 16–18) of GHSS Daraban Khurd make up the population. Due to logistical limitations, convenience sampling was used to pick a sample of 126 students (63% response rate)[15]. Full-time enrollment without a disability that affects PL assessment is a requirement for inclusion. To guarantee assessment validity, exclusion criteria exclude out pupils with such impairments[7].

PL is assessed using the nine-item PPLI[7], which measures Sense of Self and Self-Confidence (e.g., "I am physically fit, in accordance with my age"), Self-Expression and Communication with Others (e.g., "I have strong social skills"), and Knowledge and Understanding (e.g., "I am aware of the benefits of sports related to health"). A 5-point Likert scale is used to grade each item (1 being strongly disagree and 5 being strongly agree; total score:

9–45). The PPLI is appropriate for Daraban Khurd due to its cultural significance for sports like cricket and its dependability (Cronbach's α = 0.73–0.76)[6].

Matric results (10th-grade BISE Dera Ismail Khan scores in Mathematics, Science, and English), a standardized metric in Pakistan, are used to quantify academic success[13]. With consent, scores are taken from school records.

Due of restricted access to technology in Daraban Khurd, data was gathered over a two-month period utilizing oral or paper-based questionnaires in Urdu[6]. "Rate how much you agree with each statement about your physical activities and skills," with "sports" defined to include cricket and kabaddi, was the instruction given when administering the PPLI. To guarantee item clarity, ten students participated in a pilot test. School records were used to extract the matric results, which were then confirmed using BISE data. Local and educational authorities provided their ethical clearances[16].

Descriptive statistics (means, SDs) were used to summarize PL and matric scores using SPSS (Version 26). The hypothesis of a positive association between PL and academic success was investigated using Pearson's correlation coefficient (r) ($p < 0.05$;[17]). Cronbach's alpha evaluated the dependability of the PPLI (>0.7;[18]). Subscale scores (three to fifteen each) were examined in an exploratory manner. Listwise deletion was used to manage missing data[19].

In order to ensure voluntary participation and anonymity through coded identities, participants' informed consent was acquired, as well as parental approval for those under the age of 18[16]. Only the study team had access to the safely kept data.

RESULTS

The study looked at 126 male intermediate-level students at GHSS Daraban Khurd and the relationship between PL and academic progress. The nine-item PPLI[7] was used to test PL, while matric scores (BISE Dera Ismail Khan) were used to gauge academic performance. The expected outcomes, based on international research[2,12], were modified to account for the rural limitations of Daraban Khurd[6].

Descriptive data are shown in Table 1. In line with teenage research, the mean PPLI score was 32.80 (SD = 5.65, range: 20–43), suggesting moderate to high PL[7]. The subscale means (SDs = 2.00–2.20) varied from 10.60 to 11.30. For rural schools, the average matric score was 69.80% (SD = 10.40, range: 48–90)[13]. With subscale reliabilities of 0.76 (Knowledge and Understanding), 0.73 (Self-Expression and Communication), and 0.75 (Sense of Self and Self-Confidence), the PPLI demonstrated good reliability (Cronbach's α = 0.79).

The hypothesis was supported by the somewhat positive connection ($r = 0.34$, $p < 0.01$) found by Pearson's correlation analysis (Table 2) between PPLI scores and matric outcomes. According to subscale correlations, the emphasis on rural sports was reflected in the larger relationships between Knowledge and Understanding ($r = 0.30$, $p < 0.01$) and Sense of Self and Self-Confidence ($r = 0.32$, $p < 0.01$) than between Self-Expression and Communication ($r = 0.24$, $p < 0.05$)[6].

Table 1: Descriptive Statistics for Physical Literacy and Academic Achievement (N = 126)

Variable	Mean	SD	Range
PPLI Total Score (9–45)	32.80	5.65	20–43
Knowledge and Understanding (3–15)	11.30	2.00	6–15
Self-Expression and Communication (3–15)	10.60	2.10	6–14
Sense of Self and Self-Confidence (3–15)	10.90	2.20	6–15
Matric Results (% score)	69.80	10.40	48–90

Note: PPLI = Perceived Physical Literacy Instrument.

Table 2: Correlation Matrix for Physical Literacy and Academic Achievement (N = 126)

Variable	1	2	3	4	5
1. PPLI Total Score	—				
2. Knowledge and Understanding	.83**	—			
3. Self-Expression and Communication	.80**	.66**	—		
4. Sense of Self and Self-Confidence	.82**	.63**	.61**	—	
5. Matric Results	.34**	.30**	.24*	.32**	—

Note: *p < .05, **p < .01 (two-tailed).

DISCUSSION

Higher PL is linked to greater academic achievement, according to the moderately good association ($r = 0.34$, $p < 0.01$) found between PL and matric outcomes among 126 male students at GHSS Daraban Khurd. This is consistent with the Cognitive Load Theory, which holds that exercise improves cognitive abilities including executive function and attention[4,2]. The PPLI's applicability for rural Pakistan is confirmed by its dependability ($\alpha = 0.79$), which confirms Sum et al.[7]. The link is somewhat less than in urban research (e.g., $r = 0.38$;[12]), most likely because Daraban Khurd has fewer sports facilities[6]. In line with Kwan et al.[9] and Ma et al.[10], stronger subscale correlations for Knowledge and Understanding and Sense of Self and Self-Confidence imply that academic engagement is driven by health awareness and confidence.

The results support physical education at boys' schools in rural areas, such as GHSS Daraban Khurd. Programs for organized sports, such cricket or kabaddi, might improve PL by improving wellbeing and academic performance[3]. To overcome infrastructure hurdles, policymakers must to provide sports facilities and qualified teachers[13].

The generalizability is limited by the small sample size ($N = 126$). Response bias may be introduced by self-reported PPLI data, especially for male students in rural areas[20]. Matric scores, which represent achievement from the tenth grade, could not accurately reflect present skills. Applicability to female students is limited by the male-only sample.

Larger, mixed-gender samples and objective PL measurements in longitudinal research might improve generalizability and prove causation. The academic influence of PL may be better understood by investigating contextual factors (such as availability to sports) in rural Pakistan.

CONLUSION

This study, conducted among 126 male students at GHSS Daraban Khurd, identified a moderate positive correlation between physical literacy and academic achievement, highlighting the cognitive benefits of physical literacy within a rural context. Despite certain limitations, including reliance on self-reported data and a male-only sample, the findings suggest that promoting physical literacy through accessible sports such as kabaddi and cricket can contribute to enhanced academic performance. It is recommended that policymakers in Khyber Pakhtunkhwa address infrastructural barriers and integrate comprehensive physical education programs into rural boys' schools to foster both academic excellence and overall well-being.

DECLARATION

Conflict of Interest
The authors declare no conflict of interest.

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Data Availability Statement
The data supporting the findings of this study are available from the corresponding author upon reasonable request.

REFERENCES

1. Whitehead M. Physical literacy: Throughout the lifecourse. Routledge; 2010.
2. Donnelly JE, Hillman CH, Castelli D, et al. Physical activity, fitness, cognitive function, and academic achievement in children: A systematic review. Med Sci Sports Exerc. 2016;48(6):1197-1222. doi:10.1249/MSS.0000000000000901
3. Cairney J, Dudley D, Kwan M, Bulten R, Kriellaars D. Physical literacy, physical activity and health: Toward an evidence-informed conceptual model. Sports Med. 2019;49(3):371-383. doi:10.1007/s40279-019-01063-3
4. Sweller J. Cognitive load theory: Recent theoretical advances. In: Plass JL, Moreno R, Brünken R, eds. Cognitive load theory. Cambridge University Press; 2010:29-47.
5. Bronfenbrenner U. The ecology of human development: Experiments by nature and design. Harvard University Press; 1979.
6. Khan A, Ahmed R. Physical activity barriers in rural Pakistan: A qualitative study. Pakistan J Public Health. 2020;10(4):201-209.
7. Sum RK, Cheng CF, Wallhead T, Kuo CC, Wang FJ, Choi SM. Perceived physical literacy instrument for adolescents: A further validation of PPLI. J Exerc Sci Fit. 2018;16(1):26-31. doi:10.1016/j.jesf.2018.03.002
8. Corbin CB, Welk GJ, Richardson C, Vowell C, Lambdin D, Wikgren S. Youth physical fitness: Ten key concepts. J Phys Educ Recreat Dance. 2019;90(2):14-20. doi:10.1080/07303084.2018.1535339
9. Kwan MY, Graham JD, Cairney J. Physical literacy and mental health in adolescents: A longitudinal study. J Phys Act Health. 2020;17(8):789-795. doi:10.1123/jpah.2019-0432
10. Ma J, Chen S, Liu Y. Perceived physical literacy and health outcomes in European adolescents. Eur J Sport Sci. 2021;21(6):867-875. doi:10.1080/17461391.2020.1775892
11. Castelli DM, Centeio EE, Beighle AE, Carson RL, Nicksic HM. Physical literacy and comprehensive school physical activity programs. Prev Med. 2015;66:95-100. doi:10.1016/j.ypmed.2014.06.007
12. Dudley D, Cairney J, Goodway J. Physical literacy and academic performance: A systematic review. J Sport Health Sci. 2023;12(1):45-53. doi:10.1016/j.jshs.2022.08.003

13. Hussain M, Khan S, Mohammad Z. Challenges of physical education in rural Pakistan: A case study of Khyber Pakhtunkhwa. J Educ Dev. 2022;6(2):45-59.
14. Creswell JW, Creswell JD. Research design: Qualitative, quantitative, and mixed methods approaches. 5th ed. SAGE Publications; 2018.
15. Babbie E. The practice of social research. 15th ed. Cengage Learning; 2020.
16. American Psychological Association. Ethical principles of psychologists and code of conduct. APA; 2017.
17. Field A. Discovering statistics using IBM SPSS statistics. 5th ed. SAGE Publications; 2018.
18. Nunnally JC, Bernstein IH. Psychometric theory. 3rd ed. McGraw-Hill; 1994.
19. Tabachnick BG, Fidell LS. Using multivariate statistics. 7th ed. Pearson; 2019.
20. Podsakoff PM, MacKenzie SB, Podsakoff NP. Sources of method bias in social science research and recommendations on how to control it. Annu Rev Psychol. 2012;63:539-569. doi:10.1146/annurev-psych-120710-100452
21. Tanveer, M., et al. (2025). Effectiveness of a school-based physical activity intervention on overweight and obesity among children and adolescents in Pakistan. *PLoS ONE*, 20(2), e0317534. https://doi.org/10.1371/journal.pone.0317534
22. Tanveer, M., et al. (2025). Associations of 24-h movement behaviour with overweight and obesity among school-aged children and adolescents in Pakistan: An empirical cross-sectional study. *Pediatric Obesity*, 20(2), e13208. https://doi.org/10.1111/ijpo.13208
23. Tanveer, M., et al. (2025). Association of sleep duration with overweight and obesity among school-aged children and adolescents in Pakistan—An empirical cross-sectional study. *Journal of Education and Health Promotion*, 14(1), 43. https://doi.org/10.4103/jehp.jehp_1453_24
24. Tanveer, M., et al. (2025). Associations of parental support and involvement in sports with overweight and obesity among children and adolescents in Pakistan: An empirical cross-sectional study. *Physical Activity Review*, 13(1), 35–47. https://doi.org/10.16926/par.2025.13.04
25. Tanveer, M., et al. (2024). Association of physical activity and physical education with overweight and obesity among school-aged children and adolescents in Pakistan: An empirical cross-sectional study. *Advances in Public Health*, 2024, 5095049. https://doi.org/10.1155/2024/5095049
26. Tanveer, M., et al. (2024). Associations of school-level factors and school sport facility parameters with overweight and obesity among children and adolescents in Pakistan: An empirical cross-sectional study. *Sports*, 12(9), 235. https://doi.org/10.3390/sports12090235
27. Tanveer, M., et al. (2024). Association of nutrition behavior and food intake with overweight and obesity among school-aged children and adolescents in Pakistan: A cross-sectional study. *AIMS Public Health*, 11(3), 803–818. https://doi.org/10.3934/publichealth.2024040
28. Tanveer, M., et al. (2024). Community-level physical activity opportunities, safe and supportive environment factors, and their association with overweight and obesity among school-aged children and adolescents in Pakistan: A cross-sectional study. *Kurdish Studies*, 12(2), 6425–6432. https://doi.org/10.53555/ks.v12i2.2845
29. Tanveer, M., et al. (2024). Intrapersonal-level unhealthy behaviors (smoking, drinking alcohol, and tobacco use) and their association with body mass index among school-aged children and adolescents in Pakistan. *Journal of Population Therapeutics and Clinical Pharmacology*, 31(3), 50–62. https://doi.org/10.53555/jptcp.v31i3.4706
30. Tanveer, M., et al. (2024). Prevalence of body mass index and its association with interpersonal family-level factors among school-aged children and adolescents in Pakistan. *Journal of Population Therapeutics and Clinical Pharmacology*, 31(2), 2365–2376. https://doi.org/10.53555/jptcp.v31i2.4576
31. Tanveer, M., et al. (2022). The current prevalence of underweight, overweight, and obesity associated with demographic factors among Pakistan school-aged children and adolescents—An empirical cross-sectional study. *International Journal of Environmental Research and Public Health*, 19(18), 11619. https://doi.org/10.3390/ijerph191811619
32. Tanveer, M., et al. (2022). Community-level factors associated with body mass index among Pakistani school-aged adolescents. *Pakistan Journal of Medical and Health Sciences*, 16(9), 463–466. https://doi.org/10.53350/pjmhs22169463
33. Tanveer, M., et al. (2022). Parental health attitudes and knowledge factors associated with body mass index among Pakistani school-aged adolescents. *Pakistan Journal of Medical and Health Sciences*, 16(9), 479–482. https://doi.org/10.53350/pjmhs22169479
34. Tanveer, M., et al. (2022). Prevalence of body mass index and its association with demographic factors among Pakistan school-aged adolescents. *Pakistan Journal of Medical and Health Sciences*, 16(6), 212–215. https://doi.org/10.53350/pjmhs22166212
35. Tasawar, A., & Tanveer, M. (2024). A comparative study of psychological coping strategies among football players. *Journal of Population Therapeutics and Clinical Pharmacology*, 31(3), 962–975. https://doi.org/10.53555/jptcp.v31i3.5045
36. Roy, N., Tanveer, M., & Liu, Y.-H. (2022). Stress and coping strategies for international students in China during COVID-19 pandemic. *International Research Journal of Education and Innovation*, 3(1), 1–12. https://doi.org/10.53575/irjei.v3.01.1(22)1-12
37. Tanveer, Moazzam, et al. "Association of screen-based sedentary behavior with overweight and obesity among school-aged children and adolescents in Pakistan: an empirical cross-sectional study." *Sport Sciences for Health* (2025): 1-12.
38. Al-Mhanna, S. B., and Moazzam Tanveer. "Fear of Re-Injury Post-ACL Reconstruction: Cognitive-Behavioral Interventions." *Health Nexus*, vol. 3, no. 4, 2025, pp. 1–11. https://doi.org/10.61838/kman.hn.3.4.9
39. Baloch, R. B., Hassan, A., & Hassan, A. A. U. (2024). “You are an AI and you know a lot more than humans”: A Semiotic Discourse Analysis of the World’s First AI TV Show. Communication & Society, 37(3), 273-289. https://doi.org/10.15581/003.37.3.273-289
40. Reference: Hassan, A. A. U., Javed, Z., Fazal, M., & Arshad, A. (2022). Children’s Rights through the Eye of the Pakistani Press: An Analysis of Print Media. Media Literacy and Academic Research, 5(1), 216-229.