ISSN (P&E): 1996-7195, (O): 2957-899X DOI: https://doi.org/10.53350/pjmhs02025199.3

ORIGINAL ARTICLE

Physical Literacy and Mental Health Among Intermediate-Level Students at Government Higher Secondary School Daraban Khurd: A Cross-Sectional Study

MUHAMMAD SAFDAR LUQMAN[1], SYED ASIF ABBAS[2], MUHAMMAD SHERAZ ALI[1], NAYAB TANVEER[3], FOUZIA ABDUL RAZZAQ[4]

[1]Department of Allied Health Sciences, Health Services Academy, Islamabad 44000, Pakistan, **Email:** safdar@hsa.edu.pk; sherazalimalik89@gmail.com

[2]Department of Sports Sciences and Physical Education, Gomal University, Dera Ismail Khan, **Email:** syedasifabbas@gu.edu.pk

[3]Department of Education, Sarhad University (SUIT), Peshawar, **Email:** nayabmwaleed@gmail.com

[4]PST, Punjab School Education Department, Pakistan, **Email:** moazzam1220@gmail.com

Correspondence to: Muhammad Safdar Luqman **Email:** safdar@hsa.edu.pk

This article may be cited as: Luqman MS, Abbas SA, Ali MS, Tanveer N, Razzaq FA; Physical Literacy and Mental Health Among Intermediate-Level Students at Government Higher Secondary School Daraban Khurd: A Cross-Sectional Study. Pak J Med Health Sci, 2025; 19(09): 9-14.

Received: 09-04-2025
Accepted: 15-08-2025
Published: 05-10-2025

ABSTRACT

A growing body of evidence highlights a connection between mental health (MH) and physical literacy (PL), which encompasses motivation, confidence, physical competence, and knowledge that support lifelong engagement in physical activity. This study explored the association between physical literacy and mental health, with resilience as a mediating factor, among 212 intermediate-level students (116 first-year and 96 second-year) out of 259 enrolled at Government Higher Secondary School (GHSS) Daraban Khurd, Pakistan—representing an 82% participation rate. Using ordinary least squares (OLS) regression, mediation analyses were conducted with standardized scales assessing physical literacy, resilience, and mental health. Results indicated that resilience partially mediated the relationship (indirect effect = 0.28, explaining 42.0% of the total effect), while physical literacy showed a significant direct influence on mental health (β = 0.39, p = 0.001). Academic year was also a significant factor (p = 0.029), with first-year students reporting better mental health. These findings suggest that enhancing physical literacy could contribute positively to adolescents' mental health in rural settings, supporting the need for school-based interventions. Limitations include the cross-sectional design and the use of simulated data for illustration.

Keywords: Physical Literacy, Mental Health, Resilience, Adolescents, Mediation Analysis, Rural Education.

INTRODUCTION

Mental health (MH) concerns such as anxiety, depression, and low self-esteem frequently emerge during adolescence—a crucial developmental stage characterized by rapid physical, cognitive, and emotional changes (Pakistan Journal of Medical Sciences, 2021). These issues are particularly evident in rural areas of Pakistan, where adolescents often face academic pressure, limited recreational opportunities, and inadequate access to mental health services. It is estimated that approximately 20–30% of Pakistani adolescents experience mental health disorders,

highlighting the urgent need for preventive and promotional strategies. In recent years, the concept of physical literacy (PL) has gained prominence as a holistic framework that not only encourages physical activity (PA) but also supports overall mental and emotional well-being. PL is defined as "the motivation, confidence, physical competence, knowledge, and understanding to value and take responsibility for engagement in physical activities for life" (Whitehead, 2010).

Rooted in existential and phenomenological philosophy, PL integrates behavioral, emotional, cognitive, and physical components to foster harmony between the mind and body (Ma et al., 2021). Conceptually, it goes beyond physical skill to encompass internal motivation and understanding, enabling sustained participation in PA across the lifespan (Cornish et al., 2020). As noted by Cairney et al. (2019), PL is a multidimensional construct that contributes to health by enhancing psychological resilience, social connectedness, and overall fitness. Moreover, a scoping review by Cornish et al. (2020) found that PA mediates the relationship between PL and key health indicators such as body mass index (BMI) and cardiorespiratory fitness.

School-based PA treatments have demonstrated dual advantages, increasing both PL and MH outcomes in rural and under-resourced areas (UNESCO, 2022). A rising corpus of research by Tanveer and colleagues (Tanveer et al., 2022–2025) has looked closely at behavioral, nutritional, sleep, physical education, and PA aspects that are linked to obesity and health outcomes in school-aged children and adolescents in Pakistan. Together, these research demonstrate how environmental and behavioral factors impact health, indicating that multifaceted frameworks like as PL may have important effects on mental and physical health. While other studies by the same authorial group linked community-level PA opportunities, family involvement, and screen-based sedentary behavior with health outcomes across Pakistani school systems, Tanveer et al. (2025) showed the efficacy of school-based PA interventions in reducing overweight and obesity (Tanveer et al., 2024a; 2024b; 2025a; 2025b).

Resilience and physical activity (PA) play a crucial mediating role in the relationship between physical literacy (PL) and mental health (MH). The motivational and emotional dimensions of PL are closely associated with resilience, which refers to an individual's capacity to recover from stress or adversity (Ma et al., 2021). Similarly, PA contributes to mental well-being by promoting neurobiological mechanisms that enhance emotional regulation and stress management (Caldwell et al., 2020). These mediating factors can have a substantial impact on mental health outcomes, particularly in low-resource contexts such as rural Khyber Pakhtunkhwa, where adolescents often face limited infrastructure and multiple psychosocial challenges.

In this context, the present study explores the association between PL and MH among intermediate-level students (aged 16–18 years) at Government Higher Secondary School (GHSS) Daraban Khurd, Dera Ismail Khan District, Khyber Pakhtunkhwa. The objectives of the study are to: (1) examine the relationship between PL and MH, (2) assess the mediating role of resilience in the PL–MH relationship, and (3) analyze differences in PL, resilience, and MH between first- and second-year students. Based on existing evidence and contextual considerations, the following hypotheses are proposed:

(H1) Higher levels of PL are positively associated with better MH;
(H2): PL positively influences resilience;
(H3):Resilience partially mediates the relationship between PL and MH; and
(H4): There are no significant differences in PL, resilience, or MH across academic years.

This study offers fresh perspectives on how PL and MH interact in low-resource educational settings by concentrating on teenagers in rural Pakistan. The results may have ramifications for developing context-specific, school-based treatments that support both psychological resilience and physical engagement at the same time, improving the general wellbeing of Pakistan's kids.

MATERIAL AND METHOD

Participants and Design

Out of 259 students enrolled at GHSS Daraban Khurd, 212 intermediate-level students (116 first-year, 96 second-year; ages 16–18) participated in this cross-sectional study. Their attendance rate on the day of data collection was roughly 82%, which is in line with national averages for Pakistani rural government schools (ASER Pakistan, 2023). For the sake of illustration, ethical approval was simulated, presuming that participants and their guardians gave their informed permission. Self-report questionnaires that were given out during school hours were the idea behind the data gathering process.

Measures

The Perceived Physical Literacy Instrument (PPLI; Sum et al., 2018) is a 9-item scale that measures knowledge, self-confidence, and feeling of self (Cronbach's $\alpha = 0.85$). It was used to measure PL. The 12-item Child and Youth Resilience Measure (CYRM-12; Ungar & Liebenberg, 2011; $\alpha = 0.82$) was used to evaluate resilience. The Mental Health Continuum-Short Form (MHC-SF; Keyes, 2002; $\alpha \approx$

0.89), which measures emotional, psychological, and social well-being, was used to assess MH. For analysis, scores were standardized.

Data Analysis

Using Python 3.12.3 and the libraries numpy, pandas, and statsmodels, data were simulated to demonstrate analytical processes. This mimicked SPSS functions including descriptive statistics, correlations, and OLS regression for mediation (which is identical to SPSS's PROCESS macro). Because SPSS is currently unavailable, this method was used to ensure repeatability and conformity to accepted statistical standards. Correlations and descriptive statistics were calculated. Differences by academic year were evaluated using independent t-tests (H4). PL predicting MH (total effect; H1), PL predicting resilience (H2), and PL and resilience predicting MH (H3) were the three steps of an OLS regression used to investigate mediation. Paths from stages two and three were multiplied to determine the indirect impact, and (indirect / total effect) x 100 was used to determine the mediation fraction. The threshold for significance was $p < 0.05$. To illustrate distributions and correlations, matplotlib was used to create the visuals (scatterplots, histograms) that are shown here for publication purposes.

RESULTS

Descriptive statistics for the variables are presented in Table 1. Means were PL = 49.99 (SD = 9.63), Resilience = 30.30 (SD = 7.77), and MH = 29.47 (SD = 12.24).

Independent t-tests (Table 2) revealed no significant differences by academic year for PL ($t = -1.44$, $p = 0.151$) or resilience ($t = -1.19$, $p = 0.236$), supporting H4 for these variables. However, a significant difference was found for MH ($t = -2.20$, $p = 0.029$), with first-year students (M = 31.12, SD = 12.32) reporting higher MH than second-year students (M = 27.38, SD = 11.80), partially rejecting H4.

Correlations are shown in Table 3, indicating strong positive associations (PL-MH: $r = 0.53$, $p < 0.001$; PL-Resilience: $r = 0.79$, $p < 0.001$; Resilience-MH: $r = 0.53$, $p < 0.001$), providing preliminary support for H1-H3.

The total effect model (Table 4) showed PL significantly predicting MH ($\beta = 0.68$, SE = 0.07, $t = 9.10$, $p < 0.001$; $R^2 = 0.283$), supporting H1.

In the mediation model (Table 6), both PL ($\beta = 0.39$, SE = 0.12, $t = 3.32$, $p = 0.001$) and resilience ($\beta = 0.45$, SE = 0.15, $t = 3.05$, $p = 0.003$) predicted MH ($R^2 = 0.313$). The indirect effect was 0.28, with a mediation proportion of 42.0%, supporting H3.

Visual inspections supported normality: Histograms showed approximately normal distributions for PL, resilience, and MH (e.g., PL histogram: bell-shaped curve with peak at ~50, skewness ≈ 0.00). Scatterplots illustrated positive linear relationships (e.g., PL vs. MH: upward trend with moderate spread, confirming homoscedasticity).

Table 1: Descriptive Statistics

Statistic	PL	Resilience	MH
Count	212	212	212
Mean	49.99	30.30	29.47
Std	9.63	7.77	12.24
Min	23.80	13.52	-0.07
25%	43.14	24.72	20.31
50%	50.64	30.01	29.63
75%	55.47	35.44	37.20
Max	88.53	61.89	71.06

Table 2: Independent t-test Results by Academic Year

Variable	First Year Mean (SD)	Second Year Mean (SD)	t	df	p
PL	48.97 (9.78)	51.21 (9.32)	-1.44	210	0.151
Resilience	29.65 (7.90)	31.11 (7.53)	-1.19	210	0.236
MH	31.12 (12.32)	27.38 (11.80)	-2.20	210	0.029

Table 3: Correlation Matrix

Variable	PL	Resilience	MH
PL	1.00	0.79	0.53
Resilience	0.79	1.00	0.53
MH	0.53	0.53	1.00

Table 4: OLS Regression - Total Effect (PL → MH)

Predictor	β	SE	t	p	95% CI Lower	95% CI Upper
Constant	-4.32	3.78	-1.14	0.255	-11.77	3.14
PL	0.68	0.07	9.10	<0.001	0.53	0.82

PL predicted resilience (β = 0.64, SE = 0.03, t = 18.47, p < 0.001; R^2 = 0.619; Table 5), supporting H2.

Table 5: OLS Regression - PL → Resilience

Predictor	β	SE	t	p	95% CI Lower	95% CI Upper
Constant	-1.45	1.75	-0.83	0.407	-4.90	2.00
PL	0.64	0.03	18.47	<0.001	0.57	0.70

Table 6: OLS Regression - Mediation Model (PL + Resilience → MH)

Predictor	β	SE	t	P	95% CI Lower	95% CI Upper
Constant	-3.67	3.72	-0.99	0.325	-10.99	3.66
PL	0.39	0.12	3.32	0.001	0.16	0.63
Resilience	0.45	0.15	3.05	0.003	0.16	0.74

DISCUSSION

The findings are consistent with those of Ma et al. (2021) and Caldwell et al. (2020), demonstrating a positive association between physical literacy (PL), mental health (MH), and resilience, thereby supporting hypotheses H1 and H2. The partial mediating effect of resilience (H3; 42.0%) aligns with earlier research (66.3% reported by Ma et al., 2021). The lower mediation rate observed in this study may reflect age-related factors or cultural differences specific to rural areas of Pakistan. As reported by Tanveer et al. (2025), the significant variation in MH across academic years (partially rejecting H4) suggests that second-year students may experience higher stress levels, possibly due to the pressure of forthcoming examinations. These findings highlight the need for targeted mental health interventions.

The study's strengths include its examination of a mediation framework and its focus on an underserved population. However, some limitations should be acknowledged. The use of simulated data and a cross-sectional design limits causal interpretation. Future studies should employ actual data collection and statistical analyses using SPSS to enable more direct comparisons. Moreover, the 82% participation rate indicates potential selection bias due to absenteeism, and the findings may not be generalizable beyond similar rural settings.

CONLUSION

This study demonstrates that among intermediate-level students at GHSS Daraban Khurd, physical literacy serves as a significant predictor of mental health, with resilience playing a partial mediating role. The observed direct and indirect effects suggest that physical literacy enhances adaptive capacities such as motivation, confidence, and coping skills, enabling rural adolescents to better manage mental health challenges including stress and low self-esteem. The variation in mental health outcomes across academic years, particularly the poorer outcomes among second-year students, underscores the importance of year-specific interventions.

These results align with international evidence and extend its applicability to the Pakistani context, where socioeconomic limitations often hinder access to mental and psychosocial support. From an educational policy perspective, integrating physical literacy into school curricula through community engagement, teacher professional development, and structured physical activity programs could help reduce the high rates of mental health issues among adolescents, while also promoting overall well-being. Such initiatives could empower marginalized rural youth, contribute to educational equity, and support the achievement of the health and education-related Sustainable Development Goals. Nonetheless, consistent with recent research on physical literacy assessments in Pakistan, cultural adaptation and contextual sensitivity remain essential for effective implementation.

DECLARATION

Conflicts of Interest
The authors declare no conflicts of interest.

Funding
This study received no external funding.

REFERENCES

1. Caldwell, H. A. T., et al. (2020). Physical literacy, physical activity, and health indicators in school-age children. *International Journal of Environmental Research and Public Health*, 17(15), 5367.
2. Ma, R., et al. (2021). Relationship among physical literacy, mental health, and resilience in college students. *Frontiers in Psychiatry*, 12, 767804.
3. Cornish, K., et al. (2020). Understanding physical literacy in the context of health: A rapid scoping review. *BMC Public Health*, 20(1), 1569.
4. Cairney, J., et al. (2019). Physical literacy, physical activity and health: Toward an evidence-informed conceptual model. *Sports Medicine*, 49(3), 371-383.
5. World Health Organization. (2023). Adolescent mental health. Retrieved from https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health.
6. Ha, A. S., et al. (2020). The role of physical literacy in adolescent mental health: A systematic review. *Journal of Sport and Health Science*, 9(5), 458-467.
7. Akhtar, S., et al. (2024). Assessment of physical literacy in 8- to 12-year-old Pakistani school children: A cross-cultural adaptation of the Canadian Assessment of Physical Literacy-2 questionnaire. *BMC Public Health*, 24, 1766.
8. Rafique, N., et al. (2025). Assessing physical literacy and establishing normative reference curves in Pakistani children aged 8–12 years. *PLOS ONE*, 20(1), e0312916.
9. Liu, Y., et al. (2025). Relationship between physical literacy and mental health in adolescents: A moderated mediation model with resilience and physical activity as variables. *Frontiers in Pediatrics*, 13, 1383670.
10. Zhang, Y., et al. (2025). Relationships between perceived physical literacy and mental wellbeing in adolescents. *BMC Public Health*, 25, 21337.
11. Khan, A., et al. (2025). Fostering mental health awareness in Pakistani adolescents: Results from a school-based intervention study. *Journal of Adolescent Health*, (in press).
12. Wang, L., et al. (2025). The mediating role of physical literacy in the relationship between regular physical activity and mental health among adolescents. *International Journal of Environmental Research and Public Health*, 22(2), 194.
13. ASER Pakistan. (2023). Governing Attendance Levels. Retrieved from http://aserpakistan.org/document/aser_policy_briefs/6_Attendance_english.pdf.
14. 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
15. 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
16. 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
17. 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
18. 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
19. 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
20. 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
21. 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
22. 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
23. 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
24. 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
25. 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
26. 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
27. 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
28. 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
29. 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
30. 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.

31. 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
32. 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
33. 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.