The Predictive Role of Perceived Physical Literacy in Depression and Anxiety Among Veterans and Individuals with Disabilities

Abstract

Aims: Physical literacy is recognized as a multidimensional construct associated with lifelong engagement in physical activity, and evidence suggests its correlation with various mental health outcomes in general populations. However, its potential role in psychological factors among clinical groups—such as veterans and individuals with disabilities— remains unexplored. The present study aimed to investigate the predictive role of perceived physical literacy (PPL) in depression and anxiety among veterans and individuals with disabilities.

Materials & Methods: In this cross-sectional research, 110 participants—including 12 veterans and 98 individuals with disabilities—from Yazd City were selected through convenience sampling. Perceived physical literacy was assessed using the physical Literacy Scale in Adult (PLAS), and depressive and anxiety symptoms were measured by the Depression, Anxiety and Stress Scale (DASS-21). Data were analyzed using Pearson's correlation coefficients and simple linear regression in SPSS software.

Findings: The results revealed a significant negative correlation between perceived physical literacy and both depression ($r = -0.34$, $p < .05$) and anxiety ($r = -0.21$, $p < .05$). Simple linear regression indicated that perceived physical literacy explained approximately 11.5% of the variance in depression ($R^2 = .115$) and about 4.5% of the variance in anxiety ($R^2 = .045$).

Conclusion: The findings suggest that higher levels of perceived physical literacy are associated with lower levels of psychological distress, specifically depressive and anxiety symptoms, in this clinical population. Thus, physical literacy may serve as a protective psychological factor, contributing to improved mental health outcomes among veterans and individuals with disabilities.

Keywords: Anxiety; Depression; Individuals with Disabilities; Mental Health; Physical Literacy; Veterans.

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Introduction

Veterans and individuals living with war-related disabilities are considered one of the most vulnerable health groups in postwar societies and face a complex set of physical, psychological, and social consequences (1–5). Epidemiological evidence indicates that the prevalence of depression in this population typically ranges between 20% and 23%, and the rates of suicidal thoughts or tendencies are reported to be markedly higher than those of the general population (6). These disorders are often accompanied by chronic pain, functional limitations, impairments in social participation, and reduced access to physical activity (7–9); factors that synergistically undermine quality of life and impose a substantial burden on healthcare systems and families (5, 11). Such conditions highlight the necessity of developing multidimensional and behavior-based approaches to support the mental health of these vulnerable groups.

Among psychological outcomes, depression and anxiety are considered the most common and disabling disorders among veterans and individuals with disabilities and are directly associated with sedentary behavioral patterns, chronic fatigue, persistent pain, and reduced social participation. Abrantes et al. (2017) reported that veterans with post-traumatic stress disorder experience higher levels of anxiety, depression, and behavioral avoidance (7). Other studies have also shown that sedentary lifestyles, functional limitations, and environmental barriers play an important role in the exacerbation and persistence of depressive and anxiety symptoms in this population (6, 10). The extensive public health literature indicates that cycles of movement avoidance, perceived disability, low motivation, and social isolation are key pathways in the persistence of mood disorders (12–15).

Depression and anxiety in postwar societies are not viewed merely as individual disorders, but are recognized as chronic phenomena with broad social, economic, and functional consequences. Reports from the World Health Organization indicate that mood disorders in populations exposed to trauma and physical disability are often persistent in nature and are associated with reduced functional capacity, increased dependency, and the continuation of the disability cycle (16). In veterans and individuals with disabilities, the co-occurrence of physical injury, chronic pain, unemployment, and restricted social participation intensifies the risk of chronic depression and anxiety and reduces the effectiveness of conventional therapeutic interventions (17). Accordingly, recent research has focused on identifying behavioral and psychosocial protective factors that can mitigate this debilitating cycle.

Although regular physical activity is recognized as one of the most effective non-pharmacological strategies for reducing psychological distress and improving emotional functioning (12–15), evidence suggests that relying solely on recommendations to increase physical activity—particularly in populations with persistent physical and psychological limitations—is insufficient to produce long-term behavioral change. Studies have shown that many veterans and individuals with disabilities, despite awareness of the benefits of physical activity, face difficulties in maintaining sustained participation in such activities (10). These findings indicate that without attention to the psychological prerequisites of movement—such as motivation, perceived competence, and the meaningfulness of the movement experience—physical activity–based interventions will have limited effectiveness.

In addition, conventional mental health approaches, including pharmacotherapy and psychotherapy, although effective in reducing short-term symptoms of depression and anxiety, often face challenges such as low adherence, limited accessibility, and poor durability of treatment effects in veteran populations (18). In contrast, lifestyle-based approaches, particularly movement-based interventions, have received attention as low-cost and potentially sustainable complements. However, existing evidence indicates that the absence of empowering conceptual frameworks limits the effectiveness of these interventions in vulnerable populations (19).

In this context, *physical literacy*, as a multidimensional construct consisting of motivation, confidence, movement competence, knowledge, and understanding related to lifelong participation in physical activity, has gained a prominent position in health research (20–23). Unlike traditional approaches that consider physical activity merely as a measurable behavior, physical literacy emphasizes the individual's lived experience of movement and dynamic interaction with the environment, and addresses the psychological and perceptual prerequisites of movement behavior (24–27). Research has shown that higher levels of physical literacy are associated with more sustained participation in physical activity, greater positive emotions, and lower levels of psychological distress in non-clinical populations.

However, systematic reviews of the literature indicate that the concept of physical literacy has largely been overlooked in clinical or vulnerable populations, particularly veterans and individuals with disabilities. Even in extensive research within military contexts that emphasizes the role of physical activity in mental health, physical literacy has not been incorporated as an independent construct in mental health models (6, 10). This research gap suggests that although the benefits of physical activity are well documented, the psychological and experiential prerequisites of sustained engagement in movement—especially in populations with physical limitations—have received less attention.

From this perspective, physical literacy may provide a comprehensive conceptual framework for explaining the link between movement, behavior, and mental health in vulnerable populations. The focus of this construct on motivation, movement confidence, and the meaningfulness of movement experiences offers the potential to reduce psychological barriers to movement participation and consequently moderate symptoms of depression and anxiety (20–25). Despite this theoretical potential, empirical evidence regarding the role of physical literacy in the mental health of clinical populations remains limited.

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In response to this conceptual gap, the present study was designed to examine the predictive role of perceived physical literacy in depression and anxiety among veterans and individuals with disabilities. This study seeks to contribute empirical evidence to the expansion of mental health conceptual frameworks in special populations and to provide a basis for designing physical literacy–based rehabilitation interventions.

Method

Research design: This study is applied in purpose and descriptive-correlational in nature. Data collection was conducted using a survey method.

Statistical population and research sample: The statistical population of the study consisted of veterans and individuals with disabilities in Yazd City, from whom 110 participants (12 veterans and 98 individuals with disabilities) were selected using convenience sampling. Sample size was determined using G*Power software, considering a medium effect size, a Type I error of 0.05, and a power of 0.95. Inclusion criteria included not using psychiatric medications, absence of intellectual disability, absence of very severe physical disabilities or disorders, absence of genetic disability, and completion of an informed consent form. The exclusion criterion was unwillingness to complete the questionnaires.

Research instruments

1. **Demographic information questionnaire:** To collect background information, a researcher-made demographic questionnaire was used. This questionnaire included a set of basic questions assessing demographic characteristics and physical condition, including height, weight, age, presence of physical or mental illness, education level, marital status, and history of sports or therapeutic activities.
2. **Perceived Physical Literacy Questionnaire:** In this study, the Perceived Physical Literacy Assessment Scale (PLAS) was used to assess the level of physical literacy in adults. This instrument was developed by Naylor et al. in 2024 and is considered one of the newest psychometric scales in the field of physical activity and health. The PLAS consists of 23 items categorized into six main components: motivational–psychological, social, confidence, physical–coordination, physical–strength, and knowledge. To calculate the total physical literacy score, the mean score of each subscale is first calculated, and then the sum of these means is considered the final score. Higher scores indicating higher levels of perceived physical literacy. In Iran, the validity and reliability of the Persian version of this questionnaire were examined and confirmed by Samadi et al. (2025) (28).
3. **DASS questionnaire (1995):** To assess the levels of depression and anxiety of the participants, the Depression, Anxiety and Stress Scales (DASS) were used. This instrument was developed by Lovibond and Lovibond in 1995 and is regarded as a valid and standardized psychometric tool in the field of mental health. The short version of the questionnaire includes 21 items completed through self-report. Responses to each item are rated on a four-point Likert scale (from “did not apply to me at all” to “applied to me very much”). Due to its simple structure and appropriate reliability and validity, this instrument is widely used in psychological and clinical research. In Iran, the validity and reliability of the DASS have been examined by various researchers. In the study by Asghari Moghadam et al., Cronbach’s alpha coefficients of 0.77 for depression, 0.79 for anxiety, and 0.78 for stress were reported (29).

Procedure and Ethical Considerations

This study was conducted between August and September 2025, following coordination with the Martyrs and Veterans Affairs Foundation and the Disabled and Veterans Sports Board of Yazd County. The execution process was as follows: After coordination with eligible individuals, an orientation session was held for them. In this session, the research objectives and procedures were fully explained, with emphasis placed on data confidentiality, the voluntary nature of participation, and the right to withdraw at any stage. Subsequently, a written informed consent form was given to each participant and, after any ambiguities were clarified, it was signed. In the next phase, the questionnaire package was completed by the participants in a calm and private setting. Prior to starting, to reduce response bias, they were informed that there were no right or wrong answers and that the results would be reported only in aggregate and anonymously. Should any ambiguity arise during the completion of the questionnaire, the researcher was available to provide clarification. Finally, the participants’ cooperation was acknowledged, and they were promised that a summary of the overall research findings would be sent to them upon request.

Statistical analysis of data

Descriptive statistics, including the mean and standard deviation, were used to summarize the research variables and create tables. After verifying data normality, the information was analyzed using Pearson's

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correlation coefficient to assess the relationships between variables and regression to predict variables based on levels of perceived physical literacy. A significance level of α = 0.05 was maintained for all statistical tests.

Findings

To check the normality of the data, the Kolmogorov-Smirnov test (p< .05), was used, which showed that all variables had a normal distribution. Consequently, Pearson's correlation coefficient was utilized to investigate the relationships between the variables. The findings showed a significant cognitive relationship between Perceived Physical Literacy and Depression (p< 0.05, r =- 0.34), as well as a significant negative relationship between Perceived Physical Literacy and Anxiety (p< 0.05, r = -0.21).

To investigate the possibility of predicting the variables of Depression and Anxiety based on Perceived Physical Literacy level, linear regression was used. However, before using regression, the regression assumptions were tested in detail. The results of the analysis are presented below.

Table 1. Regression Analysis Predicting Depression and Anxiety Based on Perceived Physical Literacy

Criterion Variable	Model	B	SE	Beta	T	Sig.	R	R^2	F	Sig.
Depression	Constant	16.57	2.41		6.86	.001	0.34	0.115	64.06	.001
	Physical Literacy	−۰/٤٣٤	0.116	−۰/٣٣٩	−٣/٧٥	.001				
Anxiety	Constant	12.05	12.32	−۰/٢١٣	5.17	.001	0.21	0.045	5.63	.025
	Physical Literacy	−۰/٢٥٣	0.111		−٢/٢٧	.025				

As Table 1 shows, approximately 12% of the variance in depression can be predicted based on perceived physical literacy. In other words, perceived physical literacy negatively and significantly predicts depression among veterans and individuals with disabilities (p< .001). Similarly, over 4.5% of the variance in anxiety can be predicted by perceived physical literacy, showing a significant negative predictive relationship (p< .025).

Discussion

The purpose of the present study was to examine the predictive role of perceived physical literacy in symptoms of depression and anxiety among veterans and individuals with disabilities. The results showed that physical literacy had a significant negative relationship with both depression and anxiety, such that higher perceived levels of physical literacy components—including motivation, bodily confidence, movement competence, social interaction, and knowledge related to physical activity—were associated with reduced severity of psychological symptoms. These findings suggest that physical literacy can function as a multidimensional protective factor in the mental health of these vulnerable groups.

Correlation analysis indicated that the relationship between physical literacy and depression was of moderate strength (r= −0.34), whereas its association with anxiety was weaker but still significant (r= −0.21). Regression analysis also showed that physical literacy explained approximately 66.5% of the variance in depression and 4.5% of the variance in anxiety; a finding consistent with previous studies in non-clinical populations and indicating that although physical literacy is only one of the factors influencing mental health, its contribution—particularly to depression—is considerable (19).

The present findings are consistent with existing evidence in the literature on physical literacy and mental health. Shanshan et al. (2025) reported that higher levels of physical literacy among adolescents were associated with increased positive emotions and reduced negative emotions (12). Likewise, Leung et al. (2025), in a systematic review, showed that perceived physical literacy among university students was associated with reduced depression, anxiety, and stress, as well as increased quality of life and life satisfaction (14). On the other hand, Fortnum et al. (2025), emphasizing the multidimensional nature of physical literacy, identified it as a fundamental determinant of health, the effects of which are exerted through increased motivation, competence, and sustained participation in physical activity (30). However, these authors also pointed to the lack of evidence in clinical and vulnerable populations—a gap that the present study seeks to partially address by focusing on veterans and individuals with disabilities.

Several theoretical mechanisms can explain the observed relationship between physical literacy and symptoms of depression and anxiety. First, the motivational–emotional components of physical literacy can enhance feelings of competence, personal control, and social belonging—factors that are recognized in contemporary mental health models as protective buffers against depression and anxiety (25). Second, strong evidence

indicates that regular participation in physical activity—an expected outcome of higher levels of physical literacy—is associated with reduced symptoms of depression and anxiety and improved emotional functioning (19). Third, increased movement participation can reduce social isolation and provide opportunities for positive social interaction, particularly for individuals with physical limitations, a factor directly associated with improved psychological well-being.

In the context of veterans and injured populations, the findings of Abrantes et al. (2017) also indicate that physical activity in individuals with PTSD can be associated with reduced emotional symptoms, increased perceptions of controllability, and improved quality of life (7). Although the present study did not directly measure PTSD, the mechanisms proposed in that research can provide a theoretical explanation for the protective role of physical literacy in reducing psychological distress in the studied population.

One of the main innovations of this study is its focus on a population that has been largely neglected in the physical literacy literature. Most previous research on physical literacy has focused on children, adolescents, university students, and healthy populations (1, 6), while little evidence exists regarding the role of this construct among veterans or individuals with disabilities. Therefore, by providing preliminary data from a vulnerable group, the present study opens a new pathway for expanding the application of physical literacy in the fields of mental health and rehabilitation.

From a practical perspective, the results of this study suggest that promoting physical literacy can be considered as a complementary component in physical and psychological rehabilitation programs for veterans and individuals with disabilities. Since physical literacy is not limited solely to the amount of physical activity and also encompasses motivational, cognitive, and social dimensions, interventions based on this construct can lead to increased participation, reduced movement-related anxiety, and improved perceptions of personal competence (25). Such an approach could, alongside medical and psychotherapeutic treatments, contribute to the sustainable promotion of mental health in this population.

Despite these findings, the limitations of the study should be considered. The cross-sectional design limits causal inference. In addition, the use of self-report instruments may be associated with response bias. Furthermore, variables such as PTSD, severity of chronic pain, or actual levels of physical activity were not measured, which may have mediated or moderated the observed relationships. Future studies using longitudinal or interventional designs and examining these variables may provide a deeper understanding of the mechanisms through which physical literacy influences mental health.

Conclusion

The results of this study revealed that a higher level of perceived physical literacy was associated with lower levels of psychological distress, particularly symptoms of anxiety and depression, among veterans and individuals with disabilities. More precisely, the analyses demonstrated a significant inverse relationship between perceived physical literacy and both components of anxiety and depression. These findings support the hypothesis that physical literacy can serve as a psycho-social protective factor, potentially reducing vulnerability to psychological disorders. Accordingly, the development and implementation of targeted programs to enhance physical literacy could be considered a practical strategy in policy-making and mental health interventions for veterans and individuals with disabilities, warranting attention from relevant authorities and planners in this field.

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