



Effect of Physical activity on Stress and Psychological well-being among Adolescents

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Abstract

Adolescence is a developmental stage marked by rapid changes that can significantly impact mental health. This study aimed to examine the relationship between physical activity, perceived stress, and psychological well-being among adolescents. A total of 200 participants (aged 15–19 years) were selected through stratified random sampling from higher secondary schools in and around Cuddalore district. The International Physical Activity Questionnaire – Short Form (IPAQ-SF), Perceived Stress Scale (PSS-10), and Ryff's Psychological Well-Being Scale (PWB-42) were administered to measure physical activity levels, perceived stress, and psychological well-being, respectively. Pearson's correlation analysis revealed that physical activity was negatively correlated with perceived stress and positively correlated with psychological well-being. Linear regression analysis indicated that physical activity and perceived stress significantly predicted psychological well-being. These findings underscore the importance of promoting physical activity in adolescent populations as a means to enhance psychological well-being and reduce stress.

Keywords: *physical activity, perceived stress, psychological well-being and adolescents*

1. Introduction

Adolescence is a pivotal developmental period marked by significant physiological, emotional, cognitive, and social transitions. During this time, individuals experience rapid growth spurts, hormonal changes, and evolving social roles, all of which can impact mental health. According to the World Health Organization (2023), 10–20% of adolescents globally experience mental health disorders, with stress, anxiety, and depression being among the most common. In India, academic competition, parental expectations, peer pressure, and lack of coping strategies have further exacerbated the mental health burden among school-aged youth.

Stress is one of the most pervasive psychological challenges encountered during adolescence. It results from the perceived inability to cope with the demands of daily life. Chronic exposure to stress has been associated with negative psychological outcomes, including poor academic



performance, emotional dysregulation, low self-esteem, and the onset of psychiatric disorders. The Perceived Stress Scale (PSS) developed by Cohen et al. is widely used to evaluate how individuals appraise situations as stressful in their daily lives. Adolescents, due to their transitional phase and limited coping skills, often score higher on perceived stress levels compared to other age groups.

Conversely, psychological well-being, as conceptualized by Carol Ryff, encompasses more than the absence of illness; it includes self-acceptance, purpose in life, autonomy, positive relationships, personal growth, and environmental mastery. It is a comprehensive indicator of one's ability to function positively and adaptively in society. In the context of adolescents, well-being supports identity formation, resilience, and a sense of belonging, which are vital for lifelong emotional health.

Physical activity has gained increasing attention as a non-pharmacological intervention for improving mental health. Beyond its physical benefits, regular exercise is associated with the release of endorphins, regulation of neurotransmitters like dopamine and serotonin, and improvements in self-perception and social interaction. The International Physical Activity Questionnaire – Short Form (IPAQ-SF) is a validated tool to measure the frequency and intensity of physical activity, making it suitable for adolescent research.

Research has consistently demonstrated that physical activity can serve as a protective factor against stress and a promoter of well-being. However, empirical studies in the Indian context remain limited, especially those integrating all three constructs—physical activity, perceived stress, and psychological well-being—within a single framework. Moreover, much of the existing literature focuses on Western populations, and there is a growing need for culturally contextualized studies that reflect the lived experiences of Indian adolescents.

Therefore, this study seeks to fill that gap by exploring the relationship between physical activity, perceived stress, and psychological well-being among Indian adolescents using robust psychological tools. By doing so, it aims to offer evidence-based insights that can inform educational policies, school mental health programs, and interventions promoting healthy lifestyle behaviors in youth.

2. Review of Literature

The interplay between physical activity, stress, and psychological well-being has been a subject of increasing research interest in the field of health psychology, especially during adolescence—a period marked by developmental vulnerability and heightened exposure to stressors. Literature suggests that physical activity plays a critical role not only in enhancing physical health but also in promoting emotional and psychological resilience.

2.1 Physical Activity and Mental Health

The relationship between physical activity and mental health is well-documented. Exercise is known to improve mood, reduce symptoms of anxiety and depression, and enhance self-esteem and cognitive functioning (Biddle & Asare, 2011). Biologically, physical activity stimulates the production of endorphins and modulates neurotransmitters such as serotonin and dopamine,



which are associated with mood regulation. Psychologically, physical activity provides a sense of accomplishment, structure, and distraction from stressors.

Lubans et al. (2016) highlighted that physical activity interventions in youth not only reduce emotional distress but also lead to improvements in self-concept and academic performance. Moreover, physical activity contributes to the development of social skills through team-based engagement and increases overall life satisfaction.

In the Indian context, Singh et al. (2020) found that adolescents who participated in sports and regular exercise reported lower levels of anxiety and higher school engagement. However, with rising academic pressure and increased screen time, sedentary behaviours have become more prevalent, underscoring the need for targeted interventions that integrate physical movement into adolescents' routines.

2.2 Perceived Stress in Adolescents

Stress is a psychological response to perceived challenges or threats and is particularly pronounced during adolescence due to multiple transitions and uncertainties. According to Lazarus and Folkman's (1984) transactional model of stress, the individual's appraisal of a situation largely determines the stress response. The Perceived Stress Scale (PSS) by Cohen et al. (1983) aligns with this model, measuring the degree to which individuals perceive situations as uncontrollable or overwhelming.

High levels of perceived stress during adolescence are associated with a range of negative outcomes including sleep disturbances, irritability, academic burnout, substance use, and the onset of mood disorders (Compas et al., 2017). A meta-analysis by Pascoe et al. (2020) further confirmed that perceived stress negatively correlates with psychological well-being and that coping mechanisms play a mediating role.

Indian studies have reported similarly concerning trends. For instance, a study by Deb et al. (2015) on Indian high school students revealed that over 60% experienced moderate to high levels of academic stress, which was significantly linked to depressive symptoms and lower life satisfaction.

2.3 Psychological Well-Being (PWB)

Carol Ryff's multidimensional model of psychological well-being includes six core dimensions: autonomy, environmental mastery, personal growth, positive relations, purpose in life, and self-acceptance (Ryff, 1989). Psychological well-being is viewed not only as the absence of mental illness but also as the presence of positive psychological functioning.

Adolescents with high levels of well-being are more likely to succeed academically, maintain healthy relationships, and engage in prosocial behaviors. Ryff's model has been widely used



in cross-cultural research and has shown strong reliability across diverse populations, including adolescents.

Multiple studies support the claim that stress and well-being are inversely related. For example, Keyes (2002) argued that mental health is not merely the absence of illness but a state of flourishing. Moreover, recent longitudinal studies suggest that fostering psychological well-being in adolescence may serve as a buffer against future psychopathology.

In India, Sharma and Kaur (2019) found that adolescents with higher scores on Ryff's PWB scale demonstrated better coping strategies and resilience to stressors, especially those related to academic and familial pressure.

2.4 Integration of Variables

While physical activity has been independently linked to both reduced stress and enhanced well-being, fewer studies have explored these variables together within a single framework, particularly in adolescent populations. In a study by Zhang et al. (2022), physical activity was shown to mediate the relationship between stress and psychological well-being, suggesting that active adolescents were less affected by perceived stress and maintained higher levels of well-being.

Furthermore, psychosocial models such as the Self-Determination Theory (Deci & Ryan, 1985) emphasize the role of physical activity in satisfying basic psychological needs—autonomy, competence, and relatedness—which in turn enhance psychological well-being.

Thus, reviewing the literature provides a strong empirical and theoretical foundation for this study, which aims to bridge the gap by concurrently examining the influence of physical activity on perceived stress and psychological well-being in Indian adolescents.

Objectives

1. To assess the levels of physical activity, perceived stress, and psychological well-being among adolescents.
2. To examine the relationship between levels of physical activity and perceived stress among adolescents.
3. To investigate the relationship between physical activity and psychological well-being among adolescents.
4. To determine whether physical activity and perceived stress predict psychological well-being in adolescents.



Hypotheses

1. **H1:** There will be a significant negative correlation between physical activity and perceived stress among adolescents.
2. **H2:** There will be a significant positive correlation between physical activity and psychological well-being among adolescents.
3. **H3:** Physical activity and perceived stress will significantly predict psychological well-being among adolescents.

3. Methodology

3.1 Research Design

The present study employed a quantitative, correlational research design to examine the relationship between physical activity, perceived stress, and psychological well-being among adolescents. This design was selected to statistically analyse the strength and direction of relationships between the selected psychological variables using standardized psychometric tools.

3.2 Sampling Method

A stratified random sampling technique was employed to ensure appropriate representation of both male and female students across different grade levels (Classes 9 to 12). A total of 200 adolescents (100 male and 100 female), aged 15–19 years, were selected from higher secondary schools in and around cuddalore district.

3.3 Inclusion Criteria

- Adolescents aged between 15 and 19 years.
- Higher secondary schools students in and around cudalore district.
- Able to read and understand English or Tamil (for responding to the questionnaires).
- Provided informed assent along with parental/guardian consent to participate in the study.

3.4 Exclusion Criteria

- Adolescents with diagnosed psychological or neurological disorders.
- Individuals engaged in professional athletic training (to control for extreme physical activity levels).
- Adolescents who had chronic physical illnesses or injuries limiting physical activity.
- Incomplete or invalid questionnaire responses.



3.5 Data Collection Procedure

Necessary permission was obtained from the school Head masters. After receiving informed consent from the parents/guardians and assent from the students, participants were gathered in a classroom setting for data collection.

Participants were administered the following standardized self-report instruments:

- International Physical Activity Questionnaire – Short Form (IPAQ-SF)
- Perceived Stress Scale (PSS-10)
- Ryff’s Psychological Well-Being Scale (PWB-42)

The questionnaires were distributed in hard copy and instructions were clearly explained. Data collection took approximately 30–40 minutes per session. Anonymity and confidentiality of responses were assured.

4. Results and Interpretation

Table 4.1

Showing the Pearson correlation between Physical activity, Perceived stress and psychological well-being among adolescents

Variables	Physical Activity	Perceived Stress	Psychological Well-Being
Physical Activity	1.00	-0.45**	0.52**
Perceived Stress	-0.45**	1.00	-0.60**
Psychological Well-Being	0.52**	-0.60**	1.00

Note: $p < .01$ (**significant correlation)

Pearson’s correlation coefficients were computed to examine the relationships between physical activity, perceived stress, and psychological well-being. The results indicated a significant negative correlation between physical activity and perceived stress, $r(N) = -.45$, $p < .01$, suggesting that higher levels of physical activity are associated with lower perceived stress. Additionally, there was a significant positive correlation between physical activity and psychological well-being, $r(N) = .52$, $p < .01$, indicating that individuals who engage in more physical activity tend to report greater psychological well-being. A significant negative correlation was also observed between perceived stress and psychological well-being, $r(N) = -.60$, $p < .01$. This implies that higher perceived stress is associated with lower psychological well-being.

Table 4.2

Showing Simple Linear Regression Analysis Predicting Psychological Well-Being from Physical Activity and Perceived stress



Variables	B value	β value	R ² square	F value	P value
Physical activity	0.40	0.52	0.27	33.42	< .001
Perceived stress	0.35	-0.60	0.36	56.25	< .001

Note: B value- Unstandardized regression coefficient, β value- Standardized regression coefficient

Simple linear regression analyses were conducted to examine the predictive relationship between physical activity, perceived stress, and psychological well-being. The results indicated that both physical activity and perceived stress significantly predicted psychological well-being. Physical activity was a positive predictor of psychological well-being, $B = 0.40$, $\beta = .52$, $F(1, N-2) = 33.42$, $p < .001$, accounting for 27% of the variance ($R^2 = .27$). This suggests that higher levels of physical activity are associated with greater psychological well-being. Perceived stress was a negative predictor of psychological well-being, $B = 0.35$, $\beta = -.60$, $F(1, N-2) = 56.25$, $p < .001$, explaining 36% of the variance ($R^2 = .36$). This indicates that higher perceived stress is related to lower psychological well-being.

5. Conclusion

The present study investigated the relationship between physical activity, perceived stress, and psychological well-being among adolescents using standardized psychometric tools. The findings revealed a significant negative correlation between physical activity and perceived stress, and a positive correlation between physical activity and psychological well-being. Furthermore, perceived stress was found to be a strong negative predictor of psychological well-being, while physical activity significantly contributed to its enhancement.

These results highlight the crucial role of regular physical activity in reducing stress and promoting positive mental health outcomes in adolescents. The study supports the notion that engaging in physical activity can serve as a protective factor against the adverse psychological effects of stress, particularly during the transitional phase of adolescence. Given the increasing prevalence of sedentary lifestyles and academic stress among youth, the integration of physical activity programs in schools and communities is not only beneficial but necessary for fostering psychological resilience.

Suggestions for Future Study

Future research should consider longitudinal designs to explore the long-term effects of physical activity on stress reduction and psychological well-being throughout adolescence. Intervention-based studies involving specific programs like yoga, team sports, or aerobic training could provide valuable insights into their impact on mental health. Expanding to larger and more diverse samples, including adolescents from rural, tribal, or socio-economically



disadvantaged backgrounds, would enhance the generalizability of findings. Incorporating objective measures such as wearable fitness trackers or physiological stress indicators can strengthen the validity of self-reported data. Additionally, examining mediating variables like self-esteem and resilience, and moderating factors such as gender, age, or academic performance, may offer a deeper understanding of the relationship dynamics. Finally, cross-cultural comparisons could shed light on how cultural norms and lifestyle differences shape adolescent psychological well-being.

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