

Original Article

Gender Differences in Perceived Stress and Its Association with Lifestyle and Academic Performance among School-Going Adolescents in Bhopal: A Cross-Sectional Study

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ABSTRACT

Background: Adolescence is a vulnerable developmental phase characterized by rapid biological, emotional, and social changes. Limited data exist regarding gender-specific stress patterns among Indian school-going adolescents, particularly in Central India. Female adolescents are often reported to experience greater psychological stress due to emotional sensitivity, sociocultural expectations, and academic pressure. The present study was done to assess gender differences in perceived stress and evaluate its association with lifestyle factors and academic performance among school-going adolescents. **Materials and Methods:** A school-based cross-sectional analytical study was conducted among 180 adolescents aged 12–15 years in selected urban private schools of Bhopal. Participants were selected using multistage random sampling. Perceived stress was assessed using the Perceived Stress Scale (PSS-10). Data on sleep duration, physical activity, and academic performance were collected using a structured questionnaire and school-going adolescents' records. Statistical analysis was performed using SPSS version 22. Chi-square test and ANOVA were applied. **Results:** Girls constituted 50.6% and boys 49.4% of participants. A statistically significant association was observed between gender and stress levels ($p < 0.001$). Moderate and high stress were higher among girls (38.9%) compared to boys (20.6%). Specifically, moderate stress was observed in girls (25.6%) versus boys (13.9%), and high stress in girls (13.3%) versus boys (6.7%). Stress was significantly associated with sleep duration and physical activity ($p < 0.001$), but not with academic performance ($p > 0.05$). **Conclusion:** Female adolescents experienced significantly higher stress compared to males. Perceived stress was strongly associated with adverse lifestyle behaviors but not with academic performance. Gender-sensitive school-based mental health interventions are required.

Key words: Adolescent, Stress, Lifestyle.

Adolescence is a critical developmental period marked by rapid physical, emotional, and psychosocial changes. Increasing academic demands, evolving social expectations, and identity-related challenges contribute to heightened psychological stress during this phase. Adolescent stress is a significant public health concern due to its impact on mental health, emotional development, and long-term behavioral outcomes. Perceived stress refers to the extent to which individuals appraise situations as unpredictable, uncontrollable, or overwhelming [1]. Stress perception varies among adolescents based on developmental, environmental, and sociocultural factors, with gender being a key determinant [2,3].

Gender differences in stress are consistently reported, with female adolescents experiencing higher stress due to emotional sensitivity, hormonal influences, and sociocultural expectations. Males may externalize distress or underreport symptoms [2,3]. Stress also influences lifestyle behaviors, including sleep and physical activity, with higher stress linked to poor sleep, reduced activity, and unhealthy coping patterns [4,5], while its association with academic performance remains inconsistent [6,7]. Limited data from Central India necessitate further research; therefore, this study assesses gender differences in perceived stress and its association with lifestyle factors and academic performance among adolescents in urban private schools of Bhopal.

Access this article online

Received – 2nd July 2026Initial Review – 3rd July 2026Accepted – 5th August 2026

DOI: 10.32677/ijch.v13i7.8363

Quick Response Code



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MATERIALS AND METHODS

This school-based cross-sectional analytical study was conducted among adolescents aged 12–15 years enrolled in selected urban private schools of Bhopal, Madhya Pradesh, India. The study was conducted over 1.5 years (From May'24 to November'25) after obtaining institutional ethical approval and administrative permission from participating schools.

A total of 180 adolescents were included in the study. Sample size was calculated using the formula $4PQ/d^2$ at a 95% confidence interval, assuming a stress prevalence of 36.5% [8] and absolute precision of 7%. Participants were selected using multistage random sampling. Six private schools were selected by simple random sampling, followed by systematic random sampling of eligible students. Approximately 30 students were included in each school. Adolescents aged 12–15 years with parental consent and student assent were included. Adolescents with chronic illness, diagnosed psychiatric illness, long-term medication use, or unwillingness to participate were excluded.

Data were collected using a pre-designed and pre-tested structured questionnaire. Demographic information, sleep duration, physical activity, and related lifestyle variables were recorded. Academic performance was assessed using previous and current examination records obtained from school authorities. Physical activity was assessed based on self-reported daily duration: <1 hour/day, 1–2 hours/day, ≥ 2 hours/day. Perceived stress was assessed using the Perceived Stress Scale (PSS-10), a validated 10-item questionnaire scored on a 5-point Likert scale (Table 1). Stress was categorized as low (0–13), moderate (14–26), and high (27–40).

Table 1. Perceived Stress Scale (PSS) Scoring

Response Option	Score
Never	0
Almost Never	1
Sometimes	2
Fairly Often	3
Very Often	4

Data was entered in Microsoft Excel and analyzed using SPSS version 22. Categorical variables were expressed as frequencies and percentages, and continuous variables as mean $\pm$ standard deviation. Chi-square test and ANOVA were applied. A p-value <0.05 was considered statistically significant.

DEMOGRAPHIC PROFILE

A total of 180 adolescents were included in the study. The demographic and anthropometric characteristics are shown in Table 2.

RESULTS

Gender Differences in Perceived Stress

A statistically significant association was observed between gender and stress levels ($p < 0.001$). Female adolescents exhibited a higher prevalence of moderate and high stress compared with males (Table 3).

Table 3. Gender Differences in Perceived Stress

Category	Moderate	High	Total
Girls	25.6%	13.3%	38.9%
Boys	13.6%	6.7%	20.6%

Association of Stress with Gender

A considerable proportion of adolescents experienced moderate to high stress, indicating a high prevalence of overall stress in the study group. Higher stress was observed among girls compared to boys, indicating greater female vulnerability (Table 4).

Table 4: Association of Stress with Gender

Stress Category	Boys (%)	Girls (%)	p-value
Low	52 (28.8%)	21 (11.7%)	<0.001
Moderate	25 (13.9%)	46 (25.6%)	
High	12 (6.7%)	24 (13.3%)	
Total	89 (49.4%)	91 (50.6%)	

Association of Stress with Sleep Duration

Sleep duration <6 hours was associated with higher stress, suggesting that inadequate sleep increases the risk of stress (Table 5).

Table 5: Association of Stress with Sleep Duration

Sleep Duration	Low Stress (%)	Moderate Stress (%)	High Stress (%)	p-value
<6 hours	10 (5.6%)	22 (12.2%)	18 (10.0%)	<0.001
6–7 hours	28 (15.6%)	30 (16.7%)	12 (6.7%)	
8–10 hours	35 (19.4%)	19 (10.6%)	6 (3.3%)	
Total	73 (40.6%)	71 (39.4%)	36 (20.0%)	

Association of Stress with Physical Activity

Lower physical activity levels were associated with higher stress, indicating a protective role of exercise (Table 6).

Association of Stress with Academic Performance

No significant association was found between stress and academic performance (Table 7).

Table 2. Demographic and Anthropometric Characteristics of Study Participants (n = 180)

Variable	Category	Frequency (n)	Percentage (%)	Mean ± SD
Age (years)	12	8	4.4	
	13	43	23.9	
	14	63	35.0	
	15	66	36.7	
	Total	180	100.0	
Gender	Boys	89	49.4	
	Girls	91	50.6	
	Total	180	100.0	
Anthropometry	Height (cm)			154.36 ± 7.40
	Weight (kg)			43.04 ± 8.51
	BMI (kg/m²)			17.0 ± 2.5

Table 6: Association of Stress with Physical Activity

Physical Activity Level	Low Stress	Moderate Stress	High Stress	p-value
High Physical Activity	31 (17.2%)	18 (10.0%)	14 (7.8%)	
Moderate Physical Activity	42 (23.3%)	40 (22.2%)	9 (5.0%)	<0.001
Low Physical Activity	0 (0.0%)	13 (7.2%)	13 (7.2%)	

Table 7: Association of Stress with Academic Performance

Academic Performance	Low Stress (Mean ± SD)	Moderate Stress (Mean ± SD)	High Stress (Mean ± SD)	p-value
Previous Marks	85.72 ± 7.52	84.83 ± 6.53	84.82 ± 4.73	0.733
Current Marks	85.25 ± 0.02	85.22 ± 8.27	83.65 ± 6.03	0.397

DISCUSSION

The present study highlights a high prevalence of perceived stress among adolescents in urban private schools of Bhopal, with significantly higher levels observed among girls. Moderate-to-high stress was more common in female students, and stress showed significant associations with modifiable lifestyle factors such as inadequate sleep and low physical activity. However, no significant relationship was observed between perceived stress and academic performance. These findings emphasize that adolescent stress is multifactorial and influenced by both biological and behavioral determinants.

The gender disparity observed aligns with previous studies, which report higher stress among adolescent girls due to hormonal fluctuations, emotional vulnerability, and internalizing coping styles [2,3,9]. Indian studies by Singh et al. and Deb et al. similarly highlight the impact of academic pressure and sociocultural expectations on stress among girls [5,8,9]. The association between shorter sleep duration and higher stress is consistent with evidence linking sleep deprivation to impaired emotional regulation [5]. Likewise, reduced physical activity has been associated with increased stress due to lower endorphin levels.

However, many studies suggest that academic outcomes are influenced by multiple confounding factors [6,7].

Due to the cross-sectional design of the present study, causal inference is limited, and reliance on self-reported data may introduce reporting bias. Additionally, the study was confined to urban private schools, limiting generalizability. Future research should include longitudinal designs, diverse populations, and objective measures of stress. Interventions should focus on gender-sensitive approaches, improving sleep hygiene, and promoting physical activity to mitigate adolescent stress.

CONCLUSION

Perceived stress is common among adolescents and is significantly higher in females. It is associated with lifestyle factors and academic performance, highlighting the need for early interventions.

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How to cite this article: Vishwas T, Gupta M.K, Lakhwani S, Kumar S. Gender Differences in Perceived Stress and Its Association with Lifestyle and Academic Performance among School-Going Adolescents in Bhopal: A Cross-Sectional Study. *Indian J Child Health.* 2026; 13(7):102-105.

Funding: None; Conflicts of Interest: None Stated