ISSN (Online) 2456 -1304

International Journal of Science, Engineering and Management (IJSEM)

Volume 13, Issue 06, June 2026

Gender and Institutional Context Differences in Stress Dimensions among School-Going Adolescents

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***Abstract*— Psychological stress among school going adolescents varies across demographic and institutional context. This study assessed gender and school-type based differences for multiple dimensions of stress in three schools in a state in central India. A cross sectional study was conducted among 1141 school students from three schools. Stress levels were assessed for: Pressure, frustration, anxiety, physical stress, overall stress. Stress levels were categorised as low, moderate, and high. Associations between stress levels, gender, and school type were analysed using chi-square tests. Among the participants, 717 (62.83%) were female and 424 (37.10%) were males. Females reported significantly higher levels of pressure, frustration, anxiety, and physical stress compared to males (all p<0.01). Overall stress levels did not differ significantly by gender (p= 0.195). Stress levels across all dimensions were significantly associated with school type (all p<0.01). Strikingly, female students from the special school consistently demonstrated higher moderate-to-high stress levels across most dimensions while females from Co-ed schools exhibited lower stress levels. Per our study significant gender and school type related differences exist in specific stress dimensions among school going adolescents. Female students appear to be more vulnerable to elevated stress levels highlighting the need for targeted, school specific mental health interventions.**

***Index Terms*— School-related stress, Academic pressure, Psychosocial outcomes, Perceived stress, Adolescent-stress.**

I. INTRODUCTION

Adolescence lasts from puberty to maturity, typically between ages 13 to 18. It is a transitional stage of both cerebral and physical development. The child experiences hormonal, physiological, psychological, and social changes during this developmental stage. They may also experience identity crises, academic stress, and a period of equal confusion and exploration. Increased academic demands and performance expectations in this transition stage contributes to elevated stress levels among school going adolescents[1]

Stress is a condition brought on by situations that put a person under psychological or physical strain. According to Selye (1983) stress is the, “nonspecific response of the body to any demand made upon it” (Selye, H. 1983). It is an internal state that can be brought on by physical demands on the body or by social and environmental circumstances that are deemed to be potentially harmful, uncontrollable, or beyond our capacity to handle life's events and pressures. Stressors are the physical, environmental, and social factors that contribute to stress. Stress is a natural part of life, and everyone experiences it on a daily basis. However, each person's experience of stress can vary, ranging from mild to severe.

Everyone strives for excellence in today's competitive world. Starting on the first day of school, parents want their child to be flawless and succeed in every aspect of life. Parental expectations increase over time and reach their highest point during their child's adolescent years, when they are making career decisions. Academic stress results from the child being under a lot of pressure to meet expectations at home and at school. Adverse psychological consequences, such as anxiety, depressive symptoms, sleep difficulties, and decreased well-being, are linked to high levels of stress related to education[2]. Assignments, midterm tests, etc. cause stress for students. European studies suggest that competitive academic environments and standardized assessment systems are associated with higher stress levels among students[2], [3]. As awareness of education has grown, academic stress has also increase[4]. Today's adolescents live in a more stressful environment. Twenty percent or so of teenagers struggle with mental health issues[5]. Adolescent boys and girls frequently experience stress. There are regular reports of gender inequalities, with girls reporting higher levels of perceived academic stress than boys[1]. According to a study in Poland, stress levels also tend to rise with age and grade progression, indicating cumulative academic strain[6]. Inherent stress from the turbulent developmental stage is exacerbated by other environmental factors and contributes significantly, either directly or indirectly, to the development of all mental and social health issues[7]. Because of this, young people experience anxiety at some point in their lives. Teenage girls face unique challenges in relation to stress due to physiological changes that occur naturally, their social upbringing, and the pressure to perform well academically at a young age[8]. Among older adolescents, particularly girls, subjective stress-related mental health complaints like pain, anxiety, and difficulty sleeping have increased[9].

Numerous studies have been conducted on the mental health of teenagers, addressing issues like stress, anxiety, and depression. However, there are relatively few studies based

ISSN (Online) 2456 -1304
International Journal of Science, Engineering and Management (IJSEM)
Volume 13, Issue 06, June 2026

on evaluation of specific dimensions of stress. In the long run, untreated stress leads to depression. Therefore, it is better to identify the underlying cause of depression during the stressful stage. Evaluating the various aspects of stress (pressure, physical stress, anxiety, and frustration) in connection to demographic and contextual factors like school type, gender, and residential status is still a major research gap. The majority of previous research has either addressed general psychological distress without breaking it down into its component dimensions or concentrated only on academic stress as a composite variable[10]. According to the scale used, this study takes into account the four dimensions of stress which are pressure, physical stress, anxiety and frustration, along with overall stress.

II. OBJECTIVE

The goal was to investigate academic stress in school-age adolescents in Chhattisgarh, Central India, including its four dimensions and stressors. By dissecting teenage stress into its essential psychological components and evaluating these stress components in connection to gender this study seeks to address the gaps in our understanding in this area.

III. MATERIALS AND METHODS

A. Study Settings

From March to April of 2019, a cross-sectional study was carried out in three schools in Raipur, Chhattisgarh. Research has indicated that teenagers' stress levels are influenced by the type of schools they attend[11], [12].

The first group attended a state-funded school for children from the state's "Naxal" affected districts (Naxals are communist insurgent groups in India who follow a far-left, Maoist ideology). The central government schools make up the second and third group. While all of the schools were situated in Raipur, an urban area, the majority of the students at the first group school are from rural areas, while the remaining students are from urban areas. Over 500 students were enrolled in various standards at each school. Schools were conveniently selected.

B. Study Participants

Students between the ages of 13 and 18 who were enrolled in the ninth, tenth, eleventh, and twelfth grades at the time of the research study made up the study population. Every school had several sections for every standard, and each section had about fifty students studying in it.

All sections of 9th, 10th, 11th and 12th grade students were selected from each school having approximately 500 students. i.e., a total of 1500 students were expected in the study.

A total of 1145 students from all three schools took part in the study; however, only 1,141 students were included in the final analysis because 4 students were deemed ineligible due to incomplete questionnaire responses.

C. Study Instruments

A pre-tested, semi structured, self- administered questionnaire containing items related to all four dimensions of stress i.e. pressure, physical stress, anxiety and frustration including patient's age, gender etc. was used. Details regarding students' extracurricular and academic achievements, relationships with their classmates and parents, the school environment, etc. was attempted to document using the questionnaire. Parental age, education, income, occupation, time spent, and other details were not included.

D. Administration of Tests

In order to record the actual grade of stress and prevent bias related to examination stress, the tests were administered after the annual exams were finished. Before the tests were administered, the subjects were fully informed about the importance of the study and their right to withdraw at any time. Following an explanation of the study's goals, risks, and advantages, written consent was obtained. Every question was clarified to the participants. The confidentiality of the identity of the subjects and their scores were maintained.

Stress Scale 'SS-LVNS' was administered to obtain scores on dimensions of pressure, physical stress, anxiety and frustration, which covers a set of 40 items for Stress Scale for Adolescents [17]. Items were divided for each dimension. (Local language (Hindi) version was also provided by Dr. Vijaya Lakshmi & Dr. Shruti Narain.

IV. METHODOLOGY

Authorities in the selected schools were explained about the nature and procedure of the study. Schools had shown their willingness to participate and therefore permission from all the three schools was sought. Informed consent was taken from students for participation in this study.

School authorities were requested to fix a suitable date and time for collecting information from the students of 9th, 10th, 11th and 12th standards. Students of age group were from 13 to 18. Selected classes were approached on the prefixed days and time to collect information from the students. As one of the schools of the selected schools contains students from the Naxal affected and tribal districts of Chhattisgarh, the questionnaire in Hindi was distributed to students as English language skills might be challenging for students from those regions. Students were given 30-35 minutes to fill the questionnaire. Although the questionnaire was pretested and semi-structured, researchers remained available to clarify any matter related to the questionnaire while students filled it up.

A. Statistical Analysis

The data was anonymized. Study data was entered twice and checked for the error. Analysis was performed using the

ISSN (Online) 2456 -1304

International Journal of Science, Engineering and Management (IJSEM)

Volume 13, Issue 06, June 2026

statistical software R. First, we calculated descriptive statistics. All the continuous variables were checked for the normality assumption. We used the Chi square test to analyse differences in gender with stress levels and contingency tables to assess differences between the study groups. Chi Square test of independence was used to assess the relationship of gender with stress levels. P value less than 0.05 was considered statistically significant. Numerical results were represented with the help of stacked and grouped bar charts, as well as heat map summary figure.

V. RESULTS

A. Student's Demographic Characteristics

A total of 1,141 high school students participated in the study, of whom 717 (62.83%) were females and 424 (37.10%) were males. Female students constituted more than half of the study population. Among the participants, 314 (27.51%) female students were from special school. In Co-Ed school 1 268 (23.48%) were females and 306 (26.81%) were males, while in Co-Ed school 2, 135 (11.83%) were females and 118 (10.34%) were males. The demographic characteristics and stress levels of the students are presented in Table I and the supplementary table I.

Table I: Overall stress remains similar but the dimensions vary between genders.

		Female		Male		Total	
Variable	**Category**	**n**	**row %**	**n**	**row %**	**Count**	**p (Chi square test)**
Pressure	low	123	75.93	39	24.07	162	0.0006
	Moderate	397	61.74	246	38.26	643	
	High	197	58.63	139	41.37	336	
Frustration	low	277	56.19	216	43.81	493	0.0002
	Moderate	370	68.77	168	31.23	538	
	High	70	63.64	40	36.36	110	
Anxiety	low	212	55.94	167	44.06	379	0.0030
	Moderate	301	66.01	155	33.99	456	
	High	204	66.67	102	33.33	306	
Physical stress	low	359	55.92	283	44.08	642	<0.01
	Moderate	189	68.23	88	31.77	277	
	High	169	76.13	53	23.87	222	
Overall Stress	low	257	60.19	170	39.81	427	0.1952
	Moderate	366	65.47	193	34.53	559	
	High	94	60.65	61	39.35	155	

B. Overall Stress Remains Similar but the Dimensions Vary Between Genders.

Analysis of stress levels across genders revealed notable differences in several domains. For pressure, females were more likely than males to report moderate (397/643, 61.7% vs 246/643, 38.3%) and high levels (197/336, 58.6 % vs 139/336, 41.4%), with the differences reaching statistical significance ($p< 0.001$). A similar pattern was observed for frustration, where moderate and high levels were more prevalent among females ($p< 0.001$). Anxiety levels were also higher in females, particularly in the moderate (301/456, 66.0 % vs 155/456, 34.0 %) and high categories (204/306, 66.7% vs 102/306, 33.3%; ($p = 0.003$). Physical stress showed the most pronounced gender disparity, with females consistently reporting higher stress across moderate and high levels ($p< 0.001$). In contrast, overall stress did not differ significantly by gender ($p = 0.195$). These results have been summarised in Fig.1 and Fig.2.

ISSN (Online) 2456 -1304

International Journal of Science, Engineering and Management (IJSEM)

Volume 13, Issue 06, June 2026

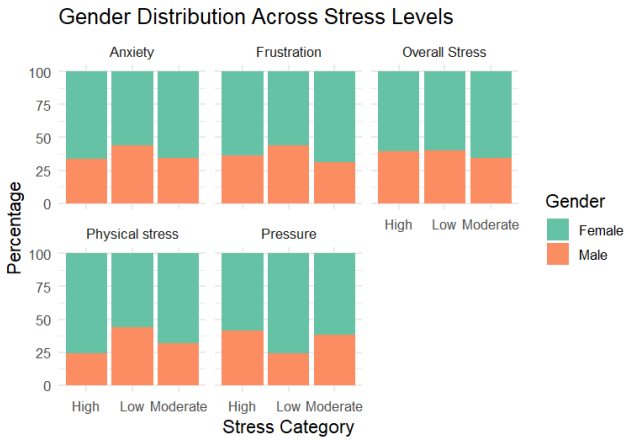


Figure 1.

Gender distribution across stress levels. Stacked bar charts show the percentage of males (orange) and females (green) within each stress category (High, Low, moderate) for the stress dimensions: Anxiety, Frustration, Overall stress, Physical stress, and Pressure. Percentages sum to 100%within each category.

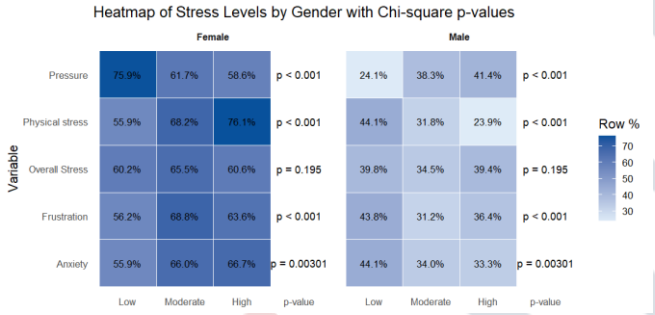


Figure 2.

Heatmap of stress levels by gender with chi-square p-values. Row-wise percentages show the distribution of stress levels (Low, moderate, high) for each stress dimension, stratified by gender. Colour intensity represents row percentages. Chi-square p-values assess differences in stress-level distribution across categories within each domain. P values<0.05 indicate statistically significant differences.

C. Females in Special School Tend to Have Higher Stress Levels

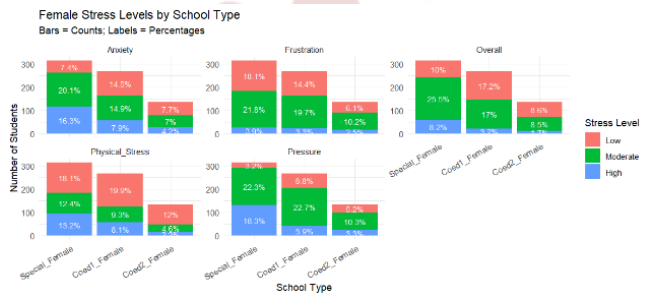


Figure 3.

Female students stress levels by school type across five domains (Anxiety, Frustration, Overall stress, Physical stress, and pressure). Stacked bars represent the number of students in each stress category – High (Blue) Moderate (Green) Low (Red). Percentage labels within each segment indicate the proportion of students in that category for the given school type and domain. Special_Female: Special schools for girls; Coed1: Coed School 1; Coed2: Coed school2.

We analysed Fig.3 data on various psychological states (Frustration, physical stress, Anxiety, pressure, Overall) categorized by severity levels (Low, moderate, High) across three different school types (Also see supplementary table I). All five categories show significant dependence on the type of school (all $p<0.001$). Female students from special school tend to have higher Moderate/High stress across most categories. Coed School 2 females generally show lower stress levels, particularly Low frustration, Low anxiety and Low overall stress. Coed school 1 falls somewhere in between Special School and Coed2- Moderate stress is most common.

VI. DISCUSSION

Societies in developing nations are heavily involved in showcasing their academic achievements. Society lays great emphasis on academic ranking achievements. As a result, parents may pressurize their wards to pursue higher education at reputable institutions. In addition, some middle-class parents want their children to study abroad, so that they could improve their financial standing in society. The managers who are in charge of education management also encourage their students to focus mostly on their academic performance. Student's personal preferences and wishes become unimportant in such a scenario. The only thing that matters is performance in competitive exams. These factors may manifest into elevated stress levels among school going children.

The findings from this cross-sectional study provide insights into the prevalence and dimensions of stress among school-going adolescents in Central India. Significant levels of pressure, frustration, anxiety, and physical stress were reported by participants. Our study highlights the higher proportions of females in the moderate and high categories for most stress domains (Fig.1). Gender-stratified heatmaps clearly illustrated these differences with embedded chi-square p-values. A difference heatmap (female- male) (Fig.2) further emphasized the domains where females experienced higher stress, particularly in physical stress and anxiety, whereas overall stress showed minimal gender differences. Together, these analyses indicate that female participants reported greater levels of stress across several domains, except for overall stress, where gender differences were not statistically significant

Males exhibited high levels of pressure (although comparatively lower than females). Male students' higher

level of pressure could be a reflection of social expectations regarding performance and emotional repression. Stress coping skills and depressive tendencies of boys and girls are influenced by temperament and family environment, according to Bouma EM *et al* [13]. However, due to biological and sociocultural changes during puberty, teenage girls are more vulnerable to social and academic stressors. Research by Rentala S. *et al* has demonstrated that teenage girls have higher levels of stress and anxiety, particularly in academic settings[7].

A major finding of our study is that female students from special school had high levels of stress across most categories, as compared to female students from Co-ed schools. However, we noted that the girls' school (special school) in our study belonged to rural region while both co-ed schools were located in urban areas. Also, the special school belonged to the area which was Naxal affected. These could be possible confounders which we could not address in our study. A female-only school in urban area and co-ed schools in rural areas would have been suitable inclusions for addressing these concerns; the lack of which is a limitation of this study. Students from special school and rural background showed distinct stress profiles in the current study. This may be related to variations in exposure, resources, and parental expectations.

Our findings are consistent with research showing gender-based disparities in resilience, life satisfaction, and stress perception[14]. In a similar vein, another study found that teenage girls frequently internalize stress related problems, which show up as psychosomatic symptoms [9]. The impact of school type on stress levels is consistent with earlier research that found academic pressure and socioeconomic context to be major contributors to stress in both rural and urban adolescent populations[15],[16]. This may indicate that teenage stress is a complex phenomenon in which unmeasured factors like peer relationships, parental involvement, and digital media use may be crucial.

Overall, this study emphasizes the pressing need for targeted mental health interventions, especially gender and context sensitive approaches. It further supports the inclusion of stress management education in school curricula and the promotion of open communication among teachers, parents, and students.

VII. LIMITATIONS OF THE STUDY

As this was a self-administered questionnaire-based study, reporting bias cannot be eliminated. Many confounders like current emotional state, personality, etc. may be present. Similarly, the difference in stress during pre-exam, exam, and post-exam period was not considered. This study does not assess the association between levels of stress of the student with the educational qualifications of their parents, or the effects of smoking or any other substance abuse on mental health.

VIII. CONCLUSIONS

School going adolescents of the higher secondary class are exposed to stress. Compared to males, females are particularly at higher risk. Academic pressure is one of the major precursors of stress. Teachers, parents, and friends should have communication about stress causing factors and counsel them if needed. Stress management education in the curriculum should be added by the school authorities. Healthy dietary and lifestyle habits should be encouraged. Physical/outdoor activities should be promoted.

IX. ACKNOWLEDGEMENTS

The authors would like to thank all the students and the institutes that participated in the study. We would like to thank the Chairman of the Shri Sathya Sai Sanjeevani Trust, Dr. C Sreenivas for providing institutional support. Thanks are due to Dr. Nomesh Yadu for his insightful inputs for data analysis.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

X. FUNDING STATEMENT

The research was self-funded by the parent institute that is Sri Sathya Sai Sanjeevani Hospital, Nava Raipur.

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