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# The Impact of Perceived Parental Academic Pressure on Depression, Anxiety, and Stress among High School Students in Kathmandu, Nepal

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**Article**

**Keywords:** Parental Academic Pressure, Depression, Anxiety, Stress, Adolescents, Mental Health

**Posted Date:** March 26th, 2026

**DOI:** https://doi.org/10.21203/rs.3.rs-8632973/v1

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**Additional Declarations:** No competing interests reported.

## Abstract

# Background

Worldwide, approximately one in seven adolescents aged 10–19 have some form of mental health disorder as reported by World Health Organization (WHO). Poor mental health among students is a growing public health concern, with evidence indicating an increase in persistent feelings of sadness or hopelessness. High parental expectations and academic pressure have been identified as significant contributors to mental health issues like depression, anxiety, and stress, affecting students' academic performance and overall well-being. Therefore, this study aims to determine the association of perceived parental academic pressure with depression, anxiety, and stress among high school students of Kathmandu Nepal.

# Methods

This study, based on the positivist philosophy, adopted a quantitative research method and a descriptive cross-sectional design to explore mental health and its association with parental academic pressure among high school students in Kathmandu Metropolitan City of Nepal. A structured self-administered questionnaire was used to collect data. Using multistage stratified sampling, 1,248 students were selected stratified by school type and faculty, with equal allocation of sample across grades. Bivariate analysis was conducted using odds ratios, and variables with $p < 0.25$ were included in multivariate logistic regression.

# Results

The prevalence of depression, anxiety, and stress was 45.5% (95% CI: 42.8–48.3),49.6% (95% CI: 46.7–52.2), and 36.8% (95% CI: 34.0–38.6), respectively. The study found that 39.9% (95% CI: 37.2–42.4) of students experienced parental academic pressure, which was significantly associated with depression (AOR = 2.60, 95% CI: 2.00–3.38), anxiety (AOR = 2.53, 95% CI: 1.9–3.26), and stress (AOR = 1.38, 95%CI: 1.06–1.80). Among the domains, "too high expectations" had the greatest impact, while "restriction" had the least impact in development of parental academic pressure.

# Conclusion

There was a strong association between parental academic pressure and depression, anxiety and stress suggesting the need for parenting education about setting realistic expectations for their children's academic performance.

## Background

World Health Organization (WHO) defines mental health as a state of well-being which enables individuals to cope with the stresses of life, realize their abilities, work productively and fruitfully, and contribute to their communities [1]. In recent years, mental health among students has been recognized as a growing public health concern worldwide. Globally, one in seven (14%) of adolescents experiences a mental disorder, accounting for 15% of the global burden of disease in this age group [2]. For instance, research in Tamil Nadu, India, found that 25% of adolescents (grades 9–12) exhibited depressive symptoms, as per the Beck Depression Inventory (BDI) [3]. In China, 24.6% and 45.2% of students reported anxiety and depressive symptoms, respectively. Similarly, a study conducted among high school students in urban municipality of Nepal reported the prevalence of symptoms of DAS as 56.5%, 55.6% and 32.9% respectively [4].

Parents, teachers, and schools are central stakeholders in students' lives, shaping their mental well-being through interactions and expectations [5]. Parental academic pressure refers to all kinds of compelling behaviors exhibited by parents to increase their children's academic achievement [6]. Perceived parental academic pressure refers to the extent to which students think or feel that their parents place high standards on them regarding their academic achievement [7]. This pressure extends beyond explicit demands to include students' perceptions of parental expectations, which influence stress levels, motivation, and psychological resilience [8]. While high parental expectations can drive achievement, they often carry adverse consequences. For example, a study in Kolkata, India, found 66% of students felt pressured by parents to excel academically, correlating with heightened psychiatric symptoms [3]. Research in China and the UAE further links parental academic expectations to anxiety, depression, and test-related stress [9, 10]. However, findings are culturally nuanced: a Korean study reported parental pressure positively influenced academic outcomes, underscoring variability in how pressure is internalized across contexts [11].

In South Asia, cultural norms amplify these pressures. Academic success is often tied to familial honor, with children expected to repay parental sacrifices through achievement [9]. In Nepal, scarce job opportunities intensify parental focus on education, particularly for students in grades 11–12, who face immense pressure to perform well in national board exams for university admissions or overseas study [10]. Despite this, research on parental academic pressure's psychological impact remains limited in Nepal. Existing tools often narrowly measure parental expectations, but neglect nuanced psychological pressures, such as restrictions on leisure time or conditional approval tied to grades [12]. This gap hinders the development of culturally relevant interventions.

In Nepal, where mental health infrastructure is underdeveloped, early identification of risk factors like parental pressure is critical to mitigating long-term harm. Although studies in India, China, and the UAE highlight associations between parental pressure and mental health, Nepal's unique socio-cultural context, economic constraints, and competitive education systems make it important to study this issue in local context [3, 9, 10].

This study aims to address these gaps by examining the relationship between perceived parental academic pressure and depression, anxiety, and stress (DAS) among high school students. It contributes to the literature by: (1) incorporating psychological dimensions of parental pressure beyond academic expectations, (2) contextualizing findings within Nepal's cultural and economic landscape, and (3) providing evidence for school- and family-based programs to foster healthier academic environments.

## Methods

# Study Design and Setting

A cross-sectional study design was adopted. The study was guided by the positive research philosophy, aligned with the deductive model emphasizing an objective, scientific approach and explaining associations between variables.

The study was conducted in Kathmandu Metropolitan City(KMC), which is the capital City of Nepal. It was selected as the study site due to its diverse demographic characteristics and status as an educational hub, comprising 167 private and 34 government secondary schools, educating approximately 83,000 students in grades 11 and 12.

## Study Population

The study population consisted of currently enrolled high school students in both private and government schools within KMC. The inclusion criteria were students enrolled in classes 11 and 12 at secondary schools within KMC while the students from the education faculty were excluded from the study.

## Sample size determination and sampling technique

The required sample size was calculated using the formula for prevalence studies n= $(z^2.p.q)/d^2$ [13] Where: Z = 1.96 (95% confidence interval), p = 0.565 [4] (prevalence of depression from a previous study), q = 1 - p = 0.435, d = 0.05 (margin of error). This yielded a sample size of 377. Applying a design effect of 1.5 sample size became 567. After adjusting for a 10% non-response rate, the final sample size per stratum (government and private) was 624. Since there were two strata, the total sample size was doubled, resulting in 1248 participants.

A multistage stratified sampling technique was used. First, all schools were stratified into government and private categories. Faculties within the schools were further stratified into science and technology, management, and humanities and law. Four schools representing each faculty were selected using probability proportional to size (PPS) sampling. In the second stage of PPS, 52 students were selected from each school. Twenty-six students were included from classes 11 and 12 each. Detailed description of the sampling is shown in the Fig. 1.

## Study Tools and Data Collection

A structured self-administered questionnaire was used to collect data from the respondents by the corresponding author. The paper-based questionnaires were used first and then entered in IBM SPSS V.22 for analysis. The validated Nepali version of the DASS-21 was used to assess symptoms of depression, anxiety, and stress. It comprises 21 items rated on a 4-point Likert scale, with good internal consistency (Cronbach's α: Depression = 0.93, Anxiety = 0.79, Stress = 0.91) [14]. Perceived parental academic pressure was measured using a 20-item tool covering psychological pressure, restriction, and high expectations, rated on a 5-point Likert scale. The overall scale demonstrated excellent reliability (Cronbach's α = 0.92) [6].

Academic stress was measured using the 30-item Scale for Assessing Academic Stress (SAAS), with yes/no responses scored 1 for "yes" and 0 for "no" (range: 0–30). Higher scores indicate greater stress. The tool has strong reliability (test-retest: 0.88; split-half: 0.75) [15].

## Measures

Independent Variables

Sociodemographic variables comprised the respondent's age, sex, family type, living arrangement, father's education level, mother's education level, and the family's economic class. Academic variables included study grade, type of school, study stream, academic stress. Contextual variables like socialization, corporal punishment at school and bullying, use of social media, and internet usage were included in the study. Additionally, perceived parental academic pressure was assessed. A detailed operational definition of each independent variable is provided in Supplementary File 2.

## Dependent Variables

The dependent variables in this study were depression, anxiety, and stress. The conceptual framework illustrating the relationships among the independent and dependent variables is presented in Supplementary File 3.

# Statistical Analysis

Data were coded and entered in SPSS version 25 for analysis. Bivariate analysis was conducted to examine associations between independent and dependent variables using odds ratios. Variables with a p-value < 0.25 were further analyzed using multivariate logistic regression.

## Ethical Considerations

Ethical approval was obtained from the Institutional Review Committee of the Institute of Medicine (IOM), Tribhuvan University, Nepal having reference number: 250 081/082 on October 22, 2024. Witten informed consent was obtained from the participants. If the students were under 16 years of age written consent were taken from the parents and assent were taken from the students. The anonymity and confidentiality of the information were assured, and the privacy of each respondent was maintained throughout the data collection process. Before participation, all participants were provided with an information sheet outlining the study's aims, objectives, benefits, and potential risks, along with assurances regarding confidentiality, privacy, and voluntary participation. Participants were given sufficient time to read and understand the information and were encouraged to ask questions or seek clarification. The study prioritized the rights and dignity of the participants, ensuring they had the freedom to withdraw from the interview at any time without any pressure. Participant confidentiality was strictly maintained throughout the study, including during data collection, analysis, and interpretation. All procedures were conducted in compliance with the Helsinki Declaration.

### Results

## Descriptive analysis

Table 1 summarizes the sociodemographic, academic, and contextual characteristics of the 1,248 participants (median age: 17 years; 51.1% male, 48.9% female). Most were Brahmin/Chettri (41.1%) or Janajati (38.3%) and lived with parents (64.8%) in nuclear families (68.4%). Parental education levels varied, with 15.0% of fathers and 7.5% of mothers of the respondents have post-secondary education, while 26.2% of mothers had no formal education. In terms of socioeconomic status, majority of the students (73.6%) were from middle-class households.

Among 1248 students 24.5% had failed their last exam, and 42.2% reported experiencing academic stress. 74.6% showed low levels of socialization. About 20.4% of the total students reported experiencing corporal punishment, and 19.4% reported being bullied either physically or online within the past year. Regarding digital access and use, 89% of students owned a mobile phone. While 40.9% reported having parental restrictions on internet and social media use, the majority did not. 34.5% of the students reported daily mobile phone use of 3–4 hours.

Table 1
Sociodemographic, academic and contextual characteristics of the respondents

| Variables | n | Percentage |
|---|---|---|
| **Age** | | |
| Median | | 17 years |
| **Gender** | | |
| Male | 638 | 51.1 |
| Female | 610 | 48.9 |
| **Ethnicity** | | |
| Dalit | 103 | 8.3 |
| Janajati | 478 | 38.3 |
| Brahmin/Chettri | 513 | 41.1 |
| Madhesi | 126 | 10.1 |
| Muslim | 25 | 2.0 |
| Others | 3 | 0.2 |
| **Living arrangements** | | |
| Staying with Parents | 809 | 64.8 |
| Staying with Relatives | 222 | 17.8 |
| Staying in Hostel | 84 | 6.7 |
| Staying with Friends | 64 | 5.1 |
| Alone | 48 | 3.8 |
| Others | 21 | 1.7 |
| **Type of family** | | |
| Nuclear | 854 | 68.4 |
| Joint | 273 | 21.9 |
| Extended | 121 | 9.7 |
| **Father's education (n = 1243)** | | |
| No education | 140 | 11.3 |
| Lower basic (1–5) | 279 | 22.4 |
| Upper basic (6–8) | 188 | 15.1 |
| Lower secondary (9–10) | 244 | 19.6 |
| Upper secondary (11–12) | 205 | 16.5 |
| More than secondary | 187 | 15.0 |
| **Mother's education (n = 1244)** | | |
| No education | 326 | 26.2 |
| Lower basic (1–5) | 314 | 25.2 |
| Upper basic (6–8) | 144 | 11.6 |
| Lower secondary (9–10) | 197 | 15.8 |
| Upper secondary (11–12) | 170 | 13.7 |
| More than secondary | 93 | 7.5 |
| **Economic class** | | |
| Upper | 42 | 3.4 |
| Middle | 918 | 73.6 |
| Lower | 288 | 23.1 |

| Variables | n | Percentage |
|---|---|---|
| **Age** | | |
| **Result in previous examination** | | |
| Failed | 306 | 24.5 |
| Passed | 942 | 75.5 |
| **Academic stress** | | |
| Present | 527 | 42.2 |
| Absent | 721 | 57.8 |
| **Socialization** | | |
| High socialization | 317 | 25.4 |
| Low socialization | 931 | 74.6 |
| **Corporal punishment at school the past year** | | |
| Yes | 254 | 20.4 |
| No | 994 | 79.6 |
| **Bullying (Physical or electronic)** | | |
| Bullied in past year | 242 | 19.4 |
| Not bullied in past year | 1006 | 80.6 |
| **Mobile phone ownership** | | |
| Own a mobile phone | 1111 | 89.0 |
| Do not own a mobile phone | 137 | 11.0 |
| **Parental rules on social media Use** | | |
| Have parental rules | 510 | 40.9 |
| No Parental rules | 738 | 59.1 |
| **Hours of mobile phone use per day** | | |
| Did not have a mobile phone | 62 | 5.0 |
| Phone time > 4 hours | 903 | 72.4 |
| Phone time ≤ 4 hours | 283 | 22.6 |
| **Screen time on average school day** | | |
| Screen time > 4 hours | 882 | 66.7 |
| Screen time ≤ 4 hours | 416 | 33.3 |

## Perceived parental academic pressure

Table 2 compares three domains of perceived parental academic pressure: psychological pressure, restriction, and too high expectations, based on their subscale scores. Findings showed that too high expectations exert the most substantial influence on the respondent's overall parental academic pressure, while restriction has the least influence.

Table 2
Ranking of parental pressure type based on mean score value

| Domains | Total score | Obtained range (Min, Max) | Mean ± SD | Percentage of mean score | Rank |
|---|---|---|---|---|---|
| Psychological pressure | 35 | (7, 35) | 20.3 ± 6.0 | 58.0% | 2 |
| Restriction | 35 | (7, 34) | 16.9 ± 6.0 | 48.2% | 3 |
| Too high expectations | 30 | (6, 24) | 19.1 ± 5.2 | 63.6% | 1 |

Table 3 shows the respondents perception about the experience of parental academic pressure which revealed that out of 1248 respondents, 60.1% reported experiencing no parental pressure, while 39.9% indicated that they did experience parental pressure.

Table 3
Respondents perception about the experience of parental academic pressure

| Characteristics | n | Percentage (95% C.I.) |
|---|---|---|
| **Perceived parental academic pressure** | | |
| No parental pressure | 750 | 60.1 (57.6–62.8) |
| Parental pressure | 498 | 39.9 (37.2–42.4) |

**4.8 Depression, anxiety and stress**

As shown in Table 4, nearly half of the respondents reported symptoms of depression (45.5%; 95% CI: 42.8–48.3) and anxiety (49.6%; 95% CI: 46.7–52.2), while over one-third experienced stress (36.8%; 95% CI: 34.0–38.6). Moderate to extremely severe symptoms were more common than mild symptoms across all three mental health outcomes, with anxiety showing the highest proportion of individuals in the more severe categories.

Table 4
Prevalence of depression, anxiety, and stress among respondents

| Characteristics | n | Percentage (95% C.I.) | Mild (%) | Moderate (%) | Severe (%) | Extremely Severe (%) |
|---|---|---|---|---|---|---|
| Depression | 568 | 45.5 (42.8–48.3) | 16.7 | 16.7 | 6.7 | 5.5 |
| Anxiety | 619 | 49.6 (46.7–52.2) | 8.9 | 20.6 | 7.9 | 12.3 |
| Stress | 459 | 36.8 (34.0 – 38.6) | 14.2 | 13.1 | 7.1 | 2.3 |

# Inferential analysis

Depression, anxiety, and stress were dichotomized using validated cut-offs ≥ 9, ≥7, and ≥ 14, respectively [16]. A multivariate logistic regression model was fitted to variables that showed p-values less than 0.25 in the binary logistic regression analysis, to enhance model adequacy [17]. Screen time and mobile phone usage were divided into two categories: over 4 hours and 4 hours or less. This division was based on the threshold of screen and phone use time and its association with the onset of mental health issues suggested by different studies [4, 18].

# Association between DAS and socioeconomic, academic and other variables using bivariate logistic regression analysis

Bivariate analysis identified several factors significantly associated with depression, anxiety, and stress (DAS) among students as shown in Table 5. Female gender, low socialization, experiences of bullying and corporal punishment, higher screen time, and mobile phone use were significantly associated with higher odds of DAS. Additionally, students from Science and Technology streams, joint families, and lower socioeconomic backgrounds showed higher stress and depression levels. Academic stress and perceived parental academic pressure were the strongest predictors, consistently associated with increased odds of all three outcomes.

Table 5
Bivariate Associations of depression, anxiety, and stress with sociodemographic, academic, and other variables

| Characteristics | Depression | Anxiety | Stress |
|---|---|---|---|
| | OR (95% CI) | OR (95% CI) | OR (95% CI) |
| **Age** | | | |
| <= 18 years | 1.02 (0.69–1.50) | 0.96 (0.66–1.42) | 1.33 (0.88–2.02) |
| > 18 years | Ref | Ref | Ref |
| **Sex of respondents** | | | |
| Female | 1.26 (1.03–1.60) * | 1.92 (1.53–2.41) *** | 1.64 (1.30–2.07) *** |
| Male | Ref | Ref | Ref |
| **Type of School** | | | |
| Private School | 1.15 (0.92–1.44) | 1.05 (0 .84–1.31) | 1.06 (0.85–1.34) |
| Government School | Ref | Ref | Ref |
| **Stream of study** | | | |
| Science and Technology | 1.53 (1.17–2.02) ** | 1.31 (0.99–1.72) | 1.29 (0.97–1.70) |
| Management | 1.29 (0.98–1.70) | 1.09 (0.83–1.43) | 0.79 (0.59–1.05) |
| Humanities and Law | Ref | Ref | Ref |
| **Study grade** | | | |
| 12 | 1.17 (0 .93–1.46) | 1.07 (0 .86–1.34) | 1.21 (0.96–1.52) |
| 11 | Ref | Ref | Ref |
| **Result in last examination** | | | |
| Failed | 1.21 (0.93–1.56) | 1.22 (0.94–1.57) | 1.03 (0.79–1.35) |
| Passed | Ref | Ref | Ref |
| **Ethnicity** | | | |
| Dalit | 1.12 (0.73–1.71) | 1.09 (0.71–1.66) | 0.93 (0.59–1.45) |
| Janajati | 1.20 (0.93–1.54) | 1.11 (0.86–1.42) | 1.11 (0.86–1.44) |
| Madhesi | 0.90 (0.61–1.34) | 0.82 (0.56–1.22) | 1.15 (0.77–1.71) |
| Muslim | 0.85 (0.38–1.94) | 0.48 (0.21–1.14) | 0.85 (0.36–2.00) |
| Brahmin/Chettri | Ref | Ref | Ref |
| **Family type** | | | |
| Nuclear | 1.32 (0.90–1.94) | 1.41 (0.96–2.07) | 1.14 (0.76–1.72) |
| Joint | 1.07(0.69–1.65) | 1.15 (0.75–1.78) | 1.63 (1.04–2.55) |
| Extended | Ref | Ref | Ref |
| **Fathers' education** | | | |
| No formal education | 1.31 (0.92–1.86) | 1.12 (0.79–1.59) | 0.99 (0.92–1.06) |
| Formal education | Ref | Ref | Ref |
| **Mothers' education** | | | |
| No formal education | 1.27 (0 .98–1.63) | 0.96 (0.74–1.23) | 1.07 (0.82–1.39) |
| Formal education | Ref | Ref | Ref |
| **Current living status** | | | |
| Without Parents | 1.16 (0.92–1.46) | 0.872 (0.69–1.10) | 0.99 (0.78–1.26) |
| With Parents | Ref | Ref | Ref |
| **Socialization** | | | |
| Low Socialization | 1.47(1.13–1.91) ** | 1.24 (1.09–1.41) ** | 1.15 (1.00–1.31) * |

| Characteristics | Depression OR (95% CI) | Anxiety OR (95% CI) | Stress OR (95% CI) |
|---|---|---|---|
| **Age** | | | |
| High Socialization | Ref | Ref | Ref |
| **Corporal punishment at school** | | | |
| Yes | 1.28 (0.97–1.69) | 1.32 (1.00–1.74) * | 1.50 (1.14–1.99) ** |
| No | Ref | Ref | Ref |
| **Experience of bullying in past year** | | | |
| Yes | 1.38 (1.05–1.84) * | 1.575 (1.19–2.09) ** | 1.81(1.37–2.41)*** |
| No | Ref | Ref | Ref |
| **Economic class** | | | |
| Upper | 0.74 (0.39–1.42) | 1.09 (0.57–2.07) | 1.33 (0.69–2.54) |
| Middle | 0.68 (0.52–0 .89) ** | 0.96 (0.73–1.25) | 0.79 (0.60–1.04) |
| Lower | Ref | Ref | Ref |
| **Ownership of mobile phone** | | | |
| Yes | 0.98 (0.69–1.40) | 0.97 (0.68–1.38) | 0.979 (0.678–1.413) |
| No | Ref | Ref | Ref |
| **Parental control for social media use** | | | |
| Yes | 0.92 (0.73–1.16) | 1.16 (0.92–1.45) | 0.964 (0.763–1.218) |
| No | Ref | Ref | Ref |
| **Mobile phone use** | | | |
| Phone time > 4 hours | 1.43 (1.09–1.87) | 0.96 (0.73–1.25) | 1.46 (1.11–1.91) ** |
| Phone time ≤ 4 hours | Ref | Ref | Ref |
| **Average Screen time per day** | | | |
| Screen time > 4 hours | 1.56 (1.23–1.98) *** | 1.02 (0.81–1.30) | 1.32 (1.05–1.67) * |
| Screen time ≤ 4 hours | Ref | Ref | Ref |
| **Academic stress** | | | |
| Present | 3.50 (2.77–4.43) *** | 3.52 (2.78–4.46) *** | 4.00 (3.13–5.10) *** |
| Absent | Ref | Ref | Ref |
| **Parental academic Pressure** | | | |
| Parental Pressure | 3.06 (2.42–3.87) *** | 2.75 (2.18–3.48) *** | 1.79(1.42–2.27) *** |
| No Parental Pressure | Ref | Ref | Ref |

*p < 0.05, **p < 0.01, ***p < 0.001; Ref, reference group

## Association between depression and socioeconomic, academic and other variables using multivariate logistic regression analysis

The final regression model incorporated type of school, sex of respondents, study grade, study stream, result in the last examination, family type, father's education, mothers' education, current living status, socialization, corporal punishment at school, bullying, mobile phone use, average screen time, academic stress and perceived parental academic pressure. Table 6 summarizes factors significantly associated with depression. Female respondents were significantly more likely to exhibit symptoms of depression compared to male respondents (p = 0.033, AOR = 1.34, 95% CI: 1.02–1.76). Students in the science and technology stream were significantly more likely to exhibit symptoms of depression compared to those in the humanities and law stream (p < 0.001, AOR = 1.72, 95% CI: 1.24–2.39. Students whose mothers have non-formal education are more likely to experience depressive symptoms compared to those whose mothers have formal education (p = 0.027, AOR = 1.45, 95% CI: 1.04–2.01.

Students experiencing academic stress were nearly three times more likely to show symptoms of depression compared to those without stress (p < 0.001, AOR = 2.75, 95% CI: 2.12–3.60). Similarly, those spending more than 4 hours on screen time have a significantly higher likelihood of experiencing depression symptoms compared to those spending less than 4 hours (p = 0.035, AOR = 1.48, 95% CI: 1.02–2.15). Furthermore, parental academic pressure significantly

increases the risk of depression symptoms, with students under pressure being more than twice as likely to exhibit these symptoms compared to those without parental pressure (p < 0.001, AOR = 2.60, 95% CI: 2.00–3.38)

Table 6
Adjusted association between depression and significant predictors in multivariate logistic regression analysis

| Variable | AOR (95% C.I.) | P value |
|---|---|---|
| Female | 1.34 (1.02–1.76) * | 0.033* |
| Male | | **Ref** |
| **Study stream** | | |
| Science and technology | 1.72 (1.24–2.38) *** | 0.001 |
| Management | 1.22 (0.89–1.67) | 0.208 |
| Humanities and Law | | **Ref** |
| **Mothers education** | | |
| Non formal education | 1.45 (1.04–2.01) * | 0.027* |
| Formal education | | **Ref** |
| **Economic class** | | |
| Upper | 0.92 (0.42–2.02) | 0.835 |
| Middle | 0.73 (0.53–1.00) * | 0.049* |
| Lower | | **Ref** |
| **Average Screen time per day** | | |
| Screen time > 4 hours | 1.48 (1.02–2.15) * | 0.042* |
| Screen time ≤ 4 hours | | **Ref** |
| **Academic stress** | | |
| Present | 2.75 (2.11–3.58) *** | < 0.001*** |
| Absent | | **Ref** |
| **Parental academic pressure** | | |
| Pressure | 2.60 (2.00–3.38) *** | < 0.001*** |
| No pressure | | **Ref** |

**p < 0.05, **p < 0.01, ***p < 0.001; Ref, reference group; AOR, Adjusted Odds Ratio; Outcome of interest, depression; Model summary: Hosmer and Lemeshow goodness-of-fit test p = 0.20; Omnibus test for model coefficients p < 0.001; Nagelkerke $R^2$ = 0.213; NA, Not Applicable*

## Association of anxiety with socioeconomic, academic, and other variables using multivariate logistic regression

The final regression model incorporated sex of respondents, study stream, result in the last examination, ethnicity, family type, current living status, socialization, corporal punishment at school, bullying, and perceived parental academic pressure. Table 7 shows that female respondents had 1.87 times higher odds of experiencing anxiety symptom compared to males (AOR = 1.87, 95% CI: 1.44–2.42, p < 0.001). Academic stress significantly increased the odds of the outcome by 2.75 times (AOR = 2.72, 95% CI: 2.12–3.50, p < 0.001), perceived parental academic pressure increased the likelihood by 2.53 times (AOR = 2.53, 95% CI: 1.97–3.26, p < 0.001).

Table 7
Adjusted association between anxiety and significant predictors in multivariate logistic regression analysis

| Variable | AOR (95% C.I.) | P value |
|---|---|---|
| **Sex of respondents** | | |
| Female | 1.87 (1.44–2.42) *** | < 0.001*** |
| Male | | Ref |
| **Academic stress** | | |
| Present | 2.72 (2.12–3.50) *** | < 0.001*** |
| Absent | | Ref |
| **Parental academic Pressure** | | |
| Pressure | 2.53 (1.97–3.26) *** | < 0.001 |
| No pressure | | Ref |

**p < 0.05, **p < 0.01, ***p < 0.001; Ref, reference group; AOR, Adjusted Odds Ratio, Outcome of interest, anxiety symptoms; Model summary: Hosmer and Lemeshow goodness-of-fit test p = 0.343; Omnibus test for model coefficients p < 0.001; Nagelkerke $R^2$ = 0.204; NA, Not Applicable*

## Association of stress with socioeconomic, academic, and other variables using multivariate logistic regression

The final regression model incorporated age, sex, study grade, study stream, family type, socialization, corporal punishment at school, being bullied (inside and outside school property), cyberbullying, smartphone use, screen time, economic class, and parental academic pressure. Table 8 presents only the factors significantly associated with stress in the final adjusted model ($p < 0.05$). The results revealed that female respondents had 1.54 times higher odds of experiencing stress as compared to males (AOR = 1.54, 95% CI: 1.17–2.01, p = 0.002). Students who were bullied had 1.49 times higher odds of experiencing stress symptoms (AOR = 1.49, 95% CI: 1.08–2.06, p = 0.016). Academic stress was strongly associated with the outcome, increasing the likelihood by 3.39 times (AOR = 3.39, 95% CI: 2.60–4.43, p < 0.001). Similarly, parental academic pressure increased the odds by 1.38 times (AOR = 1.38, 95% CI: 1.06–1.80, p = 0.017). Phone time for more than four hours was also found to be significantly associated with stress.

Table 8
Adjusted association between stress and significant predictors in multivariate logistic regression analysis

| Variable | AOR (95% C.I.) | P value |
|---|---|---|
| **Sex of respondents** | | |
| Female | 1.54 (1.17–2.01) ** | 0.002** |
| Male | | Ref |
| **Experience of bullying** | | |
| Yes | 1.49 (1.08–2.06) * | 0.016* |
| No | | Ref |
| **Mobile phone use** | | |
| Phone time > 4 hours | 1.55 (1.01–2.37) * | 0.045* |
| Phone time ≤ 4 hours | | Ref |
| **Economic class** | | |
| Upper | 1.47 (0.70–3.09) | 0.315 |
| Middle | 0.66 (0.48–0.90) ** | 0.009** |
| Lower | | Ref |
| **Academic Stress** | | |
| Present | 3.39 (2.60–4.43) *** | < 0.001*** |
| Absent | | Ref |
| **Parental Academic pressure** | | |
| Pressure | 1.38 (1.06–1.80) * | 0.017* |
| No pressure | | Ref |

**p < 0.05, **p < 0.01, ***p < 0.001; Ref, reference group; Outcome of interest, stress; AOR, Adjusted Odds Ratio; S.E., Standard Error; Model summary: Hosmer and Lemeshow goodness-of-fit test p = 0.305; Omnibus test for model coefficients p < 0.001; Nagelkerke $R^2$ = 0.195, NA, Not Applicable*

## Discussion

This study found a high prevalence of depression (45.5%), anxiety (49.6%), and stress (36.8%) among higher secondary students in Kathmandu Metropolitan City. These rates indicate a significant mental health burden in this population. According to a study by Gautam et al., over a quarter (27%) of high school students in a rural area of Nepal presented depressive symptoms [19]. The prevalence of depression in our study is similar to previous research from urban Nepal, by Bhattarai et al. (44.2%) and Sharma et al. (41.6%) [20, 21]. However, it is lower than rates reported in some rural or mixed settings, such as Bhandari et al. (76%) and Karki et al. (56.5%) [4, 22]. These differences between studies may be due to contextual disparities (e.g., rural versus urban settings) and methodological variations, including differences in assessment instruments and sampling frameworks.

The prevalence of anxiety symptoms observed in this study was comparable to the proportion reported by Sharma et al., Karki et al., and Bhandari et al. [4, 18, 22]. Similarly, the prevalence of stress symptoms in our study was 36.8%, which was similar to the findings of Karki et al [4]; however, Sharma et al. found that over a quarter (27.5%) of students exhibited stress symptoms, a proportion lower than observed in our study [18].

The prevalence of depression documented in this study corresponds with findings from research conducted in Malaysia, India, and China, reflecting comparable trends observed across South Asian countries [3, 23, 24]. However, our study found higher prevalence of anxiety among students compared to research conducted in Sri Lanka and China [24, 25]. Prevalence of stress symptoms reported by the study from Chandigarh was comparable to this study [21]. These findings highlight a high burden of depression, anxiety, and stress among high school students in South Asia. One reason for these high levels of mental health symptoms may be the academic phase students are in class 11 students are adjusting to new environments, while class 12 students face pressure to perform well in final board exams, which are often linked to their future education and career paths. Other contributing factors in Nepal include insufficient allocation of resources for mental health programs, a lack of trained mental health practitioners, and persistent societal stigma surrounding mental health issues, which hinder students from accessing or seeking necessary care [26].

Nearly 40% of students reported feeling academic pressure from their parents. This is lower than the 66% reported in a study from India [27], possibly due to cultural or measurement differences.

This study identified several factors that were strongly associated with symptoms of depression, anxiety, and stress (DAS) in adolescents which were consistent with the findings from prior studies. Female students were much more likely to experience DAS symptoms across all three outcomes [4, 21, 25, 28]. However, a study from Dang, Nepal, found that adolescent males had a 1.5 times higher likelihood of experiencing anxiety compared to females [20].

Biological factors like hormonal change through puberty and greater exposure to psychosocial stressors like gender-violence can partly explain this heightened susceptibility [29, 30].

Academic stream was highly correlated with depression symptoms: students of science and technology stream had 1.72 times higher odds of depression compared to humanities and law students. This is consistent with previous studies in Nepal [4, 31], which reflect that students of science have greater academic competition, more study time, and tougher courses. Between management and humanities/law students, no difference was observed.

In this study mother's education was found to be associated with depression. In comparison with formally educated mothers, students with uneducated mothers demonstrated higher likelihood of experiencing depressive symptoms which is also supported by a study conducted in Nepal (OR = 1.78) and Germany among students [4, 26]. Conversely, another study conducted in Nepal found no significant association between maternal education and depression in children [32]. This may be due to reduced awareness of mental health among parents and decreased communication about emotional issues [33, 34].

Students who had more than 4 hours of screen time daily were highly likely to have depression and stress which is consistent with findings from Kuwait and Korea [35–37]. Excessive screen exposure can contribute to sleep issues, reduced physical activity, social isolation, and exposure to negative internet experiences such as cyberbullying all of which relate to poor mental health outcomes [38].

Bullying was directly associated with stress in this study. Bullying victims had 1.49 times greater odds of developing symptoms of stress. This is in accordance with the literature that defines bullying as a chronic stressor [39–41], leading to activation of stress responses, social isolation, and emotional harm, which are well-documented risk factors for mental health issues [42].

Academic stress was the most prominent and consistent predictor of DAS. Several studies have documented similar findings [3, 27, 43], highlighting how academic pressure during adolescence an academically transitional phase can overwhelm students, especially when they struggle to meet expectations from parents, teachers, and themselves.

Finally, perceived parental academic pressure was significantly associated with each of the three outcomes. Pressured children had double the risk of depression (AOR = 2.60) and anxiety (AOR = 2.53), and 38% higher risk of stress (AOR = 1.38).Similar kind of findings are revealed by the studies conducted in China and India [11, 27], which demonstrate that parental emphasis on academic performance often motivated by cultural values prioritizing family honor and socioeconomic advancement can place adolescents under considerable psychological stress [17, 44]. In Nepal, this pressure may be compounded by limited employment opportunities, which elevate the perceived importance of academic success [10].

## Strengths and Limitations of the study

## Strengths:

This study makes valuable contribution by focusing on perceived parental academic pressure and mental health outcomes (depression, anxiety, stress) among high school students of Kathmandu Metropolitan City in Nepal. It employed validated tools such as the Depression Anxiety Stress Scale (DASS-21) and comprehensive statistical analysis that controlled for key confounders, enhancing statistical power and precision. Having a large sample (n = 1,248) enhances the generalizability of findings to similar situation.

## Limitations

The cross-sectional design limits the ability to establish causal relationships between parental pressure and DAS. Potential social desirability bias, as participants might have underreported mental health issues due to stigma. Additionally, recall bias may be present in self-reported data on bullying, corporal punishment, as students retrospectively reported experiences over a one-year period.

### Conclusion

This study revealed a high prevalence of depression (45.5%), anxiety (49.6%), and stress (36.8%) among high school students in Kathmandu Metropolitan City (KMC). Nearly two in five students reported feeling pressure from their parents regarding academic success. Perceived parental academic pressure was found to be significantly associated with depression, anxiety and stress. Several other factors were significantly associated with these mental health symptoms: depression was linked to sex, study stream, academic stress, mother's education, screen time; anxiety was associated with sex and academic stress; and stress was related to sex, bullying, mobile phone use time, economic class and academic stress. The findings highlight the urgent need for school- and community-based interventions to address the high prevalence of depression, anxiety, and stress among students.

Given these findings, there is a crucial need for school-wide interventions to address the mental health challenges faced by students. Schools should implement comprehensive programs focused on reducing bullying and academic stress, efforts to manage academic stress must be prioritized through supportive learning environments. Parents should be educated on effective parenting strategies and should be encouraged to set realistic academic expectations for their children. Additionally, students should be guided to set achievable academic and career goals that align with their interests and capabilities. These combined efforts are essential to promote the mental well-being and academic success of adolescents in KMC and similar settings.

### Abbreviations

AOR
Adjusted Odds Ratio

BDI
Beck Depression Inventory
CI
Confidence Interval
DAS
Depression, Anxiety and Stress
KMC
Kathmandu Metropolitan City
OR
Odds Ratio
PPS
Probability Proportionate to Size
SAAS
Scale for Accessing Academic Stress
WHO
World Health Organization
AOR
Adjusted Odds Ratio

## Declarations

**Ethics approval and consent to participate**

Ethical approval for the study was granted by the Institutional Review Committee of Central Department of Public Health, Tribhuvan University. The permission for the study was also taken from the Education Section of Municipal Office, Kathmandu Metropolitan City. Witten informed consent was obtained from the participants. The anonymity and confidentiality of the information were assured, and the privacy of each respondent was maintained throughout the data collection process. All procedures were conducted in compliance with the Helsinki Declaration.

**Consent for publication**

Not applicable

**Data availability**

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

**Competing interests**

The authors declare no competing interests.

**Funding**

The authors have not received any financial support from any institution or organization.

**Ethical Approval**

There is name and other identifying information in Ethical approval so it is not attached here. It is attached with cover letter.

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## Figures

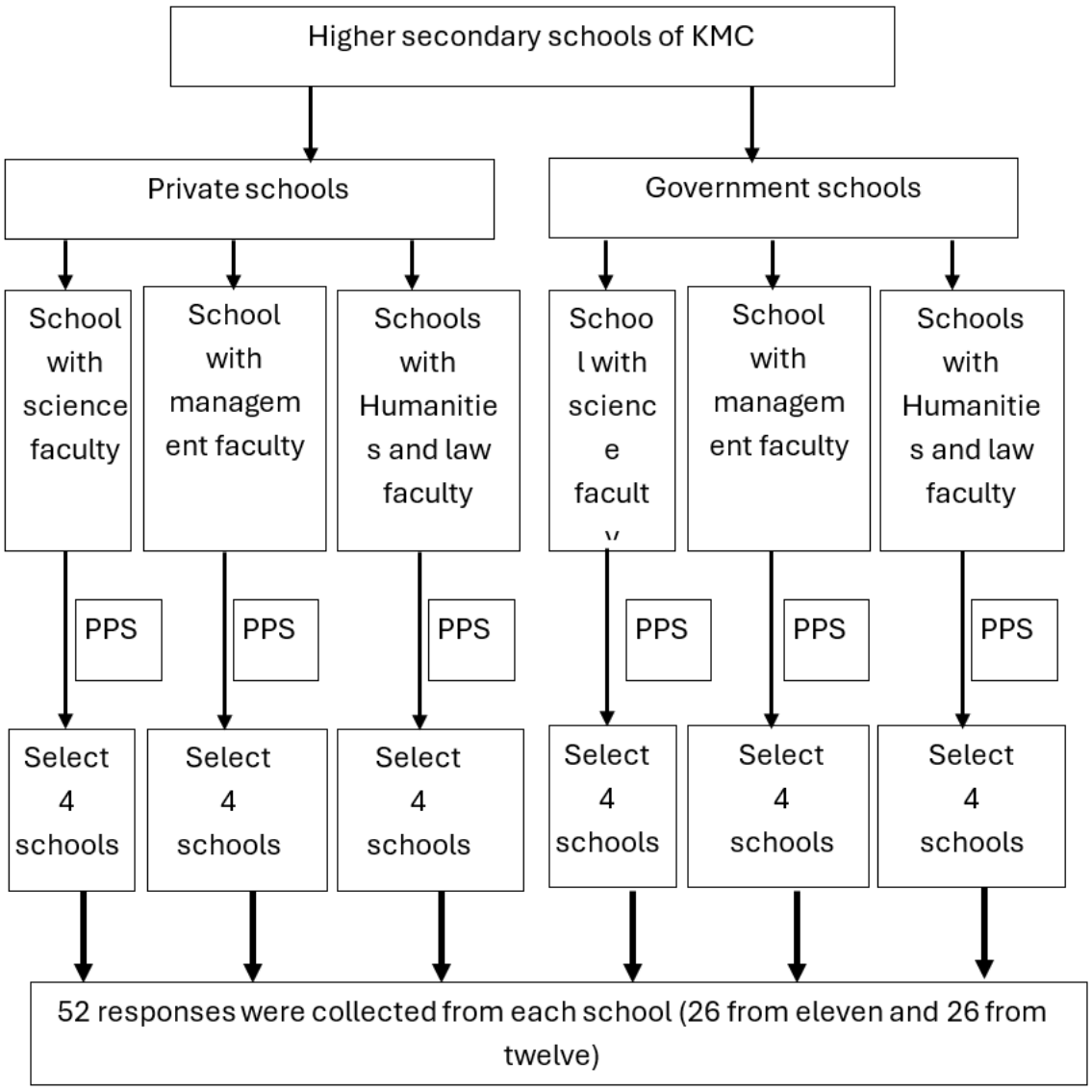



**Figure 1**

Sampling flow chart

## Supplementary Files

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