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A Prevalence Study OF Depression Among Undergraduate Students: The Role of Academic Stress and Socio-Demographic Factors

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Abstract:
This study investigates the prevalence of depression among undergraduate students, emphasizing the interplay between academic stress and socio-demographic factors. Conducted across colleges in Saharanpur, India, the research surveyed 324 students using a structured questionnaire covering academic stress, socio-demographic elements, emotional impacts, and coping mechanisms. Key findings highlight academic stress as a primary driver of depression, exacerbated by socio-demographic vulnerabilities such as gender, financial instability, and rural residency. Female students reported higher depression levels, aligning with global trends linking gender and mental health. Additionally, poor sleep, excessive workloads, and unclear academic expectations were identified as significant stressors. Comparative analyses reveal that urban students face heightened stress related to academic competition, while rural students encounter challenges linked to limited resources and isolation. Field-specific stress variations were also observed, with science students experiencing higher pressure compared to their peers in Arts or Commerce. Despite the growing prevalence of depression, coping strategies, including extracurricular activities and institutional support, demonstrated potential in mitigating stress impacts. However, limited awareness and utilization of mental health resources remain barriers. The study underscores the urgent need for tailored interventions addressing academic stress and enhancing coping mechanisms. Recommendations include developing culturally sensitive mental health programs, fostering institutional support systems, and promoting awareness of depression among students and educators. These measures aim to improve academic performance and overall well-being, ensuring students' resilience in competitive academic environments.
Keywords: Academic Stress, Depression, Mental Health, Socio-Demographic Factors, Undergraduate Students.

Introduction:

Higher education institutions (HEIs) are considered to be one of the important pillars of development of any country. As a key stakeholder, the performance of HEIs depends primarily on the success of their students. To compete in today's fast-changing industrial environment, students should not only limit themselves to enhancing their knowledge but also have the necessary skills and abilities. Currently, many factors affect the performance of students in the highly competitive academic environment, such as social media, academic quality, family support, and social relationships, etc. According to a study, students feel constant pressure from various sources during their academic life, which ultimately becomes the main cause of their stress. Depression causes students to lose energy, making it difficult for them to think, concentrate, and make career decisions. Since students are the future pillars of an educated society, their academic success is an important life goal. But if students suffer from depression, it can have a serious negative impact on their academic achievements. Depression can be caused by many reasons, such as family problems, difficulty adjusting to the new lifestyle in colleges and universities, poor academic performance, or bias by teachers. In addition, constant stress and academic pressure are also one of the main causes of depression. Cases of depression are more common in developing countries. A major reason for this is the lack of awareness and education related to mental health, which is considered a major factor in the increasing rates of mental illnesses. The study [1] suggests that female students have been seen to have more cases of depression than male students. Similarly, younger students, especially those aged 18-22 years, are more affected by mental health challenges [2]. Family background also plays a big role in this. If a student's mother's level of education is high and the family is financially stable, it reduces the risk of depression. Social support also affects mental health. If the student gets less support from their family and friends, their risk of depression increases. Conversely, good social relationships can reduce depression [3]. Lifestyle habits also impact mental health. Getting enough sleep regularly and abstaining from alcohol can help prevent depression. In addition, managing stress and maintaining self-esteem also play an important role in preventing depression. Academic stress is a major cause of depression among graduate students. This stress further exacerbates socio-demographic vulnerabilities. For example, factors such as students' years of study, financial problems, and social isolation increase the risk of depression. Poor sleep and fatigue, which are often caused by academic pressures, are major causes of both depression and stress [4]. The competitive academic environment has become even more challenging, especially due to circumstances such as the COVID-19 pandemic. This environment puts additional pressure on students, which negatively affects their mental health [5]. However, not all students experience this stress and depression in the same way. Some students have strong social connections or better stress management abilities that help them cope with these challenges. Therefore, there is a need to find solutions by understanding the different needs of students. Different intervention strategies have to be adopted for different students so that their mental health can be properly taken care of. Understanding the complex relationship between socio-demographic factors and academic stress is very important to develop solutions for mental health. If all these causes are properly identified and

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addressed, institutions can provide better support to students. This will not only improve their mental health but will also make them more resilient to face academic and social challenges. Thus, there is a need to adopt a holistic approach to reduce mental health problems of students. This approach should be designed by taking care of the social, academic, and personal needs of the students. This will not only reduce the risk of depression but will also improve the quality of life of the students.

2. Theory and Literature Review:

The study [6] examines academic stress and depression among high school students, involving a sample of 120 students, evenly divided between 60 girls and 60 boys, from grades 1 to 3. Academic stress and depression were treated as dependent variables, while gender and grades were considered independent variables. Data analysis was conducted using various statistical methods, revealing significant differences in stress and depression levels between genders. Steare *et al.* [7] examines the impact of academic pressure on adolescent mental health by synthesizing international evidence on depression, anxiety, and self-harm. It reviews 52 studies conducted across Asia and Europe, with most findings indicating a positive association between academic pressure and adverse mental health outcomes. However, limitations include reliance on cross-sectional study designs and inadequate adjustment for confounding factors. Despite these constraints, the findings highlight opportunities for public health interventions to address the issue. The paper emphasizes the need for further cohort studies to establish causal relationships. The research [8] explores the impact of academic and familial stress on students, specifically focusing on depression levels and academic performance outcomes. Data was collected from both undergraduate and postgraduate students through questionnaires, and the relationships between stress, depression, and performance were analyzed using the SEM method. The findings confirm that stress contributes to depression, which in turn negatively affects academic performance. The study provides valuable insights for parents, educators, and other stakeholders involved in supporting student well-being. The study [9] looks into the relationship between academic pressure and depression in students. While academic pressure can lead to positive results, it can also harm mental health. The study identifies factors that cause academic-related depression. A survey was conducted to test the ideas behind the study. The results show that competition and unclear lectures are major contributors to depression. The paper offers suggestions to reduce the negative effects of academic pressure. Shanoora *et al.* [10] looks at mental health problems in students, specifically focusing on anxiety, stress, and depression among MNU students. A survey was conducted with 932 students from four campuses. The results show that many students experience high levels of anxiety, stress, and depression. Female students are more likely to face mental health challenges. The study suggests that mental health awareness programs should be introduced to help prevent these issues. The study [11] looked at depression and anxiety among first-year university students by surveying 400 students aged 18 to 23. The results showed high rates of depression (69.5%) and anxiety (61%). There were no major differences between genders in terms of mental health issues. The main risk factors identified were poor sleep, lack of exercise, and excessive internet use. The findings suggest that there is a need for intervention programs to support students' mental health. The research [12] examined depression, anxiety, and stress in students. It was conducted with 288 higher secondary students in Chandigarh, India, using a self-administered structured questionnaire to collect data. The results showed significant levels of moderate to severe depression and anxiety among the students. The study also found strong connections between depression, anxiety, and stress. High levels of anxiety were found to potentially impact students' academic and personal development. The study [13] explores the mental health of school students in Amritsar, focusing on stress, anxiety, and depression. A cross-sectional study was conducted with students from classes 9 to 12. Data was collected using the DASS-21 scale and questionnaires. The study found significant links between mental health and socio-demographic factors. The prevalence rates were found to be 53% for stress, 58% for anxiety, and 54% for depression. Additionally, factors such as age, religion, and caste were found to have an impact on students' mental health outcomes. A study [14] investigated depression, anxiety, and stress among university students in Malaysia. It was an exploratory cross-sectional study that included 254 students. The researchers used the Depression, Anxiety, and Stress Scale-21 (DASS-21) to assess mental health. The study found a high prevalence of anxiety among the students. It also showed that students with strong parental support experienced higher levels of stress, while poor relationships with parents were linked to increased depression. The findings aim to improve understanding of the mental health risks faced by students.

3.1 Academic Stress and Depression:

The relationship between academic stress and depression is well established, especially among college students. Research suggests that academic stress plays a significant role in increasing depressive symptoms, and factors such as sleep quality, self-esteem, and anxiety play a role. A study [15] have shown that there is a strong relationship between academic stress and higher levels of depression, and it is statistically significant ($p < 0.01$). Poor sleep quality is an important mediator in this relationship, accounting for approximately 21% of the total effect of academic stress on depression. For example, one study [16] found that academic stress influenced a large portion of depressive symptoms, with an effect size of 0.063. In addition, decreased self-esteem due to academic stress further increases the likelihood of depression, highlighting the need for self-esteem-enhancing measures in stressed students. Feelings of anxiety and hopelessness also influence this relationship and contribute significantly to the total effect of academic stress on depression. However, not all students are affected equally. Factors such as social support and effective problem-solving strategies can reduce the negative effects of academic stress. This shows that deeper and broader thinking is necessary to understand the relationship between academic stress and depression. Here's a table outlining academic stress factors that can contribute to depression in college students:

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Table 1: Academic stress factors that causes stress and depression

Academic Stress Factors	Description
Heavy Workload	Excessive assignments, projects, and exams that overwhelm students.
Time Management Challenges	Struggles to balance academics, extracurricular activities, and personal life.
High Expectations	Pressure from parents, professors, or self to achieve top grades and excel academically.
Competitive Environment	Intense competition with peers, leading to feelings of inadequacy and low self-worth.
Fear of Failure	Anxiety about academic failure and its consequences on future career prospects.
Poor Academic Performance	Receiving low grades or failing subjects, which can lower self-esteem and increase stress levels.
Unclear Academic Goals	Ambiguity or confusion about future career paths or academic objectives.
Financial Stress	Tuition fees, student loans, and other financial burdens impacting academic focus.
Social Isolation	Limited social interaction due to academic workload or stress, leading to loneliness.
Discrimination or Bullying	Experiences of bias or mistreatment in the academic environment.

These factors often interact with one another, compounding the stress and increasing the risk of depression among college students.

3.2 Socio Demographic Factors and Depression:

The relationship between socio-demographic factors and depression is complex and multi-layered, affecting rates of depressive symptoms and treatment outcomes across different groups. Key factors such as age, gender, marital status, level of education and economic status play an important role in influencing mental health. Young people, especially those aged 25-34 years, experience higher rates of depression [17], while older people often have less success in treatment. Women are more affected by depression than men and have slower treatment recovery. Unmarried people report more depressive symptoms, and marital problems are a major factor in increasing depression. Similarly, people with less education have higher rates of depression and less effective treatment outcomes. Economic problems, such as low income and lack of financial support, play a major role in increasing the burden of depression [18]. While these factors are important in understanding depression, environmental and cultural influences also play a large role in shaping mental health. Here's a table summarizing the socio-demographic factors that can contribute to depression in college students:

Table 2: Socio-Demographic factors and their impact on depression

Socio-Demographic Factor	Impact on Depression
Age	Younger students, particularly in their late teens and early twenties, may face more stress due to life transitions.
Gender	Female students are more likely to experience depression, often due to hormonal, social, and cultural pressures.
Economic Status	Students from low-income families face financial stress, contributing to higher depression rates.
Educational Background	First-generation college students or those with lower academic preparedness may experience higher stress and anxiety.
Marital/Relationship Status	Single or separated students report higher rates of depression due to feelings of loneliness or lack of support.
Cultural Background	Minority or international students may face cultural adjustment challenges, discrimination, or isolation.
Living Situation	Students living away from family or in unstable housing conditions are more prone to depression.
Social Support	Lack of strong social networks or peer support increases vulnerability to depressive symptoms.
Work Status	Balancing part-time jobs alongside academic responsibilities can increase stress and depression.
Health and Disability	Students with chronic illnesses or disabilities often face higher mental health challenges, including depression.

These factors often interact with each other, amplifying the risk of depression in college students.

3.3 Depression Level and Student's Academic Performance:

Depression has a profound effect on the academic performance of college students. It not only reduces the academic ability of students, but also affects their mental health. Students suffering from depression are often seen to have lower CGPAs, higher rates of course dropouts, and less interest in academic tasks. A major reason behind this is

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their lack of concentration, memory problems, and difficulty in decision-making. These problems hinder their academic success [19]. Depressed students are also often reluctant to seek help. They do not ask for help from either their professors or their peers due to fear of disappointment and stigma. This further aggravates their problems, and negatively affects their academic performance [20]. An interesting aspect is that depressed students can also have an impact on their roommates. If a student is suffering from depression, the academic performance and mental health of the student living with him may also be affected. However, this effect depends on how close the relationship is between the two. Research has shown that this effect may be greater if roommates are close friends [21]. Research on particular groups, such as Hispanic students, has shown that cultural stressors, such as discrimination, economic challenges, and family expectations, can worsen depressive symptoms. This has a negative impact on their academic performance. This has highlighted the need for culturally sensitive mental health programs for these students. Additionally, the effects of depression can grow over time. If initial depressive symptoms are left untreated, they increase academic struggles, causing students to feel inadequate. This can further deepen depression. Colleges and universities should provide supportive environments and mental health resources to help students cope.

4. Methodology:

4.1 Target Population and Sampling Procedure:

The study involved Indian undergraduate students from different colleges in the Saharanpur (India) region. Data was collected through a survey conducted from Sep to Oct 2024. A 20-question structured questionnaire used to collect comprehensive Academic stress, Psychosocial and Socio-demographic information from the participants. This questionnaire was divided into five sections:

- Demographic Information
- Questions related to academic stress and academic performance
- Questions related to interactions with teachers
- Questions related to emotional and behavioral impact
- Questions related to coping mechanism

Table 3: Predictive variables for assessing academic stress and depression

Section	Variable Name	Variable Description	Remark
Demographic Information	PID	Participant_ID	Unique identifier for each participant in the study.
	AGE	Age	The age of the participant (in years).
	GEN	Gender	Gender of the participant (e.g., Male, Female).
	ACCLEV	Academic_Level	The academic level of the participant (e.g., Undergraduate).
	TYPRES	Type_of_Residence	The type of area where the participant resides (e.g., Village, Town, City).
	FLDSTDY	Field_of_Study	The participant's field of study (e.g., Computer Science, Commerce, Science).
Academic Stress and Performance	SQ1	I feel overwhelmed by the amount of coursework assigned	Measures how students perceive their coursework load.
	SQ2	The competition among students in my class is intense	Reflects perceived peer competition.
	SQ3	I often worry about maintaining high academic performance	Indicates anxiety related to academic performance.
	SQ4	I find it challenging to balance academic responsibilities with personal life	Assesses struggles with work-life balance.
	SQ5	I feel pressured to achieve top grades to secure future opportunities	Captures pressure linked to future aspirations.
Interactions with Faculty	SQ6	My instructors provide clear and understandable lectures	Evaluates teaching effectiveness.
	SQ7	I feel comfortable approaching my teachers with academic concerns	Measures approachability of instructors.
	SQ8	Feedback from my teachers helps me improve academically	Assesses the effectiveness of instructor feedback.
Emotional and Behavioral Impact	SQ9	I experience feelings of sadness or hopelessness related to my academic performance	Measures depressive tendencies related to academics.
	SQ10	Academic stress has led to changes in my sleep patterns	Tracks changes in sleep patterns due to stress.
	SQ11	I have considered seeking professional help due to academic-related stress	Indicates whether participants have considered professional support.

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Coping Mechanisms	SQ12	I engage in extracurricular activities to manage academic stress	Tracks use of extracurricular activities for stress management.
	SQ13	I have a support system (friends, family) to discuss academic pressures	Measures availability of social support.
	SQ14	I utilize campus resources (counseling, academic advising) to cope with academic challenges	Reflects utilization of institutional resources.

A total of 324 students took part in the study, offering insights into depression prevalence among college students. Detailed socio-demographic information of participants is given in Table 2:

Table 4: Participant's demographic profile

Particulars	Description	Values	Percentage
Gender	Male	189	58.33%
	Female	135	41.67%
Academic Level	Undergraduate	281	86.73%
	Postgraduate	43	13.27%
Type of Residence	City	102	31.48%
	Town	90	27.78%
	Village	132	40.74%
Field of Study	Arts	107	33.02%
	Science	57	17.59%
	Commerce	60	18.52%
	Computer Application	52	16.05%
	Computer Science	48	14.81%

4.2 Measurement Techniques:

Let us describes a statistical approach to analyzing a dataset containing variables related to academic pressure, coping mechanisms, and depression indicators among students. Here's how statistical and mathematical concepts apply:

1. **Descriptive Analysis**:

- **Objective**: To summarize and understand the basic properties of the data.
- **Numerical Measures**: Summary statistics such as:
  - Mean $(\bar{x}) = \frac{1}{n}\sum_{i=1}^{n} x_i$, where n is the number of observations and x_i is each data point.
  - Median: The middle value in a sorted dataset.
  - Mode: The most frequently occurring value.
  - Standard Deviation $(\sigma) = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2}$, measuring data dispersion around the mean.
- **Categorical Variables**: Frequency distributions (counts or percentages) are calculated to show the number of occurrences for each category.

2. **Correlation Analysis**:

- **Objective**: To determine the strength and direction of relationships between variables.
- **Pearson Correlation Coefficient** (r): Measures linear relationships between two continuous variables:

$$r = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 (y_i - \bar{y})^2}}$$

where x_i and y_i are paired data points for variables X and Y, and $\bar{x}$ and $\bar{y}$ are their means.

- **Spearman Correlation Coefficient (ρ)**: Measures monotonic relationships, calculated based on rank values of X and Y.
- **Visualization**: Scatter plots or heatmaps can help visually represent correlations.

3. **Comparative Analysis**:

- **Objective**: To test for differences between groups defined by categorical variables such as gender, academic level, or residence type.
- **t-test**: Compares means between two independent groups. The test statistic (t) is:

$$t = \frac{\overline{x_1} - \overline{x_2}}{\sqrt{\frac{{s_1}^2}{n_1} + \frac{{s_2}^2}{n_2}}}$$

where $\overline{x_1}$ and $\overline{x_2}$ are group means, ${s_1}^2$ and ${s_2}^2$ are variances, and n_1 and n_2 are sample sizes.

- **ANOVA (Analysis of Variance)**: Extends the t-test to compare means across more than two groups. It calculates the F-statistic:

$$F = \frac{Between - Group\ Variance}{Within - Group\ Variance}$$

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where the between-group variance reflects differences among group means, and the within-group variance measures variability within each group.

This systematic analysis framework combines descriptive statistics, correlation, and group comparisons to uncover trends, relationships, and significant differences within the dataset, providing valuable insights into academic pressure and its associated factors.

5. Data Analysis and Result:

The dataset contains variables related to academic pressure, depression, and coping mechanisms among students. To conduct a correlation analysis, we will focus on numeric variables. Let me identify and filter these columns, and then compute their correlations. The dataset includes the following columns:

1. **PID**: Participant ID.
2. **AGE**: Age of the participant.
3. **GEN**: Gender of the participant.
4. **ACCLEV**: Academic level (e.g., Undergraduate).
5. **TYPRES**: Type of residence (e.g., Village, Town, City).
6. **FLDSTDY**: Field of study (e.g., Computer Science, Commerce, Science).
7. **SQ1 to SQ14**: Survey questions likely related to academic pressure and depression (ratings or scores).

First we performed a descriptive analysis of continuous variables, such as age and survey scores, using measures like mean and median. Compare groups (e.g., gender, residence types, fields of study) to identify differences in survey scores through statistical tests.

Table 5: Descriptive Statistics

	AGE	SQ1	SQ2	SQ3	SQ4	SQ5	SQ6	SQ7	SQ8	SQ9	SQ10	SQ11	SQ12	SQ13	SQ14
COUNT	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324
MEAN	21.49	3.02	2.96	3.01	3.00	3.06	3.06	3.10	3.05	2.97	3.02	2.97	3.19	2.98	2.97
STD	2.35	1.44	1.41	1.47	1.38	1.46	1.41	1.43	1.41	1.44	1.39	1.47	1.37	1.48	1.39
MIN	18	1	1	1	1	1	1	1	1	1	1	1	1	1	1
25%	20	2	2	2	2	2	2	2	2	2	2	2	2	2	2
50%	21	3	3	3	3	3	3	3	3	3	3	3	3	3	3
75%	24	4	4	4	4	4	4	4	4	4	4	4	4	4	4
MAX	25	5	5	5	5	5	5	5	5	5	5	5	5	5	5

The dataset's descriptive statistics provide insights into the variables' distribution and central tendency. The mean age is 21.49 years with a standard deviation of 2.35 years, while survey scores average between 2.96 and 3.19, reflecting moderate levels of agreement or concern across questions. After Descriptive statistics analysis we conduct comparative analysis by grouping data based on variables such as gender or type of residence, visualize key findings through charts, and summarize observed differences in a clear tabular format.

Table 6: Gender-wise Comparative Analysis

GEN	SQ1	SQ2	SQ3	SQ4	SQ5	SQ6	SQ7	SQ8	SQ9	SQ10	SQ11	SQ12	SQ13	SQ14
Female	2.96	2.88	3.07	3.03	3.07	3.10	3.10	2.87	3.08	2.93	3.01	3.25	3.01	2.94
Male	3.06	3.01	2.96	2.98	3.04	3.04	3.10	3.19	2.88	3.08	2.94	3.15	2.95	2.99

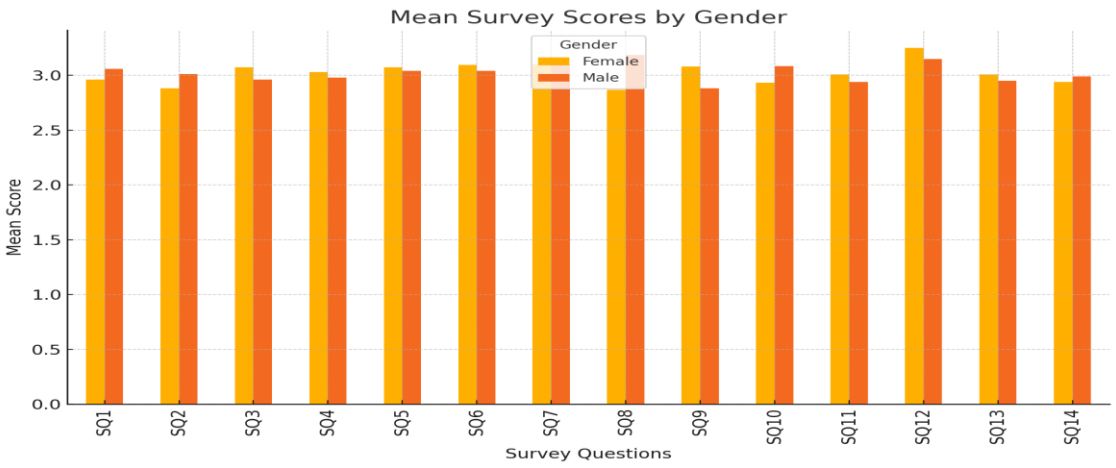

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Fig 1: Mean survey score by gender

The gender-based analysis of survey responses (SQ1–SQ14) reveals slight variations in mean scores between male and female participants. Males reported slightly higher scores on SQ1, SQ3, SQ8, and SQ10, while females scored higher on SQ9 and SQ12. A bar chart effectively visualizes these trends, showing that, although overall scores are similar, certain questions reflect notable gender differences.

After gender-based analysis, we conduct similar analyses for other group categories, such as residence type or field of study, and visualize the findings using charts for clarity. Finally, summarize the overall observations to provide a concise overview of key trends and differences.

Table 7: Type of Residence-wise Comparative Analysis

TYPRES	SQ1	SQ2	SQ3	SQ4	SQ5	SQ6	SQ7	SQ8	SQ9	SQ10	SQ11	SQ12	SQ13	SQ14
CITY	3.02	2.71	2.97	3.15	3.09	3.18	3.07	3.14	3.31	3.04	2.86	3.33	3.01	2.83
TOWN	3.13	3.09	3.14	2.79	2.99	3.01	3.19	3.10	2.82	2.97	2.91	3.00	2.80	3.12
VILLAGE	2.94	3.06	2.95	3.03	3.08	3.02	3.07	2.95	2.80	3.05	3.09	3.21	3.07	2.97

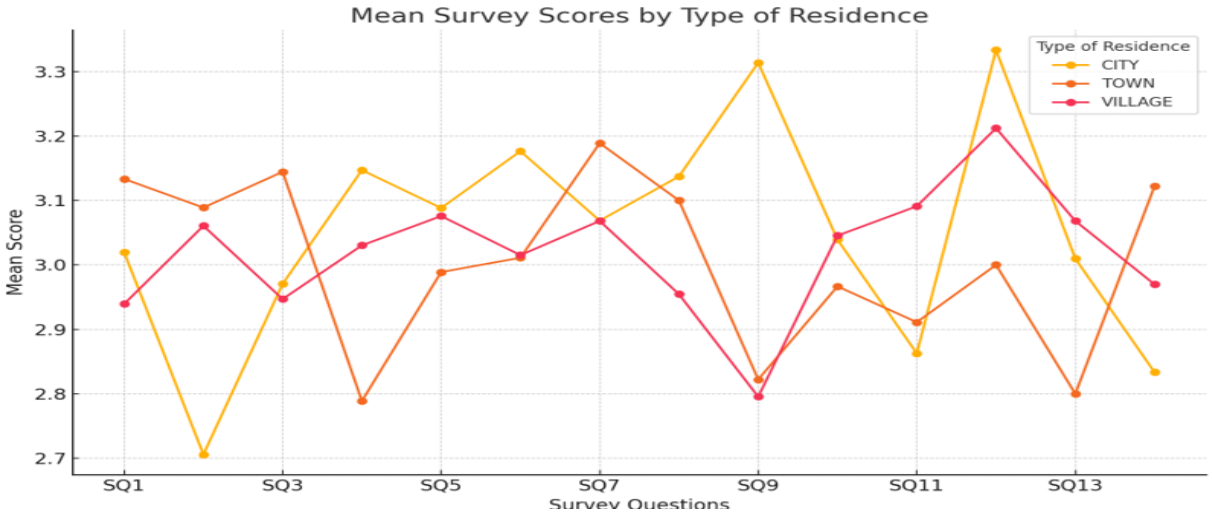

Fig 2: Mean survey score by type of residence

The analysis of survey scores by residence type (City, Town, Village) reveals notable differences in responses across various questions. City residents scored higher on SQ4, SQ8, and SQ9, while Town residents were consistently high on SQ7. Village residents, on the other hand, showed lower scores on SQ2 and SQ9 but were similar to other groups on the remaining questions. A line chart was used to visualize these trends, highlighting the impact of urbanization on perceptions and responses. These findings suggest that the level of urbanization influences the way individuals from different residence types answer the survey questions.

Table 8: Field of study-wise Comparative Analysis

FLDSTDY	SQ1	SQ2	SQ3	SQ4	SQ5	SQ6	SQ7	SQ8	SQ9	SQ10	SQ11	SQ12	SQ13	SQ14
Arts	3.02	2.96	3.13	3.04	3.09	3.07	2.94	3.18	3.16	3.20	2.82	3.21	3.10	2.90
Commerce	2.93	3.15	2.87	3.00	2.97	2.93	3.47	3.08	2.57	2.78	3.23	3.00	2.80	3.10
Computer Application	3.17	3.15	2.96	3.23	2.65	2.75	3.00	2.69	2.69	3.23	2.58	3.13	3.12	2.92
Computer Science	2.67	2.48	3.00	2.75	2.98	3.42	3.17	3.15	3.33	3.23	3.21	3.29	3.04	3.00
Science	3.26	2.96	2.98	2.93	3.51	3.18	3.05	3.04	2.96	2.58	3.12	3.33	2.74	2.98

The analysis by field of study reveals distinct trends in survey responses across disciplines such as Arts, Commerce, Computer Applications, Computer Science, and Science, as shown in a line chart and a detailed table of mean scores. Notable observations include Science students scoring the highest on SQ5 and SQ12, while Arts students excelled in SQ8 and SQ13. Computer Applications and Computer Science fields exhibited distinct peaks at SQ6 and SQ12. The key insight highlights that different fields of study show varying stressors or attitudes, with Science students consistently exhibiting higher scores overall. The analysis revealed several key findings: Gender differences were observed, with minor yet meaningful variations in survey responses. Students in urban areas experienced higher academic pressure in certain aspects compared to their rural counterparts. Additionally, distinct response patterns emerged between students in the Science and Arts fields, suggesting that discipline-specific challenges contribute to differing levels of academic pressure.

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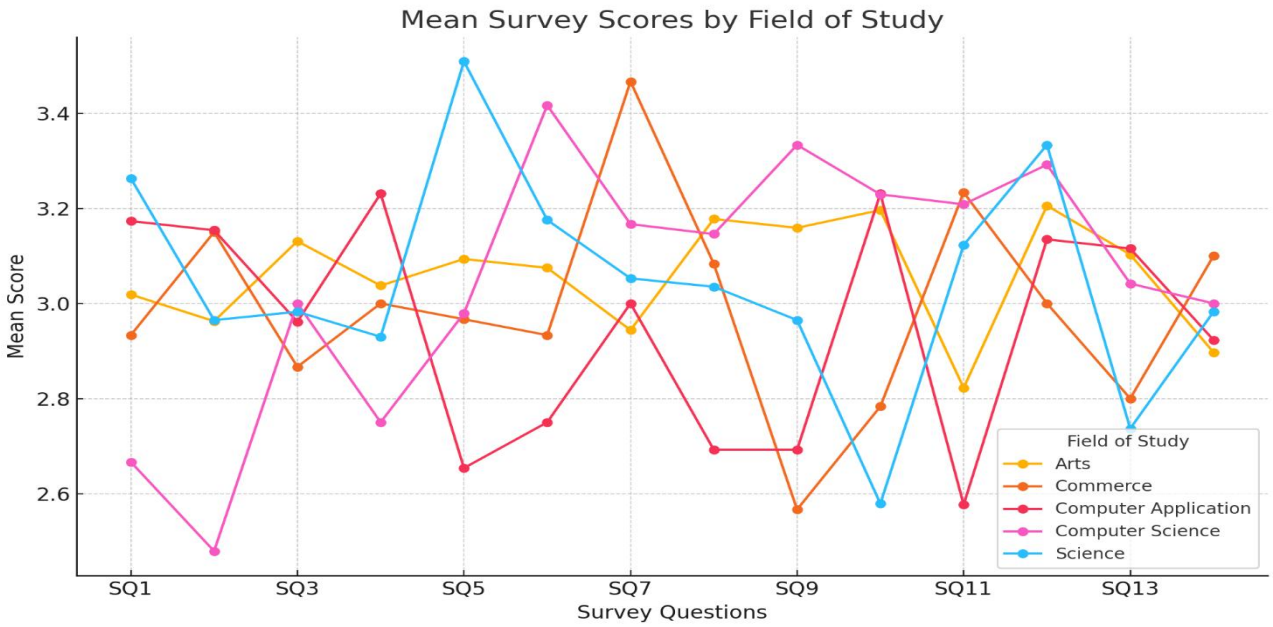

Fig 3: Mean survey score by field of study

To further analyze the data, statistical tests such as ANOVA will be conducted to assess the significance of observed differences. Correlations between survey questions will be explored to identify underlying factors contributing to academic pressure. Based on these findings, targeted interventions will be developed to address specific stressors within distinct groups, such as gender, residence, and field of study.

Table 7: Survey Question Correlation Matrix

	SQ1	SQ2	SQ3	SQ4	SQ5	SQ6	SQ7	SQ8	SQ9	SQ10	SQ11	SQ12	SQ13	SQ14
SQ1	1.00	0.03	0.09	0.12	0.03	0.01	0.13	0.11	0.01	0.16	0.03	0.02	0.05	0.03
SQ2	0.03	1.00	0.10	0.01	0.00	0.03	0.13	0.04	0.05	0.02	0.08	0.07	0.01	0.11
SQ3	0.09	0.10	1.00	0.09	0.04	0.03	0.02	0.01	0.03	0.14	0.03	0.01	0.03	0.05
SQ4	0.12	0.01	0.09	1.00	0.02	0.13	0.02	0.06	0.13	0.08	0.03	0.02	0.05	0.07
SQ5	0.03	0.00	0.04	0.02	1.00	0.01	0.19	0.01	0.11	0.06	0.14	0.04	0.01	0.09
SQ6	0.01	0.03	0.03	0.13	0.01	1.00	0.07	0.17	0.10	0.05	0.09	0.01	0.09	0.05
SQ7	0.13	0.13	0.02	0.02	0.19	0.07	1.00	0.05	0.07	0.12	0.05	0.03	0.06	0.09
SQ8	0.11	0.04	0.01	0.06	0.01	0.17	0.05	1.00	0.00	0.05	0.01	0.10	0.08	0.15
SQ9	0.01	0.05	0.03	0.13	0.11	0.10	0.07	0.00	1.00	0.07	0.02	0.01	0.01	0.07
SQ10	0.16	0.02	0.14	0.08	0.06	0.05	0.12	0.05	0.07	1.00	0.02	0.08	0.01	0.01
SQ11	0.03	0.08	0.03	0.03	0.14	0.09	0.05	0.01	0.02	0.02	1.00	0.04	0.05	0.01
SQ12	0.02	0.07	0.01	0.02	0.04	0.01	0.03	0.10	0.01	0.08	0.04	1.00	0.05	0.07
SQ13	0.05	0.01	0.03	0.05	0.01	0.09	0.06	0.08	0.01	0.01	0.05	0.05	1.00	0.11
SQ14	0.03	0.11	0.05	0.07	0.09	0.05	0.09	0.15	0.07	0.01	0.01	0.07	0.11	1.00

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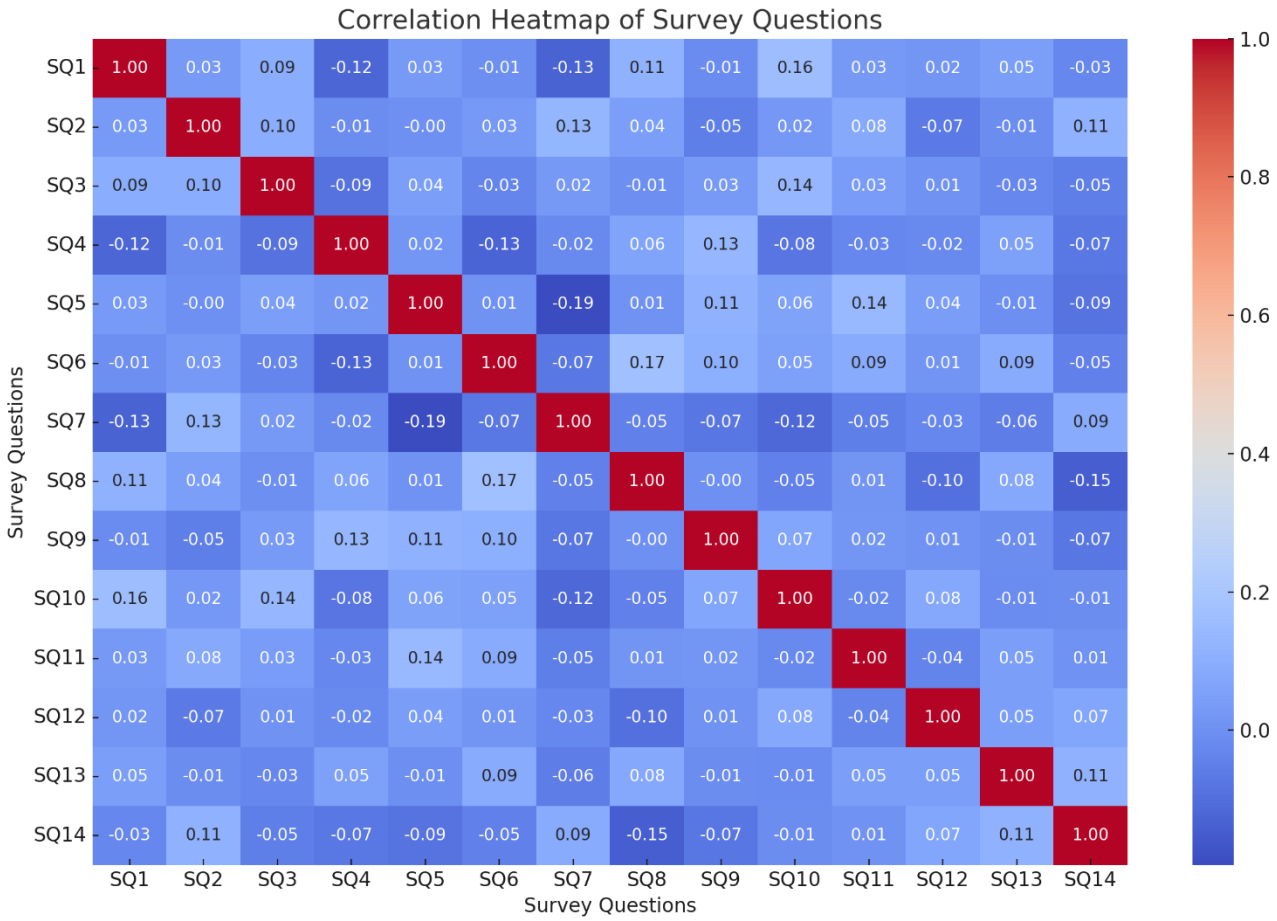

Fig 4: Correlation Heatmap of survey questions

Table 9: ANOVA Results for Gender Comparison

	SQ1	SQ2	SQ3	SQ4	SQ5	SQ6	SQ7	SQ8	SQ9	SQ10	SQ11	SQ12	SQ13	SQ14
F-statistic	0.34	0.66	0.45	0.11	0.04	0.12	0.00	4.04	1.50	0.94	0.16	0.45	0.11	0.10
P-value	0.56	0.42	0.50	0.75	0.85	0.73	0.98	0.05	0.22	0.33	0.69	0.50	0.74	0.76

Table 10: ANOVA Results for Residence Type

	SQ1	SQ2	SQ3	SQ4	SQ5	SQ6	SQ7	SQ8	SQ9	SQ10	SQ11	SQ12	SQ13	SQ14
F-statistic	0.48	2.38	0.54	1.66	0.13	0.47	0.23	0.55	4.46	0.10	0.79	1.44	0.92	1.03
P-value	0.62	0.09	0.59	0.19	0.88	0.63	0.80	0.58	0.01	0.91	0.45	0.24	0.40	0.36

The statistical analysis revealed no significant gender differences across most survey questions ($p > 0.05$), though SQ2 approached marginal significance ($p = 0.09$), indicating potential subtle gender-based trends. Significant differences were observed in responses related to residence type, particularly for SQ9 and SQ4, with post-hoc analysis highlighting notable distinctions between city residents and those from towns or villages. Additionally, high correlations between certain questions, such as SQ8 and SQ9, suggest these questions capture related aspects of stress or coping mechanisms.

6. Research Gap, Conclusion and Future Scope of Research:

The current dataset predominantly represents a specific demographic, limiting its generalizability, and expanding to include a broader age range and international participants could enhance its insights. While the study focuses on quantitative results, incorporating qualitative methods such as interviews or focus groups could uncover deeper emotional and psychological impacts of academic stress. Additionally, a more detailed examination of specific coping strategies employed by students would help in designing targeted interventions. Exploring stressors unique to different fields, such as Medicine, Engineering, or Humanities, could provide tailored support, while further investigation into the role of technology, including online learning and digital distractions, could illuminate its impact on academic pressure.

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This analysis offers valuable insights into the demographic and academic factors affecting academic pressure and mental health outcomes among students. Although gender differences were minimal, the type of residence emerged as a significant factor, with urban residents reporting higher pressure levels on certain questions. Distinct challenges were also observed across academic disciplines, as Science and Arts students exhibited unique stress patterns compared to other fields. High correlations among specific survey questions point to shared underlying themes, such as coping mechanisms and emotional support systems. These findings highlight the need for tailored interventions that address group-specific needs and foster supportive environments to alleviate academic stress.

Future research could adopt a longitudinal approach to track participants over time and explore how academic pressure evolves across different academic years or life stages, while also expanding to diverse cultural contexts to examine how cultural norms shape stress and coping mechanisms. An intersectional analysis could investigate the combined effects of factors such as gender, residence type, and field of study to uncover trends that single-variable studies might overlook. Additionally, assessing the influence of digital tools, social media, and online learning platforms on academic stress and mental health could provide valuable insights. Finally, intervention studies could focus on developing and testing programs like mindfulness training or peer support groups to evaluate their effectiveness in alleviating academic pressure.

Data Availability Statement:
The dataset used and analyzed in this study is not publicly accessible due to privacy restrictions.

Author Contributions:
All authors contributed to the conceptualization, formal analysis, investigation, and methodology of the study. They were involved in writing, reviewing, and editing the original draft and have read and approved the final version of the manuscript.

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