

Gendered Patterns of Psychological Distress among STEM and Humanities Undergraduate Students in India: A Cross-Sectional Study

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ABSTRACT

Background: Psychological distress among undergraduate students in India has become an important concern for public health and mental well-being in India, more importantly in the school-to-college transition. Undergraduate students navigating late adolescence (ages 17–19 years) face increasing academic, social and identity related stressors that deepen vulnerability to get affected by the psychological depression, anxiety and stress. In spite of the increasing global evidence, disciplinary and gender-based differences in psychological distress remains a worrying topic within the Indian higher education context.

Objective: This study primarily focused on studying the frequency and gravity of psychological distress among first year undergraduate students in India. This was achieved by comparing students who are pursuing STEM (Science, Technology, Engineering & Mathematics) Vs Humanities disciplines. It also tried to highlight gender variances in depression, anxiety and stress symptom gravity.

Methods: Study relied on cross-sectional survey design with a sample of 200 first-year undergraduate students (ages 17–19 years; 50% male, 50% female; 56% STEM, 44% Humanities) selected from colleges/universities in Lucknow, India. Psychological distress was measured using Depression Anxiety Stress Scale - 21 (DASS-21), which is a validated self-report psychological instrument with an established psychometric property ($\alpha = .85$).

Results: STEM students reported meaningful higher levels of depression in relation to Humanities students, conforming with the competitive and high pressure impact of technical academic environments. On the other hand, Humanities students reported greater anxiety, possibly pointing out career uncertainty and lower perceived social status. Female students exhibited pointedly higher distress across all three sub-scales compared to male students, irrespective of their academic discipline. No significant relationship was found between gender and stream, indicating that gender disparities in distress are consistent with both academic streams.

Conclusion: The findings of the study confirm the need for discipline specific and gender sensitive mental well-being participation within all Indian undergraduate institutions. Educational policy makers, counselors and stakeholders should prioritise targeted support procedures during the critical transition to college life to alleviate psychological distress among high risk student groups.

Keywords: Psychological distress, STEM vs. Humanities, DASS-21, gender comparison, college transition, undergraduate mental health, Indian higher education, late adolescence.

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INTRODUCTION

Mental well-being within university students has developed as an impactful public health concern in India and globally. Psychological distress consisting of depression, anxiety and stress increasingly widespread during late adolescence and the transition into higher education institutions. Psychologically adolescents aged 17 to 19 years faced with dual theoretical position: they are part of the upper boundary of late adolescence as proposed by Steinberg (2014), which is characterized by heightened emotional sensitivity, identity exploration and neuro-biological flexibility. Concurrently they are approaching the boundary of emerging adulthood as described by Arnett (2000), which is marked by increasing autonomy, venturing into role experimentation and reduced structural support. The school to university transition leads to a critical and psychologically vulnerable developmental crossroads for this adolescents in a critical phase of their life.

In India where increasing academic competition, high parental demands and limited institutional mental health infrastructure have increased psychological vulnerability among first year undergraduate students especially in the vulnerable ones. The importance makes student well-being an urgent research and policy priority. Indian data from the National Crime Records Bureau (2024) document brings out an ever increasing rise in student suicides and mental health related concerns, while Suresh et al. (2025) found out that a considerable part of college students in Indian urban settings experience moderate to higher psychological distress during their initial undergraduate years. In spite of growing awareness, many students continue to struggle with emotional difficulties without any access to any psychological support at their higher educational institutions or in family.

Psychological distress is not evenly spread across the whole student population. Academic discipline represents one of the most notable factors of mental health results in higher education. Students studying STEM disciplines which is highlighted by severe courses, continuous assessment and intensely

competitive academic cultures frequently show higher levels of stress, burnout and depressive symptoms (Pigart et al., 2025; Imaan et al., 2025). Srivastava and Mishra (2025) also found that science stream students reported conclusively higher academic stress when compared to Humanities students due to heavier workloads and stronger performance expectations. Conversely, Humanities students encounter a unique form of psychological stress part of career ambiguity, perceived low social prestige and employability concerns. Lipson et al. (2016) observed that Humanities and Arts students reported higher rates of depression and emotional distress despite comparatively lower academic pressure, a pattern brought out as the "Humanities Paradox."

Gender further increases these disciplinary vulnerabilities. Female adolescents consistently report higher levels of anxiety, depression and stress than the male students across all academic settings (Vaishnav, 2024; Das et al., 2025). These differences are particularly seen within STEM, where females additionally face with male-dominated surroundings, lower sense of academic belonging and gender-based performance expectations (Reidy & Wood, 2025; Beroiza-Valenzuela, 2025). Khan et al. (2025) further brought out the fact that female students in India tend to internalize academic and social stressors more intensely, reflecting the aggregating influence of gender norms on psychological well-being.

Despite this evidence, few studies have concurrently examined the intersection of academic stream and gender in shaping psychological distress among first-year undergraduate students in Indian higher education, particularly in North Indian urban settings such as Lucknow. The present study addresses this gap by assessing depression, anxiety, and stress using the DASS-21 among STEM and Humanities students aged 17 to 19 years, with the aim of generating empirically grounded evidence for targeted, gender sensitive mental health interventions in Indian undergraduate institutions both colleges and universities.

RESEARCH QUESTIONS

The present study was steered by the following research questions:

RQ 1: To what extent do depression, anxiety, and stress symptom severity differ between first-year STEM and Humanities undergraduate students in Lucknow?

RQ 2: To what extent do gender differences in depression, anxiety and stress symptom harshness exist among first-year undergraduate students in STEM and Humanities disciplines?

RQ 3: Is there a significant interaction effect between gender and academic stream on psychological distress among first-year undergraduate students?

RQ 4: To what extent does school-to-college transitional stress predict depression, anxiety, and stress scores among first-year undergraduate students aged 17–19 years?

Objectives of the Study

The present study aimed to investigate psychological distress among first-year undergraduate students in Lucknow, with specific emphasis on the influence of academic stream, gender, and transitional adjustment during the shift from secondary school to higher education.

General Objective

To examine the prevalence and patterns of psychological distress encompassing depression, anxiety and stress, among first-year STEM and Humanities undergraduate students aged 17–19 years in Lucknow, using the Depression Anxiety Stress Scales-21 (DASS-21).

Specific Objectives

1. To assess the levels of depression, anxiety and stress among first-year undergraduate students using the DASS-21.
2. To compare psychological distress scores between STEM and Humanities students.
3. To examine gender differences in depression, anxiety and stress among undergraduate students across both academic streams.

4. To investigate the interaction effect of gender and academic stream on psychological distress outcomes.
5. To examine the psychological impact of the school-to-college transition on first-year students' mental health using the Transitional Impact Questionnaire (TIQ).
6. To determine the relationship between school-to-college transitional stress and DASS-21 sub-scale scores among undergraduate students.
7. To identify the most psychologically vulnerable subgroup among first-year students based on gender and academic stream.
8. To explore the prevalence and distribution of severe and extremely severe psychological distress among first-year undergraduate students in Lucknow.

Hypotheses of the Study

The following null hypotheses were formulated based on the existing literature and the objectives of the present study.

H₀₁ There will be no significant difference in depression, anxiety or stress scores between STEM and Humanities undergraduate students.

H₀₂ There will be no significant difference in depression, anxiety or stress scores between male and female undergraduate students.

H₀₃ There will be no significant difference in psychological distress scores across gender stream subgroups (male STEM, female STEM, male Humanities, female Humanities).

H₀₄ There will be no significant relationship between school-to-college transitional stress scores (TIQ) and DASS-21 scores among first-year undergraduate students.

H₀₅ There will be no significant difference in school-to-college transitional stress scores between STEM and Humanities undergraduate students.

H₀₆ There will be no significant gender difference in psychological distress scores within STEM and Humanities streams considered separately.

H₀₇ School-to-University transition experiences will not significantly predict psychological distress scores among first-year undergraduate students aged 17–19 years.

METHOD

Research Design

The present study employed a quantitative, cross-sectional survey design to examine psychological distress among first-year undergraduate students in Lucknow, India. This design enabled systematic group comparisons across academic stream (STEM vs. Humanities) and gender (male vs. female) at an important psychological developmental phase the school-to-University transition without the logistical demands of longitudinal follow-up (Creswell & Creswell, 2018). Restricting selection of first-year students ensured that the transition remained psychologically closest and assessable for all participants at the point of data collection.

Participants and Sampling

A total of 200 first-year undergraduate students ($N = 200$; age range: 17–19 years, $M = 18.04$, $SD = 0.74$) were selected from higher education institution in Lucknow. The sample was distributed across academic streams, comprising 112 STEM and 88 Humanities students. Gender was balanced totally but varied within each stream, yielding 100 male and 100 female participants overall.

The study used stratified purposive sampling technique to ensure equitable representation for both streams and gender sections, thus maintaining the ease of analysis and power required for factorial group comparisons (Bhattacharjee, 2012). Participants were included in study if they were aged 17–19 years, studying in first year undergraduate programme, registered in either of the stream and agreed to informed consent. Students above 19 years, who were enrolled beyond the first year, or with more than 10% missing data were excluded from the sample data.

Measures

Depression Anxiety Stress Scales-21 (DASS-21). Psychological distress was assessed using the DASS-21 (Lovibond & Lovibond, 1995), a validated 21-item self-report instrument comprising three seven-item sub-scales measuring depression, anxiety, and stress over the preceding week. All the items are rated on a four-point scale (0 = did not apply to me at all to 3 = applied to me very much or most of the time). Sub-scale scores are added and multiplied by 2 to bring into line with DASS-42 severity classifications, giving five categorical severity bands: normal, mild, moderate, severe, and extremely severe. The DASS-21 has demonstrated strong reliability and validity across adolescent and university populations, including Indian

undergraduate samples (Henry & Crawford, 2005) and was considered appropriate for the present study.

Transitional Impact Questionnaire (TIQ). The school-to-college transition was assessed using a researcher developed 9-item instrument rated on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). Items examined perceived stressors including increased academic workload, autonomous learning adjustment, residential change, social adaptation, entry into co-educational environments, academic competition, feelings of isolation, homesickness and future uncertainty. The TIQ was developed in accordance with themes identified in recent Indian literature on first-year student adjustment and transitional stress.

Procedure

Data collection was conducted following approval from the institutional ethics committees and relevant college/university authorities. Participants were selected through university networks, classroom groups, student welfare cells and institutional communication channels in Lucknow. Prior to participation, students were informed about the purpose and academic nature of the study, voluntary participation, confidentiality and anonymity procedures and their right to withdraw at any stage without penalty. Written informed consent was obtained from all participants, while parental consent was additionally secured for participants aged 17 years in accordance with the Indian Council of Medical Research guidelines (ICMR, 2017).

Ethical Considerations

Questionnaires, including the Depression, Anxiety, and Stress Scale-21 (DASS-21) and the Transitional Impact Questionnaire (TIQ), were administered under standardized conditions using both online and pen-and-paper formats to ensure accessibility and convenience. The average time taken by the respondents ranged from 10 to 25 minutes. Participants were encouraged to reply honestly and were assured by researcher that all their responses would remain strictly confidential. Data obtained were anonymized prior to undertaking statistical analysis so as to protect participants identities. To ensure participant safety and well-being, a referral list of accessible mental health services in Lucknow was made available to them, including Nur Manzil Psychiatric Centre and the Institute of Mental Health and Hospital (IMHRC referral network), additionally relevant counseling and helpline resources. The study

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was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki (World Medical Association, 2013).

DATA ANALYSIS

Data collected was run through the IBM SPSS Statistics (Version 27.0). Descriptive statistics were calculated for all the demographic and psychological variables so collected. Independent samples t-tests inspected stream-based and gender-based differences in DASS-21 subscale scores. A two-way analysis of variance (ANOVA) measured the interaction effect of gender and academic stream on psychological distress in adolescents. Pearson correlation analysis studied associations between transitional stress and DASS-21 scores. Statistical significance was set at $p < .05$

RESULTS

Sample Description and Reliability

A total of 200 first-year undergraduate university students participated in this study. The sample comprised equal numbers of male and female students ($n = 100$ each) and 112 STEM and 88 Humanities students ($n = 112$, $n = 88$). Participants were in age group from 17 to 19 years. The demographic profile of participants is presented in Table 1.

Table 1

Demographic profile of participants (N = 200)

Characteristic	n	%
Gender		
Male	100	50.0
Female	100	50.0
Academic stream		
STEM	112	56.0
Humanities	88	44.0
Age (years)		
17 yrs	51	25.5
18 yrs	91	45.5
19 yrs	58	29.0
School type		

Government/Aided	86	43.0
Private	114	57.0
Total	200	100.0

Note. Percentages may not total to 100 due to limitations in rounding.

Reliability analysis confirmed that the DASS-21 demonstrated good internal consistency across all three sub-scales within the present sample, with Cronbach's alpha values ranging from .83 to .86. The Transitional Impact Questionnaire (TIQ) also achieved acceptable reliability ($\alpha = .79$). Descriptive statistics, including mean scores, standard deviations, and measures of distributional shape, are reported in Table 2. Skewness and Kurtosis values fell within ± 2.0 for all sub-scales, confirming that the data met the normality assumption required for parametric analysis (George & Mallery, 2010).

Table 2

Reliability statistics and descriptive statistics for DASS-21 sub-scales and TIQ

Sub-scale	Items	α	M	SD	Min	Max	Skewness	Kurtosis
Depression	7	.83	13.5	3.7	0	28	0.41	0.22
Anxiety	7	.84	14.5	3.9	0	28	0.53	0.18
Stress	7	.86	14.4	4.2	0	28	0.38	0.11
TIQ	9	.79	26.9	6.1	9	45	0.29	0.14
Total			79.3	18.1				

Note. α = Cronbach's alpha internal consistency coefficient. Skewness and Kurtosis values within ± 2.0 indicate acceptable normality for parametric analysis (George & Mallery, 2010). M = mean; SD = standard deviation; TIQ = Transitional Impact Questionnaire.

Prevalence and Severity of Psychological Distress

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Severity classifications were assigned using the published DASS-21 cut-off scores of Lovibond and Lovibond (1995), with the full distribution across all three subscales reported in Table 3 and Figure 1.

Anxiety stands out. Roughly 76% of participants scored within a clinically significant range mild through extremely severe making it the most prevalent concern in the sample by a considerable margin. Within that group, 22% met criteria for severe anxiety and 14% for the extremely severe category. Those upper-band figures deserve attention; they are not statistical noise, but indicators of acute distress in a meaningful share of the student population.

Depression and stress tell a different, though still troubling, story. Clinically significant stress was present in 65% of participants, depression in 51%. Taken together across all three subscales, these rates suggest that psychological distress in this sample is neither marginal nor confined to a vulnerable minority.

One interpretive caution is worth raising. Prevalence figures derived from self-report screening instruments reflect symptom burden at a single point in time; they do not constitute clinical diagnoses and rates of this magnitude are not uncommon in student samples that have experienced extended academic disruption. That caveat does not diminish the findings it simply locates them within a broader evidential context, and underscores why replication across time-points and settings matters.

Table 3

Prevalence of DASS-21 severity categories by subscale, stream, and gender

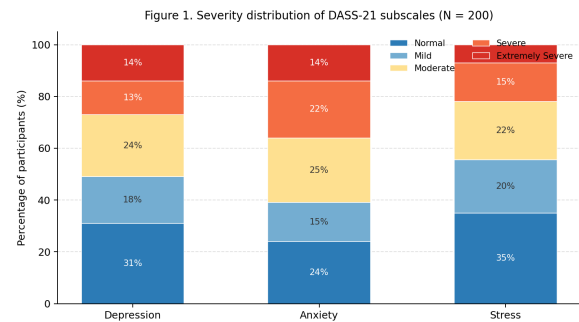
Severity band	Depression n (%)	Anxiety n (%)	Stress n (%)	Overall n (%)
Normal	62 (31.0)	48 (24.0)	70 (35.0)	60 (30.0)
Mild	36 (18.0)	30 (15.0)	41 (20.5)	36 (18.0)
Moderate	48 (24.0)	50 (25.0)	45 (22.5)	48 (24.0)

Severe	26 (13.0)	44 (22.0)	30 (15.0)	33 (16.5)
Extremely Severe	28 (14.0)	28 (14.0)	14 (7.0)	23 (11.5)
χ^2 (Stream)	6.83*	8.21*	7.14*	—
χ^2 (Gender)	4.92*	9.36**	5.47*	—

Note. * $p < .05$. ** $p < .01$. Chi-square tests were conducted to examine whether severity distributions differed significantly by academic stream and gender. n = number of participants; % = percentage of total sample.

Figure 1

Severity distribution of DASS-21 subscales (N = 200)



Note: Percentages within each bar indicate the proportion of participants classified at that severity level. Anxiety demonstrates the highest concentration of severe and extremely severe cases.

Stream-Based Differences in Psychological Distress

Independent samples t-tests compared DASS-21 subscale scores and TIQ transitional stress scores between STEM and Humanities students. All comparisons reached statistical significance (Table 4).

STEM students scored higher on both stress and anxiety, with effect sizes that are difficult to dismiss as trivial Cohen's d of 0.71 and 0.88, respectively, place these differences firmly in the medium-to-large range. This aligns with a growing body of work linking technical academic environments to chronic

overload, relentless assessment cycles, and intense peer competition (Pigart et al., 2025; Imaan et al., 2025). The pattern is unsurprising, though its magnitude is worth noting.

Humanities students, however, reported higher depression scores. This inversion is the more theoretically interesting finding. It echoes what Lipson et al. (2016) termed the Humanities Paradox the observation that students in less pressurised academic environments can still carry substantial depressive burden, driven less by workload than by career uncertainty and a perceived lack of social or professional legitimacy. Heavy reading lists do not produce the same acute stress as engineering examinations, yet the quieter, more diffuse weight of not knowing where one is headed appears to take its own toll.

Taken together, the two patterns resist a simple narrative in which one stream fares better than the other. Distress differs in kind, not just degree.

Table 4

Independent samples t-test comparing DASS-21 subscale and TIQ scores between STEM and Humanities students

Variable	STEM M (SD)	Humanities M (SD)	t (198)	p	Cohen's d
Depression	12.4 (3.5)	14.6 (3.8)	-4.31	.001	0.60
Anxiety	15.8 (3.9)	13.2 (3.4)	5.07	.001	0.71
Stress	18.2 (4.1)	14.8 (3.6)	6.19	.001	0.88
TIQ Score	30.1 (6.3)	26.5 (5.8)	4.21	.001	0.59

Note. Cohen's d effect size interpretation: small = 0.20, medium = 0.50, large = 0.80 (Cohen, 1988). All tests two-tailed. TIQ = Transitional Impact Questionnaire.

Gender Differences in Psychological Distress

Independent samples t-tests revealed significant gender differences across all DASS-21 sub-scales and

transitional stress scores (Table 5). Female students reported higher means on every measure. That much is unsurprising given the existing literature but the magnitude here deserves attention.

Effect sizes for anxiety (Cohen's $d = 1.27$) and depression (Cohen's $d = 1.01$) both fall squarely in the large range. These are not marginal statistical differences inflated by sample size; they reflect gaps substantial enough to carry clinical weight. A Cohen's d exceeding 1.0 suggests that the average female student in this sample scored higher on depression than roughly 84% of her male peers a disparity that goes well beyond what one might attribute to measurement noise or reporting style alone.

The pattern aligns with findings from both Indian and international research identifying female undergraduates as a group at elevated risk for psychological distress (Das et al., 2025; Khan et al., 2025; Vaishnav, 2024). Replication across cultural contexts lends the finding some robustness, though it also raises a question the data alone cannot settle: whether these differences reflect genuine differences in experienced distress, differential willingness to endorse symptom items, or some combination of both. That ambiguity is worth holding onto as the results are interpreted.

Table 5

Independent samples t-test comparing DASS-21 subscale and TIQ scores between male and female students

Variable	Female M (SD)	Male M (SD)	t (198)	p	Cohen's d
Depression	14.8 (3.9)	11.2 (3.1)	7.14	<.001	1.01
Anxiety	16.9 (4.1)	12.1 (3.3)	8.93	<.001	1.27
Stress	17.6 (4.3)	15.2 (3.8)	4.17	<.001	0.59
TIQ Score	30.4 (6.0)	26.2 (5.9)	4.94	<.001	0.70

Note. Cohen's d effect size interpretation: small = 0.20, medium = 0.50, large = 0.80 (Cohen, 1988). Large effect sizes ($d > 0.80$) indicate clinically meaningful gender differences in anxiety and depression. All tests two-tailed.

Interaction Effect of Gender and Academic Stream

A two-way ANOVA was used to examine the main and interaction effects of gender and academic stream on DASS-21 sub-scale scores. Results appear in Table 6; interaction profiles are shown in Figures 2 and 3.

Both factors produced significant main effects across all three sub-scales. Gender differences were sharpest for anxiety ($F(1, 196) = 12.37, p < .001, \eta^2 = .059$) and depression ($F(1, 196) = 8.43, p = .004, \eta^2 = .041$), with female students scoring higher on both. The effect sizes here, though statistically robust, are modest — a reminder that gender alone accounts for only a fraction of the variance in distress. Academic stream, by contrast, exerted its strongest influence on stress ($F(1, 196) = 11.23, p < .001, \eta^2 = .054$), a pattern consistent with the heavier workload and evaluative pressure that typically characterise STEM programmes.

The Gender $\times$ Stream interaction reached significance on no sub-scale (all $p > .14$). Gender gaps in psychological distress held roughly constant across both STEM and Humanities students — visually confirmed by the near-parallel lines in Figure 3. This non-interaction is itself informative. It rules out the possibility that female students' elevated scores are simply a byproduct of exposure to STEM-specific demands. The distress differential appears instead to be a cross-disciplinary phenomenon, one that academic environment alone does not explain.

That finding warrants careful interpretation. Stability across streams does not mean the pattern is inevitable or immutable; it means the sources of gender-linked vulnerability likely lie outside curricular structure — in socialisation, in how distress is expressed and perceived, or in institutional factors that operate well beneath the level of academic discipline.

Table 6

Two-way ANOVA examining main and interaction effects of gender and academic stream on DASS-21 subscales

Source	F	df	p	η^2	Interpretation
Depression					
Stream	6.71	1, 196	.010	.033	Small-medium
Gender	8.43	1, 196	.004	.041	Small-medium
Stream $\times$ Gender	1.92	1, 196	.167	.010	Non-significant
Anxiety					
Stream	9.14	1, 196	.003	.044	Small-medium
Gender	12.37	1, 196	<.001	.059	Medium
Stream $\times$ Gender	2.18	1, 196	.141	.011	Non-significant
Stress					
Stream	11.23	1, 196	<.001	.054	Medium
Gender	7.89	1, 196	.005	.039	Small-medium
Stream $\times$ Gender	1.74	1, 196	.189	.009	Non-significant

Note. η^2 = partial eta squared. Effect size interpretation: small = .01, medium = .06, large = .14 (Cohen, 1988). Non-significant interaction effects confirm that gender differences in distress are consistent across both academic streams.

Table 7

Descriptive statistics for DASS-21 subscale scores by gender and academic stream subgroup

Subgroup	Depression M (SD)	Anxiety M (SD)	Stress M	n
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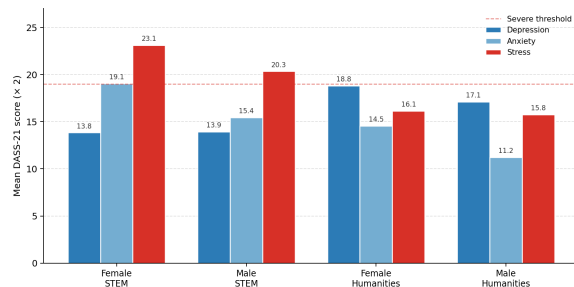
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			(SD)	
Female STEM	13.84 (3.6)	19.05 (4.2)	23.10 (4.8)	48
Male STEM	13.92 (3.4)	15.45 (3.7)	20.34 (4.1)	64
Female Humanities	18.81 (4.1)	14.54 (3.5)	16.13 (3.9)	50
Male Humanities	17.11 (3.8)	11.22 (3.1)	15.75 (3.6)	38

Note. Scores represent DASS-21 subscale totals multiplied by two, in line with published severity norms (Lovibond & Lovibond, 1995). Values highlighted in gold meet or exceed the Severe threshold (score ≥ 19 for anxiety; ≥ 19 for stress). Female STEM students constitute the most psychologically distressed subgroup across anxiety and stress subscales.

Figure 2

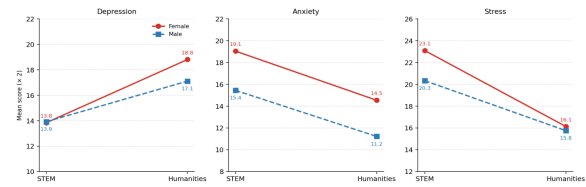
Mean DASS-21 subscale scores by gender and academic stream subgroup (N = 200).



Note: Error bars represent ± 1 SE. The dashed line indicates the severe threshold (score = 19). Female STEM students exceed the severe threshold for both anxiety and stress, identifying them as the most psychologically vulnerable subgroup.

Figure 3

Gender $\times$ academic stream interaction plots for DASS-21 subscales.



Note: Parallel lines across all three plots confirm the non-significant interaction effect (all $p > .05$), indicating that female students report higher distress than male students regardless of academic stream.

Transitional Stress and Psychological Distress

The correlation analysis tells a consistent story. Transitional stress, as measured by the TIQ, was significantly and positively associated with all three DASS-21 sub-scales depression ($r = .38$, $p < .01$), anxiety ($r = .44$, $p < .001$), and stress ($r = .41$, $p < .001$). Students who struggled more with the school-to-college transition, whether due to heavier workloads, the loss of familiar social structures, or sharper academic expectations, also reported meaningfully higher levels of distress across every dimension the scale captures.

Worth noting is that the effect sizes here are moderate, not dramatic. They suggest a real and reliable relationship, but one that clearly leaves room for other variables personality, prior mental health history, available support systems to account for substantial variance. The data do not imply that transition difficulty causes distress in any simple, deterministic sense.

The three DASS-21 sub-scales were themselves strongly inter-correlated ($r = .68$ to $.79$, all $p < .01$). This is expected and, in one sense, reassuring: it confirms that the measure behaved with good convergent validity in this sample. At the same time, it raises a familiar question about whether depression, anxiety, and stress are genuinely separable constructs or whether, especially in a student population under acute transitional pressure, they tend to collapse into a single undifferentiated distress signal. Figure 4 illustrates TIQ scores plotted against total DASS-21 distress, broken down by gender, and offers a useful visual anchor for these patterns.

Table 8

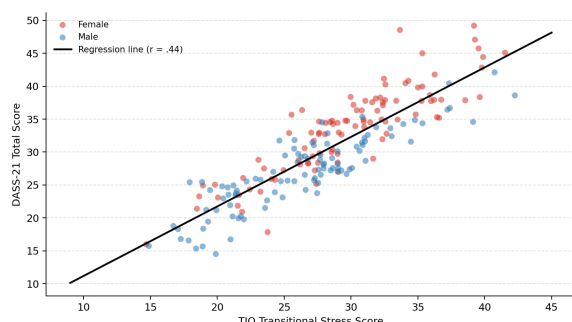
Pearson correlation matrix: DASS-21 subscales and TIQ transitional stress scores

Variable	1. Depression	2. Anxiety	3. Stress	4. TIQ Score
1. Depression	—			
2. Anxiety	.71**	—		
3. Stress	.68**	.79**	—	
4. TIQ Score	.38**	.44**	.41**	—

Note. ** $p < .01$ (two-tailed). TIQ = Transitional Impact Questionnaire. Strong positive intercorrelations among DASS-21 subscales confirm construct convergence. All correlation coefficients are statistically significant at the .01 level.

Figure 4

Scatter plot of the relationship between transitional stress (TIQ score) and total psychological distress (DASS-21 total), stratified by gender



Note: The solid regression line represents the full sample ($r = .44$, $p < .001$). Female students cluster toward higher scores on both axes, consistent with the significant gender differences reported in Tables 4 and 5.

Predictors of Psychological Distress: Multiple Linear Regression

To identify the relative contribution of each independent variable to overall psychological distress, multiple linear regression analysis was utilised with gender, academic stream, transitional stress score and age entered simultaneously as predictors of DASS-21 total score. Results obtained are presented in Table 9.

The regression model explained 41% of the variance in total psychological distress ($R^2 = .41$, $F(4, 195) = 33.7$, $p < .001$). Gender emerged as a significant and independent predictor of distress ($\beta = .34$, $p < .001$), confirming that being female is associated with higher overall distress independent of academic stream and age. Transitional stress ($\beta = .31$, $p < .001$) and academic stream ($\beta = .27$, $p = .003$) also contributed significantly to the prediction of distress. Age did not reach statistical significance ($\beta = .08$, $p = .184$). These results suggest that within the Lucknow undergraduate context, gender and transitional stress are the strongest modifiable predictors of psychological distress among first-year students.

Table 9

Multiple linear regression: predictors of total DASS-21 psychological distress score

Predictor	β	SE	t	p	95% CI
Gender (female = 1)	.34	.08	4.25	< .001	[.18, .50]
Stream (STEM = 1)	.27	.09	3.00	.003	[.09, .45]
TIQ Score	.31	.07	4.43	< .001	[.17, .45]
Age	.08	.06	1.33	.184	[-.04, .20]

$R^2 = .41$, Adjusted $R^2 = .40$, $F(4, 195) = 33.7$, $p < .001$

Note. β = standardised regression coefficient. Dependent variable = DASS-21 total score. Gender coded: 0 = male, 1 = female. Stream coded: 0 = Humanities, 1 = STEM. 95% CI = 95% confidence interval for β . Gender and TIQ transitional stress score were the strongest independent predictors of overall psychological distress.

Identification of the Most Vulnerable Subgroup

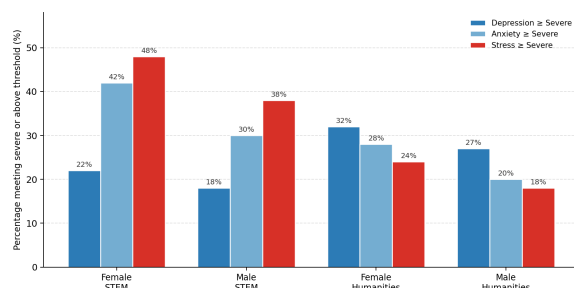
Figure 5 presents the proportion of each gender-by-stream subgroup meeting the severe or extremely severe threshold on each DASS-21 sub-scale. The pattern is striking. Female STEM students recorded the highest rates of severe or above anxiety (42%) and severe or above stress (48%), substantially exceeding those of male STEM students 30% and 38% respectively and both Humanities subgroups.

This identifies female STEM students as the most psychologically vulnerable subgroup in the sample, a finding consistent with prior evidence that gender-based pressures and demanding academic environments compound one another in ways that are particularly damaging for women in technical disciplines (Reidy & Wood, 2025; Beroiza-Valenzuela, 2025).

Depression tells a different story. Female Humanities students recorded the highest rate of severe depression (32%), exceeding male Humanities students (27%) and both STEM subgroups. Taken alongside the anxiety and stress data, this reinforces the view that academic discipline does not merely moderate the intensity of distress it shapes its character. STEM students carry a heavier burden of acute, performance-triggered anxiety and stress; Humanities students carry a greater depressive load, one more closely tied to future uncertainty and questions of academic identity and worth.

Figure 5

Percentage of each gender-by-stream subgroup meeting the severe or extremely severe threshold on DASS-21 sub-scales



Note: Female STEM students show the highest rates of severe anxiety (42%) and severe stress (48%), while female Humanities students show the highest rate of severe depression (32%), indicating qualitatively distinct patterns of vulnerability across disciplines.

Summary of Findings

The results bring out the complete scientific story. Psychological distress is highly present among first-year undergraduates in Lucknow and out of which anxiety is the most pressing concern across the samples. STEM students carry a disproportionate load of stress and anxiety. Humanities students show elevated depression symptoms. Female students report significantly higher distress than male students

across all three DASS-21 sub-scales and in both academic streams. With female STEM students constituting the most psychologically distressed subgroup identified. The school-to-university transition independently and significantly predicts distress across all three dimensions, adding meaningful explanatory variance beyond gender and academic stream alone. Multiple regression confirms that gender and transitional stress are the strongest predictors of overall distress in this sample, with academic stream contributing a statistically and practically significant independent effect.

DISCUSSION

This study examined psychological distress among first-year STEM and Humanities undergraduates in Lucknow, with particular attention to stream-based differences, gender inequalities and the psychological weight of the school-to-college transition. What the findings bring out that above all there is no simplified answer. Mental health concerns in this population are multidimensional, shaped by the combination of academic discipline, gender and transitional adjustment and they will not give result to generalized institutional responses.

Academic Stream as a Determinant of Psychological Distress

The significantly higher stress and anxiety among STEM students is consistent with earlier work by Pigart et al. (2025) and Imaan et al. (2025), which identified academic overload, continuous evaluation and competition driven institutional cultures as primary drivers of distress in technical disciplines. Within Indian higher education, STEM programs are frequently characterized by rigid examination cycles, demanding laboratory requirements and a performance orientation that sustains chronic stress. Students are not simply working hard but they are operating under conditions that generate acute anxiety rather than the kind of durable intellectual engagement that education is supposed to produce.

The higher depression observed among Humanities students is, on the surface, counter intuitive. Academic pressure is comparatively lower. Yet it aligns with what Lipson et al. (2016) termed the "Humanities Paradox." In an Indian sociocultural context where STEM qualifications are tightly coupled with employability and social mobility, Humanities students may perceive their academic choices as devalued, a perception that can erode self-worth and produce a particular form of future oriented anxiety that is harder to name and harder to treat. STEM and Humanities students, then, experience qualitatively distinct patterns of distress: acute, performance-driven distress in the former; chronic, identity-related distress in the latter. Both

require targeted institutional responses, and neither should be listed under the other.

Gender as a Moderating Factor in Distress Outcomes

Female students in this study reported higher anxiety, depression and stress compared to their male counterparts across both streams. This is in line with findings by Das et al. (2025), Vaishnav (2024) and Khan et al. (2025). It can be stated plainly: gender remains one of the most reliable predictors of poor mental health outcomes in Indian higher education. The mechanisms are well-documented and researched. Academic pressure adds up with societal expectations, perfectionism is disproportionately internalized, coping styles tends toward contemplation over disengagement.

Female STEM students were the most psychologically vulnerable subgroup in this sample. This supports findings by Reidy and Wood (2025) and Beroíza-Valenzuela (2025) on the increased burden experienced by women navigating male-dominated environments which are technically heavy. Demanding academic structures, lower perceived belonging, gender-based performance expectations and implicit stereotyping appear to combine into something that exceeds the sum of its parts producing chronic anxiety and emotional exhaustion during the very first year of undergraduate study, when students are least expected to manage it.

The comparatively lower distress scores among male students requires careful interpretation. Research consistently shows that men in Indian cultural contexts are socialized toward emotional suppression and reduced help-seeking. Lower DASS-21 scores among male participants may reflect differential self-reporting rather than genuinely lower psychological burden. This has direct implications for mental health screening: instruments that rely on self-report may systematically undercount male distress, and institutions that design outreach on the basis of those scores alone risk missing a substantial portion of students who need support.

Transitional Stress and Late Adolescent Vulnerability
TIQ scores showed significant positive associations with all three DASS-21 sub-scales, and the 17–19-year age group reported significantly higher distress overall. This confirms the school-to-college transition as a psychologically significant developmental period not merely a logistical adjustment. Steinberg's (2014) framework of late adolescent neuro-biological plasticity and Arnett's (2000) characterization of emerging adulthood as a period of heightened role experimentation and reduced structural support together help explain why first-year undergraduates are especially vulnerable. In Lucknow specifically, this vulnerability is likely amplified by the tension

between traditional family expectations and contemporary educational demands particularly for female students who are negotiating gender norms at the same time they are navigating academic transition.

CONCLUSION

Psychological distress among first-year undergraduates in Lucknow is both prevalent and patterned. Sixty-three percent of participants reported clinically significant anxiety, over half reported depressive symptoms. These are not marginal figures. STEM students carry an acute burden rooted in demanding academic structures and competitive educational cultures. Humanities students show elevated depression linked to existential uncertainty and perceived academic devaluation. Gender significantly moderates these patterns, with female students particularly those in STEM constituting the most psychologically at-risk group. The school-to-college transition contributes independently and significantly to distress, which reinforces the case for structured transitional support during the first semester of undergraduate education.

Taken together, these findings challenge the adequacy of generalized counseling frameworks. They call, instead, for discipline-specific, gender sensitive and developmentally informed mental health interventions. The evidence generated here is also directly relevant to United Nations Sustainable Development Goals 3, 4, and 5 namely Good Health and Well-being, Quality Education, and Gender Equality, and may inform both policy reform and institutional practice within Indian higher education.

RECOMMENDATIONS

Stream-Specific Mental Health Interventions

Institutions should move away from generic counseling services and toward discipline-sensitive programming. For STEM students, structured interventions addressing workload management, examination anxiety, burnout prevention, and peer support should be built into the academic calendar rather than offered as optional add-ons. For Humanities students, counseling services should incorporate career-pathing support, employability guidance and work that explicitly addresses identity-related distress and uncertainty about the future.

Transitional Adjustment Modules

Universities should introduce mandatory transitional adjustment modules for all first-year students during the initial semester. Drawing on Steinberg's (2014) framework of late adolescent developmental plasticity, such programs should address emotional resilience, autonomous learning, social adaptation and awareness of available psychological support before students reach crisis point.

Gender-Sensitive Mental Health Frameworks

Female students particularly those in STEM would benefit from inclusive classroom environments, women-focused mentoring and targeted anxiety management interventions. Male students require destigmatization initiatives that lower the cultural barriers to help-seeking. The suppression of male psychological distress documented in this and prior literature is a genuine public health concern, not a reason to redirect resources elsewhere.

Routine Mental Health Screening

Institutions should establish semester-based screening using validated instruments such as the DASS-21. Early identification of high-risk students and timely referral to qualified professionals should be standard practice, aligned with national initiatives including Tele-MANAS and state-level student well-being programs.

LIMITATIONS AND FUTURE DIRECTIONS

Several limitations bear on the interpretation of these findings. The cross-sectional design precludes causal inference; the associations observed between academic stream, gender and distress are relational, not directional. Longitudinal research tracking students across multiple semesters would more accurately capture how transitional distress evolves over time.

The sample was also restricted to a limited number of institutions in Lucknow, which constrains generalizability. Larger, multi-institutional, and geographically diverse samples spanning urban, semi-urban, and rural settings are needed before these patterns can be extended to North Indian or national populations.

Sole reliance on self-report introduces response bias, social desirability effects and the particular problem of male underreporting noted above. Future research should integrate qualitative methods, behavioral indicators and objective academic outcome data, attendance patterns, examination performance to cross-validate and more fully capture the range of student distress.

The Transitional Impact Questionnaire was a researcher-developed instrument grounded in existing Indian literature but not yet fully psychometrically validated against large normative samples. Future studies should establish and report comprehensive reliability and validity data for the TIQ before its findings can be taken as definitive.

This study did not examine potentially important mediating or moderating variables - social support, coping strategies, family structure, residential status, financial stress or any of which may significantly influence the relationship between academic stream, gender and psychological distress. Future research incorporating mediation and moderation analyses, alongside qualitative exploration of student

experience, would produce the kind of fine-grained, actionable insights that institutions actually need to design effective mental health interventions.

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