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# Prospecting Risk factors for Anxiety and Depression among University Students : A Delhi based Cross-Sectional Study

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## Abstract

Recent studies on trends in depression and anxiety have led to raised concern regarding overall health status of college students during this crucial period of transition into adulthood which can potentially adversely affect their social and academic development. The present study aims to examine the association of various socio-demographic factors along with different forms of social and physical activities with prevalence of depression and anxiety among college students. The prevalence of depression and anxiety was found to be 33.3% and 32.4% respectively among the study participants. It was found that depression was lower among those who shared a close bond with their parents and siblings. Girls were found to be at significantly higher risk of depression (1.86; 95% C.I. (1.16-2.97)) compared to boys. Students involved in active yoga showed lower depressive and anxiety disorders. The study identified being overweight and obese, along with an increasing consumption of social media (which promoted fad diets, comparisons etc.), as some of the major risk factors for mental disorders.

**Key Words:** College students; BMI; Depression; Anxiety; Social Media; Yoga

## Introduction

Various national and international studies have shown an alarmingly increased prevalence of anxiety, stress and depression among youth worldwide, causing a serious public health concern (Mathers & Loncar, 2006). In India 197.3 million people suffer from mental disorders, comprising 14.3% of the population in 2017. The main contributors of mental disorder were found to be depression (34%) and anxiety disorder (19%) (Sagar et al., 2019). It also found that one among every seven people had a mental disorder in India and this proportion doubled during the period from 1990 to 2017. Both depression and anxiety are emotional responses leading to change

in thinking and behaviour, social withdrawal, affecting relationship with others, lack of interest and concentration, change in eating and sleeping pattern and even sometimes pushing recurrent thoughts of suicide.

College is a time of tremendous change in an adolescent's life exposing them to stress at various levels. Further social and biological changes during the post-pubertal phase may lead to depression indirectly. During college, students move toward independence, and they sometimes struggle to find a balance between physical and mental health. Confluence of factors such as pandemic, influence of social media, academic pressure, financial burden, lack of leisure time, handling or establishing new personal relationships, competition and poor coping skills may become causes of psychological distress and thereby impact their mental wellbeing.

Worldwide, staggering 12–50% college students suffer from at least one or more mental disorders. Many studies conducted on college students have identified a moderate to high prevalence of depression, anxiety and stress in this population globally.

In India, mental health problems are highly prevalent in children and adolescents (Grover S. et al., 2019). Also, several studies have been conducted to understand anxiety and stress levels of students pursuing professional courses (Kumari et al., 2019; Nezam, S. et al., 2020). Previous studies have reported a high prevalence of anxiety and depression in this population (Singh M. et al., 2017; Shah et al., 2020) but they have not considered related academic, social and demographic factors. Even though there is a high prevalence of stress and anxiety, in India, there is a lack of availability of Institutional counsellors or psychologists, which makes individuals more vulnerable. Also, there is a hesitation to visit professionals even when in need. More awareness and openness may prevent further complications like severe depression and suicide. Based on the above, we aim to determine the prevalence of anxiety, depression and their associated factors in a sample of Delhi college students

## Material and Methods

The study population consisted of 442 students, majorly in the age group 18-22, from a wide range of disciplines, backgrounds and all academic years. Google forms , both in English and Hindi, were circulated over a period of three months from July 2020 to September 2020 over online platforms. The study questionnaire was approved by the Institutional Research Committee and a formal consent was taken from each participant at the beginning to conduct the study.

### Data Collection/ Survey

Survey questionnaire consisted of demographic questions, a section associated with daily life activities of subjects and subsequent sections were related to various standardized psychological questionnaires to determine levels of anxiety, stress and depression. Self-reported height and weight information was also collected to determine the BMI (Body Mass Index) of all the study participants. Data can be assessed at https://github.com/swastika-rla/rla-mentalhealthproject.

### Generalized Anxiety Disorder Questionnaire-7 (GAD 7)

The GAD 7 questionnaire was used to assess the participant's anxiety and health status over the last two weeks. The questionnaire consisted of seven items enquiring about the number of times a person has felt anxious, worried, on the edge, not being able to relax, restless, annoyed, irritable, paranoid etc. in the past 2 weeks . The questions have to be answered by selecting the most close response on the frequency of feeling a particular emotion. These categories were assigned scores with 0 being assigned for 'not at all' and 3 being assigned to 'nearly every day'.

The total score of the seven items ranges from 0-21. Accordingly the degree of anxiety can be determined with 0-5 score indicating mild, 6-10 indicating moderate, 11-15 indicating moderately severe and 15-21 indicating severe anxiety (Spitzer et al., 2004).

### Patient Health Questionnaire-9 (PHQ-9)

The PHQ-9 is a self-administered, low-cost diagnostic screening tool that can be used to assess and monitor severity of depression in adults. It is based on criteria prescribed in the fourth edition and carried over in the fifth edition of the Diagnostic and Statistical Manual of Mental disorders (DSM-4 & 5). The questions asked include the respondent's level of energy, status of appetite, amount of sleep, feeling depressed or hopeless, concentration level, pleasure they find in doing tasks and thoughts of self-harm which may have been experienced in the last 2 weeks. The questions have to be answered by selecting the most appropriate response on the frequency of feeling a particular emotion. These categories were assigned scores with 0 being assigned for 'not at all' and 3 being assigned to 'nearly every day'.

The range of the total score obtained can be 0-27. The scores are categorised for interpretation of results and determining the level of depression. 0-4 is minimal depression category, 5-9 is mild depression category, 10-14 is moderate depression category, 15-19 is moderately severe category and 20-27 is severe depression category ( Kroenke et al., 2001).

### Height and weight for BMI calculation

Body Mass Index (BMI) was determined through participants' self-reports of height and weight. It was of good reliability between college students' self-reported and measured height and weight. Self-reports are acceptable to calculate BMI in survey research on college students. Participants were categorised based on their BMI into three groups using the WHO cut-offs for BMI. Participants with BMI less than 18.5 $kg/m^2$ were categorised as underweight, those between 18.5-24.9 $kg/m^2$ were considered to be in the normal range, those with BMI 25.0-29.9 $kg/m^2$ were categorised as overweight and those with BMI 30.0 $kg/m^2$ were categorised as obese. Here, we combined the groups overweight and obese since very few individuals were present in the overweight category (Quick et al., 2015).

## Data Analysis

The final study data comprised of 442 participants with information on age, sex, time spent on social media and involvement and frequency of various physical activities. Association between depression and anxiety and other variables were determined using the chi-square test. A binary logistic regression analysis was performed with depression and anxiety as dependent variables and demographic factors namely age, sex, BMI; social factors such as time spent on social media, time spent doing exercise, doing yoga, playing any sport and academic performance being considered as independent variables. Imputation on missing values of covariates was done by replacing it with the median value. The entries where less than 50% of the questionnaire was answered were removed from the analysis. Odds ratios (OR) were reported as the effect measure along with 95% confidence intervals for the analysis. All the statistical analysis was done using the SPSS (v20) package.

## Results

As per the demographic profile of survey population, majority (80%) of sample consisted of individuals in the age group 18-20 years. The bulk of the sample (71%) belonged to the normal BMI category. A large number of students (61.8%) were active on social media for more than 2 hours in a day. A significant number of participants (65.2%) were exercising between 1-3 hours in a week whereas only few participants (12.9% ) were doing yoga for more than 2 hours in a week. Most of the students (53%) were playing one sport or other.

Students who reported spending time with their parents (26%) and siblings (28%) indicated to show less symptoms of depression however nearly half of them had anxiety. Of those involved in online gaming and spending time watching television shows and movies showed depression (33%) and over half of them showed signs of suffering from anxiety. Depression was also observed to be among those who spent time on personal development ( 28%-31%) while anxiety was again observed to be present in more than half

of these individuals. Among those involved in physical activities (22%) and those with a structured daily routine (21%) were having less depression and also less anxiety level (45%, 40%). In times of uncertainty peers and friends were found to be the greatest support to students, very few reported taking professional help (**Table 1**).

Table 1: Mental health and activities and the respondents involvement in various recreational activities.

| Individual characteristics | **Depression** | | **Anxiety** | | **Total** | |
|---|---|---|---|---|---|---|
| | **Frequency** | **Percentage (%)** | **Frequency** | **Percentage (%)** | **Frequency** | **Percentage (%)** |
| Activities undertaken for recreation | | | | | | |
| Spending time with siblings | 57 | 28.22 | 99 | 49.01 | 202 | 45.70 |
| Spending time with parents | 73 | 26.26 | 133 | 47.84 | 278 | 62.90 |
| Connecting with friends/ relatives online | 48 | 30.38 | 77 | 48.73 | 158 | 35.75 |
| Gaming and online sports | 45 | 33.33 | 70 | 51.9 | 135 | 30.54 |
| Watching movies or TV shows | 101 | 32.58 | 168 | 52.4 | 310 | 70.14 |
| Pursuing online courses for personal development | 50 | 28.25 | 86 | 48.6 | 177 | 40.04 |
| Picking up a new hobby | 40 | 29.85 | 69 | 51.49 | 134 | 30.32 |
| Reading | 58 | 31.18 | 99 | 53.23 | 186 | 42.08 |
| Creative pursuits (sketching, painting, music, cooking, etc.) | 81 | 34.46 | 140 | 59.57 | 235 | 53.17 |
| Physical activity | 37 | 21.76 | 76 | 44.71 | 170 | 38.46 |
| A structured, daily routine | 22 | 21.36 | 41 | 39.81 | 103 | 23.30 |
| People/sources reached out to when overwhelmed with uncertainty | | | | | | |
| Professional counsellor | 3 | 42.86 | 5 | 71.43 | 7 | 1.58 |
| Online support groups | 8 | 53.33 | 12 | 80.00 | 15 | 3.39 |
| Teachers | 9 | 32.14 | 17 | 60.71 | 28 | 6.33 |
| Parents | 50 | 47.17 | 94 | 88.68 | 106 | 23.98 |
| Siblings | 31 | 24.03 | 55 | 42.64 | 129 | 29.19 |
| Peers and friends | 117 | 35.35 | 191 | 57.70 | 331 | 74.89 |

Bivariate analysis for association of various socio-demographic characteristics with depression indicates strong positive correlation of gender with depression (**Table 2**). Females are indicated to be more likely to be suffering from depression compared to males. Significantly higher depression was observed among those with normal and overweight BMI status compared to those who were underweight.

Students active on social media for more than 3 hours were more likely to have depression compared to those who did not spend time on social media. Whereas students who are practicing yoga or playing sports for more than 4 hours were found to be having negative association with depression upon adjustment.

Table 2: Bivariate association of socio-demographic variables and Depression among college students.

| Characteristics | OR | 95% C.I. | AOR | 95% C.I. |
|---|---|---|---|---|
| Gender [a, f] | | | | |
| Male® | | | | |
| Female | 1.839*** | [1.232 - 2.746] | 1.860*** | [1.163 - 2.974] |
| Age Group [c] | | | | |
| Below 18 years® | | | | |
| 18-20 years | 1.217 | [0.702 - 2.112] | 1.310 | [0.713 - 2.405] |
| 21 years and above | 0.666 | [0.329 - 1.348] | 0.695 | [0.321 - 1.505] |
| BMI Status [c, e] | | | | |
| Underweight® | | | | |
| Normal | 1.819* | [0.898 - 3.686] | 2.269** | [1.079 - 4.768] |
| Overweight | 2.844** | [1.250 - 6.475] | 3.503*** | [1.455 - 8.435] |
| Obese | 2.982 | [0.683 - 13.016] | 2.803 | [0.544 - 14.432] |
| Hours spent on social media in a day [a, d] | | | | |
| None® | | | | |
| 1-2 hours | 1.064 | [0.521 - 2.170] | 1.419 | [0.663 - 3.036] |
| 2-3 hours | 1.544 | [0.801 - 2.977] | 2.097** | [1.026 - 4.290] |
| More than 3 hours | 2.621*** | [1.388 - 4.951] | 3.297*** | [1.653 - 6.577] |
| Hours spent exercising in a week [e] | | | | |
| None® | | | | |
| 1-3 hours | 0.819 | [0.498 - 1.347] | 0.972 | [0.560 - 1.686] |
| 4-6 hours | 0.808 | [0.448 - 1.457] | 1.105 | [0.559 - 2.185] |
| More than 6 hours | 0.379** | [0.170 - 0.840] | 0.724 | [0.277 - 1.890] |
| Hours spent doing yoga in a week [a] | | | | |
| None® | | | | |
| 1-2 hours | 0.528*** | [0.339 - 0.822] | 0.449*** | [0.258 - 0.782] |
| 2-3 hours | 0.262** | [0.088 - 0.785] | 0.242** | [0.076 - 0.775) |
| 3-4 hours | 0.524 | [0.162 - 1.696] | 0.318* | [0.085 - 1.195] |
| More than 4 hours | 0.333* | [0.092 - 1.200] | 0.326 | [0.077 - 1.382] |

| | | | | |
|---|---|---|---|---|
| Hours spent playing Sports in a week [a, e] | | | | |
| None® | | | | |
| 1-2 hours | 0.923 | [0.582 - 1.464] | 1.275 | [0.718 - 2.262] |
| 2-3 hours | 0.565 | [0.276 - 1.154] | 0.647 | [0.292 - 1.431] |
| 3-4 hours | 0.364** | [0.132 - 0.999] | 0.755 | [0.250 - 2.274] |
| More than 4 hours | 0.242*** | [0.091 - 0.647] | 0.355* | [0.115 - 1.098] |
| CGPA [c, f] | 0.978 | [0.822 - 1.164] | 0.961 | [0.788 - 1.172] |
| Note: * p-value<0.10; ** p-value<0.05; *** p-value<0.001; [a-c] Significant at 1%, 5% and 10% level respectively ($\chi^2$ value) for depression; [d-f] Significant at 1%, 5% and 10% level respectively ($\chi^2$ value) for anxiety. ® Reference Category | | | | |

Anxiety was also observed to have a similar relationship with various socio-demographic factors as depression, although no significant association was observed between anxiety and depression (**Table 3**). Anxiety showed a positive association with BMI status of the study participants and involvement in activities such as exercise, sports and yoga were found to be negatively associated. Academic performance of students was found to have an inverse relationship with depression and anxiety although the association did not come out to be significant.

| Table 3: Bivariate association of socio-demographic variables and Anxiety among students. | | | | |
|---|---|---|---|---|
| Characteristics | OR | 95% C. I. | AOR | 95% C. I. |
| Gender | | | | |
| Male® | | | | |
| Female | 1.438* | [0.964 - 2.146] | 1.258 | [0.796 - 1.989] |
| Age | | | | |
| Below 18® | | | | |
| 18-20 | 1.152 | [0.654 - 2.027] | 1.174 | [0.633 - 2.177] |
| 21 and above | 1.349 | [0.686 - 2.653] | 1.401 | [0.668 – 2.935] |
| BMI Status | | | | |
| Underweight® | | | | |
| Normal | 1.906* | [0.918 - 3.953] | 2.340** | [1.094 - 5.006] |
| Overweight | 3.405*** | [1.469 - 7.897] | 4.351*** | [1.786 - 10.599] |
| Obese | 5.250** | [1.190 - 23.171] | 5.463** | [1.063 - 28.074] |
| Hours spent on social media in a day | | | | |
| 0-1 hours® | | | | |
| 1-2 hours | 1.644 | [0.759 - 3.559] | 1.841 | [0.820 - 4.131] |
| 2-3 hours | 2.927*** | [1.432 - 5.982] | 3.083*** | [1.449 - 6.560] |
| More than 3 hours | 3.512*** | [1.738 - 7.097] | 3.716*** | [1.775 - 7.780] |
| Hours spent exercising in a week | | | | |
| Never® | | | | |
| 1-3 hours | 1.111 | [0.668 - 1.847] | 1.196 | [0.686 - 2.087] |
| 4-6 hours | 1.153 | [0.635 - 2.090] | 1.218 | [0.616 - 2.407] |
| More than 6 hours | 0.375** | [0.158 - 0.886) | 0.581 | [0.217 - 1.556] |

| | | | | |
|---|---|---|---|---|
| Hours spent practicing yoga in a week | | | | |
| 0-1 hours® | | | | |
| 1-2 hours | 0.782 | [0.502 - 1.218) | 0.729 | [0.423 - 1.257] |
| 2-3 hours | 1.025 | [0.437 - 2.405) | 1.023 | [0.402 - 2.601] |
| 3-4 hours | 1.695 | [0.593 - 4.843] | 1.430 | [0.431 - 4.752] |
| More than 4 hours | 0.646 | [0.202 - 2.067] | 0.769 | [0.207 - 2.854] |
| Hours spent playing sports in a week | | | | |
| Never® | | | | |
| 1-2 hours | 1.009 | [0.633 - 1.606] | 1.050 | [0.597 - 1.846] |
| 2-3 hours | 0.876 | [0.444 - 1.727] | 0.816 | [0.391 - 1.703] |
| 3-4 hours | 0.517 | [0.200 - 1.339] | 0.697 | [0.244 - 1.997] |
| More than 4 hours | 0.213*** | [0.073 - 0.624] | 0.269** | [0.082 - 0.880] |
| CGPA | 0.926 | [0.778 - 1.102] | 0.900 | [0.739 - 1.095] |
| Note: * p-value<0.10; ** p-value<0.05; *** p-value<0.001,® Reference Category | | | | |

## Discussion

The present study identifies a significantly high prevalence of depression (33.3%) and anxiety (32.4%) among college students. Even though measures of depression and anxiety using the PHQ-9 and GAD-7 questionnaire without medical supervision cannot be treated as a clinical diagnosis, it can however be considered a useful tool to measure the prevalence of symptoms of depression and anxiety in the target population. Globally, there exists a wide level of variations in the reported level of depression ranging from 10%--80%, previous studies reported an average prevalence of depression to be about 30.5% worldwide (Ramón-Arbués et al., 2020). The variations may be explained by differences in the type of screening tools selected, inclusion criteria of different studies and the presence of confounding factors that can potentially affect the participant's subjective perception and expression of psychological discomfort. A review of studies on depression among children and adolescents in India indicated that the point prevalence of depression ranged from 1.2% to 21% in clinic-based studies; 3% - 68% in school based studies and 0.1% to 6.94% in community based studies (Grover et al., 2019) . The Lancet report on global burden of diseases 2017 stated that the proportional contribution of mental disorders to the total disease burden in India almost doubled from 1990 to 2017; about 197.3 million (95% C.I. 178.5–216.4) people were suffering from mental disorders in 2017, comprising approximately 14.3% of the total population of the country. The highest contribution to DALYs for mental disorders was attributed to depressive and anxiety disorders (Sagar et al., 2019).

The present study shows that females are more likely to show signs of depression compared to males. Previous studies on the difference in prevalence of depression by gender have shown mixed results. Past studies conducted in Bangladesh (Islam et al., 2020), India (Kumari et al., 2019; Raja et al., 2020), Malaysia (Shamsuddin et al., 2013), Turkey (Bayram & Bilgel, 2008), Australia (Lovell et al., 2015), Saudi Arabia (Kulsoom & Afsar, 2015) and USA (Beiter et al., 2015) reported no significant difference in levels of depression and anxiety. However, contrasting studies have reported the prevalence of depression among girls compared to boys approaching an adult ratio of about 2:1 in late adolescence (Raja et al., 2020). Prospective longitudinal studies on depressive symptoms from pre-adolescence to young adulthood among girls and boys indicated that the greatest gender difference in prevalence of depression was observed in 15-18 age groups indicating that

depression could be linked to hormonal changes that occur in females during the onset of puberty (Hankin et al., 1998; Raja et al., 2020).

Body mass index was found to be positively associated with the prevalence of depression as well as anxiety. The current study adds to the growing evidence base that BMI is associated with an individual's mental health status. Previous studies have provided evidence consistent with our present research that overweight and obesity are associated with an increased risk of depression and anxiety among individuals (Zhao et al., 2009). However, the results were inconsistent in case of individuals with underweight BMI status. Most studies in the past have pointed out depression to be higher among those who were underweight compared to those with normal BMI status. In consistency to our research another study on depression and anxiety found no U shaped association of BMI with depressive and anxiety symptoms, even though higher risk of mental disorder was observed in individuals who were overweight or obese (Herhaus et al., 2020).

Participants spending more time on social media were found to be at higher risk of suffering from depression and anxiety. This is consistent with evidences from past studies that excessive involvement in social media can lead to increased risk of depression and anxiety among individuals (Islam et al., 2020; Liu et al., 2019). A systematic review of literature on the relationship between social media use and mental health problems such as depression and anxiety indicated that activities such as repeated checking of messages, personal investment, and addictive and problematic use of social media were the major risk factor of mental disorders (Keles et al., 2020). Studies also suggest that the excessive use of social media can lead to displacement of activities which can potentially obstruct normal emotional and cognitive development such as active and productive activities and sleep which in turn can become a significant risk factor for mental disorder (Liu et al., 2019).

In the past studies have hinted at academic performance being associated with depression among college students however the present study did not find any conclusive evidence to support the claim.

While likelihood of depression was observed to decrease with improved academic performance the relationship did not come out to be significant. Further studies in this direction would likely shed better light on the role of academic performance in mental disorders among university students.

Previous studies have indicated physical activities to be a protective factor against mental disorders. Although the present study indicates an inverse relationship between physical activities and mental disorders the results are not directed to be significant. However, involvement in yoga comes out as a protective factor against depression among college students. A review of past literature of the effectiveness of yoga as a protective factor against depressive and anxiety symptoms showed that regardless of the population heterogeneity, duration of practice and style of yoga positive results were demonstrated by majority of the studies in helping reduce the level of depression and anxiety among the participants (Nanthakumar, 2020).

Additionally, it was also observed that prevalence of depression was lower among those participants who were close to their parents and siblings indicating family relationship as one of the important factors that affect depression among college students. This supports claims from previous studies that family relationships also have a significant impact on an adolescent's mental health.

The study suggests a need for implementation of targeted measures to help college students deal with depressive and anxiety disorders. The university and health care professionals' attention should be drawn to the needs of this vulnerable group so that timely help can be provided to the students. As a preventive measure periodic awareness camps and workshops should also be arranged at college or university level to raise awareness on the importance of mental health among the students. They should be provided with information on the detrimental effect of increased involvement in social media and be encouraged to focus on healthy habits such as yoga and physical exercise. Institutions should also facilitate the adoption of healthy lifestyle habits that can provide protection from development of mental disorders among these young adults.

## Conclusion

The present study provides an estimate of the point prevalence of depressive and anxiety symptoms among college students. It identifies girls being at a higher risk of depression compared to boys. It also identifies time spent on social media and overweight/ obesity as major risk factors for depressive and anxiety symptoms among young adults. The study indicates positive family relationships and involvement in yoga as protective factors against mental disorders like depression and points towards a need for university and college level involvement towards increasing awareness on mental disorders and facilitating the involvement of college students in health promoting activities.

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## Declaration of conflicting Interest

The Author(s) declare(s) that there is no conflict of interest.

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