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Prevalence of depression among young adults: Evidence from a cross-sectional study in a college in peri-urban South India

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Abstract

Introduction: Half of all depression begins in the teenage years and goes undetected in early adulthood. This study aimed to estimate the prevalence of depression among college-going young adults in a peri-urban area near Bangalore city and determine the associated factors.

Materials and Methods: This cross-sectional study was conducted from October to December 2018, among 806 students aged ≥ 18 years in a college in peri-urban Bangalore. Screening for depression conducted using Patient Health Questionnaire-9, with a questionnaire to assess risk factors for depression under six domains: i) socio-demographic factors, ii) family factors, iii) academic factors, iv) relationship factors, v) self-image, and vi) substance abuse. The data analyzed through Chi-square test, and Adjusted Odds Ratios generated by logistic regression analysis.

Results: Depression among young adults was 31.1% (18.9% moderate depression, 9.2% moderately severe, and 3.1% severe depression). Only 10% of those with depression sought help, none consulted a psychiatrist. Depression was significantly associated with female gender [OR=1.9(1.3-2.7), $P=0.001$], living in joint families [OR=1.9(1.1-3.2), $P=0.023$], residing in city [OR=1.6(1.2-2.3), $P=0.006$], feeling parents were too strict [OR=2.1(1.3-3.2), $P=0.001$], conflicts with family [OR=1.5(1.1-2.2), $P=0.039$] or friends/classmates [OR=1.5(1.1-2.2), $P=0.043$], family history of mental illness [OR=4.5(1.7-11.5), $P=0.002$], partner abuse [OR=2.0(1.2-3.1), $P=0.005$], and feeling lack of material possessions [OR=1.6(1.1-2.3), $P=0.018$].

Conclusion: Nearly one-third of college-going young adults in our study had depression, with family and relationship stressors linked to depression. Our findings reveal a need for awareness generation among college-going young adults, focusing on seeking care for depressive symptoms, de-stigmatization, and strengthening mental health services.

Keywords: Depression, Prevalence, Patient Health Questionnaire, Young adults

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Introduction

Depression is characterized by persistent sadness and loss of interest in activities one normally enjoys for at least two weeks (1). Other symptoms of depression change in sleep and appetite, inability to carry out daily activities, reduced concentration, lack of energy, anxiety, restlessness, feelings of hopelessness, worthlessness, guilt, and thoughts of self-harm (2). Globally, more than 264 million people suffer from depression (3), with depression being ranked as the number one contributor to global disability (4). Depression is a major public health problem in India, with one in every 20 Indians suffering from depression (5). Young adults are those aged 18-25 years (6) and comprise over 10% of India population (7). In India, 79.8% of young adults are enrolled in the undergraduate level program (8). The prevalence of depression among college-going young adults in India is 57.5% (9). The second leading cause of death among young adults is a suicide, and depression is one of the strongest predictors for suicide (10). It is reported that half of all mental illness begins during the teen years but goes undetected, untreated, and unreported (11).

There are known risk factors for depression like family history, hormonal imbalances, female gender, childhood abuse, chronic diseases, substance use (12,13). In addition, there are also factors like poor academic performance, stressful home environment, excessive screen time use, and overweight/obesity, which may lead to depression or may occur as a result of depression (14-16).

While these factors have been studied to some extent among adolescents, there is a paucity of data linking depression among college-going young adults to lifestyle and behavioral factors, family stressors, scholastic performance, participation in extra-curricular activities, interpersonal relationships, and body image. To fill the gaps in the existing body of knowledge regarding depression among college-going young adults in the Indian context, this study was conducted to estimate the prevalence of depression among college-going young adults in a peri-urban area near Bangalore city and determine associated factors. The findings of this study may be useful to formulate specific targeted interventions to diagnose and manage depression

early. Recognition of key factors would help in referral and early diagnosis of depression, one of the important strategies to address this public health issue.

Materials and Methods

This research employed a cross-sectional study design conducted at a general degree college located around 20 kms from Bangalore city, from October to December 2018. Around 900 students were enrolled in the college to pursue undergraduate degree courses like Bachelor of Science (BSc), Arts (BA), Commerce (BCom), Computer Applications (BCA), Business Administration (BBA), and Business Management (BBM).

All adult students aged 18 years and above who were enrolled in an undergraduate course at the college were included in the study. Those who were absent on the days of a visit by the researchers were excluded.

Institutional Ethics Committee approval was obtained before the commencement of the study (IEC#151/2018) and permission from the college authorities. All the study participants gave written informed consent. Participants scoring 5-9 on PHQ-9 were referred to the college counselor, while those scoring ≥ 10 on PHQ-9 were referred to a psychiatrist for further evaluation and management.

The sample size was estimated regarding a study among medical college students in Mysore, Karnataka, where the prevalence of depression was 37.3% (17). With a 10% relative precision and assuming 95% confidence limits, the sample size required for our study was estimated to be 654. However, on request of the college authorities to include all students, using universal sampling technique, all the students present on the days of a visit by the researchers were invited to participate in the study.

Research instruments

A) A pre-tested, self-administered questionnaire: It included socio-demographic details along with 43 questions to assess factors associated with depression. We used Modified BG Prasad socioeconomic classification to determine the socio-economic class of the study subjects (18). The questions were selected after an extensive review of available literature and face-validated

by two experts in psychiatry. Risk factors for depression were listed under six domains: i) Socio-demographic factors, ii) Family factors, iii) Academic factors, iv) Relationship factors, v) Self-image, and vi) Substance abuse.

B) Patient Health Questionnaire-9: This screening tool scores each of the nine DSM-IV criteria as '0' (not at all) to '3' (nearly every day). PHQ-9 scores represent no depression (0-4), mild depression (5-9), moderate (10-14), moderately severe (15-19), and severe depression (≥ 20) (19). We decided to use PHQ-9 based on its attributes of being short and having a diagnostic cut-off to aid referrals for further evaluation and management. In addition, the PHQ-9 is reliable and valid as a screening tool to determine the presence and severity of depression. (20) At a cut-off score of ≥ 10 , PHQ-9 has been found to have 88% sensitivity and 88% specificity when screening for major depression (19). The outcome variable in this study was depression. This was determined using a PHQ-9 cut-off score of ≥ 10 .

IBM SPSS Statistics for Windows, version 21 (IBM Corp., Armonk, N.Y., USA) was used to analyze data. Frequencies, proportion, mean and standard deviation, median and interquartile range were used to describe the various study variables. Depression was associated with various independent co-variates using the Chi-square test. After multiple logistic regression analyses, adjusted odds ratios with 95% confidence intervals were calculated. A P-value of less than 0.05 was considered statistically significant for all analyses.

Results

A total of 806 young adults participated in the study. The mean age of the participants was 19.51 + 1.33 years (Range: 18-25 years). There was a nearly equal proportion of males (49.6%) and females (50.4%). While 41.7% resided in cities, the rest hailed from villages and small towns. None were married. Most (88.6%) came from nuclear families, with a median number of family members being 4 (IQR= 4,5) and the median number of formal years of education among parents being 10 (IQR= 7,12). Most fathers were gainfully employed, with 43.4% salaried and 43.4% self-employed, while mothers were mostly housewives (70%).

Nearly one-third (31.1%) of the college-going young adults in our study were found to be depressed after screening with PHQ-9 (out of which, 60.7% had moderate depression, 29.5% moderately severe, and 9.8% severe depression). A further one-third (32.8%) screened positive for mild depression, while 36% of the subjects had no depressive symptoms.

Only 25(10%) of those with depression had sought help or advice from the college counselor. None of the students reported having consulted a psychiatrist.

Depression was significantly associated with female gender ($P= 0.041$) and residing in the city ($P= 0.019$). No association was found between depression and age, type of family, parents' occupation, socio-economic class, or staying at the hostel (Table 1).

Table 1. Association of depression with socio-demographic variables

Factor		Depression		P*
		Present 251 (31.2%)	Absent 554 (68.8%)	
Gender	Male	111 (27.8)	288 (72.2)	0.041
	Female	140 (34.5)	266 (65.5)	
Age	18 - 20 years	127 (29.1)	171 (39.2)	0.172
	21 - 25 years	124 (33.6)	245 (66.4)	
Residence	Village/town	131 (27.9)	338 (72.1)	0.019
	City	120 (35.7)	216 (64.3)	
Type of family	Nuclear	215 (30.2)	498 (69.8)	0.080
	Joint	36 (39.1)	56 (60.9)	
Socio-economic class	Upper/ upper middle	167 (30.3)	385 (69.7)	0.696
	Middle	52 (33.5)	103 (66.5)	
	Lower/ lower middle	32 (32.7)	66 (66.3)	

*Chi-square test

Nearly all the family stressors were found to be have significance when associated with depression (Table 2), as also academic factors like feeling pressurized to choose a particular

course/ stream, feeling pressurized to perform well in exams, failing any subject in college in the past one year (Table 3).

Table 2. Association of depression with family stressors

Risk factor		Depression		P*
		Present 251 (31.2%)	Absent 554 (68.8%)	
Often has serious arguments /conflict with family for any reason	Yes	171 (40.9)	247 (59.1)	<0.001
	No	80 (20.7)	307 (79.3)	
Feels that parents fight frequently	Yes	70 (45.5)	84 (54.5)	<0.001
	No	181 (27.8)	470 (72.2)	
Feels that parents are too strict	Yes	82 (48.5)	87 (51.5)	<0.001
	No	169 (26.6)	467 (73.4)	
Death in family in the past one year	Yes	68 (37.6)	113 (62.4)	0.035
	No	183 (29.3)	441 (70.7)	
Family member with serious illness (hospitalization/terminal)	Yes	27 (42.9)	36 (57.1)	0.037
	No	224 (30.2)	518 (69.8)	
Family member with mental illness (diagnosed/treated)	Yes	22 (71.0)	9 (29.0)	<0.001
	No	229 (29.6)	545 (70.4)	
Family member with drinking (alcohol) problem	Yes	57 (47.1)	64 (52.9)	<0.001
	No	194 (28.4)	490 (71.6)	
Feel that parents often make comparisons between siblings	Yes	105 (37.8)	173 (62.2)	<0.003
	No	146 (27.7)	381 (72.3)	

*Chi-square test

Table 3. Association of depression with academic factors

Risk factor		Depression		P*
		Present 251 (31.2%)	Absent 554 (68.8%)	
Felt pressurised to choose course/stream	Yes	44 (46.8)	50 (53.2)	0.001
	No	207 (29.1)	504 (70.9)	
Failed in any subject in college in the past one year	Yes	117 (38.1)	190 (61.9)	0.001
	No	134 (26.9)	364 (73.1)	
Feel pressurized to perform well in exams	Yes	127 (36.8)	218 (63.2)	0.003
	No	124 (27.0)	336 (73.0)	
Participation in extracurricular activities †	Yes	128 (29.4)	307 (70.6)	0.244
	No	123 (33.2)	247 (66.8)	
Participation in any sport	Yes	159 (29.6)	379 (70.4)	0.157
	No	92 (34.5)	175 (65.5)	
Ever suspended from college for any reason	Yes	18 (38.3)	29 (61.7)	0.278
	No	233 (30.7)	525 (69.3)	

*Chi-square test †Such as art, music, drama, dance, debate

Most relationship factors were statistically significant when associated with depression (Table 4). Feeling of not having enough material possessions as compared to others and lack of funds were also associated with depression

($P<0.001$) (Table 5). Smoking of weed (marijuana) ($P<0.001$) and consuming alcohol ($P=0.007$) were linked to depression as well (Table 6).

Table 4. Association of depression with relationship factors

Risk factor		Depression		P*
		Present 251 (31.2%)	Absent 554 (68.8%)	
Often had fights/ arguments with friends/classmates for any reason	Yes	102 (45.9)	120 (54.1)	<0.001
	No	149 (25.6)	434 (74.4)	
Been bullied in college	Yes	32 (40.5)	47 (59.5)	0.060
	No	219 (30.2)	507 (69.8)	
Ever been in a romantic relationship	Yes	128 (38.3)	206 (61.7)	<0.001
	No	123 (26.1)	348 (73.9)	
Ever experienced a breakup of a romantic relationship	Yes	100 (41.2)	143 (58.8)	<0.001
	No	151 (26.9)	411 (73.1)	
Ever been abused by partner (girlfriend/boyfriend)†	Yes	77 (48.4)	82 (51.6)	<0.001
	No	174 (26.9)	471 (73.1)	

*Chi-square test †Physical/emotional/sexual

Table 5. Association of depression with self-image

Risk factor		Depression		P*
		Present 251 (31.2%)	Absent 554 (68.8%)	
Confident and satisfied with one's appearance	Yes	178 (30.0)	415 (70.0)	0.233
	No	73 (34.4)	139 (65.6)	
Confident and satisfied with one's color/complexion	Yes	185 (29.7)	438 (70.3)	0.092
	No	66 (36.3)	116 (63.7)	
Confident and satisfied with one's height	Yes	164 (30.5)	374 (69.5)	0.545
	No	87 (32.6)	180 (67.4)	
Confident and satisfied with one's weight	Yes	123 (26.3)	344 (73.7)	<0.001
	No	128 (37.9)	98 (62.1)	
Feels lack of spending-money to meet one's needs	Yes	159 (38.9)	250 (61.1)	<0.001
	No	92 (23.2)	304 (76.8)	
Feels lack of material possessions compared to others†	Yes	141 (41.7)	197 (58.3)	<0.001
	No	110 (23.6)	357 (76.4)	

*Chi-square test †Laptop, phone, gadgets, bike, car, make-up, accessories, fashionable clothes

After regression analysis, it was found that depression was twice more likely among females [OR=1.9 (1.3-2.7), $P=0.001$] among those living in joint families [OR=1.9 (1.1-3.2), $P=0.023$] and residing in the city [OR=1.6 (1.2-2.3), $P=0.006$]. Family stressors that retained statistical significance were feeling that parents were too strict [OR=2.1 (1.3-3.2), $P=0.001$], having serious arguments/ disagreements with family [OR=1.5 (1.1-2.2), $P=0.039$] and family history of mental illness [OR=4.5 (1.7-11.5), $P=0.002$].

While academic factors were not significant on regression, relationship factors like having fights/ arguments with friends/classmates [OR=1.5 (1.1-2.2), $P=0.043$] and history of physical/emotional abuse by a partner [OR=2.0 (1.2-3.1), $P=0.005$] were found to be significant. Factors related to substance abuse lost their significance after regression. However, self-image stressors like lack of material possessions as compared to others were significantly associated with depression [OR=1.6 (1.1-2.3), $P=0.018$] (Table 7).

Table 6. Association of depression with substance abuse in the past one year

Risk factor		Depression		P*
		Present 251 (31.2%)	Absent 554 (68.8%)	
Smoking of cigarette/beedi	Yes	43 (38.7)	68 (61.3)	0.064
	No	208 (30.0)	486 (70.0)	
Alcohol consumption	Yes	57 (40.7)	83 (59.3)	0.007
	No	194 (29.2)	471 (70.8)	
Smoking of marijuana/weed/hashish	Yes	26 (54.2)	22 (45.8)	<0.001
	No	225 (29.7)	532 (70.3)	
Any other substance abuse†	Yes	15 (45.5)	18 (54.5)	0.071
	No	236 (30.6)	536 (69.4)	

*Chi-square test †Illegal/recreational drugs, over the counter/prescription drugs

Table 7. Multiple logistic regression analysis of factors associated with depression

Domain	Variable	Adjusted Odd Ratio	95%CI	P
Socio-demographic factors	Female gender	1.9	1.3 - 2.7	0.001
	Joint family	1.9	1.1 - 3.2	0.023
	Residing in city	1.6	1.2 - 2.3	0.006
Family stressors	Feel that parents are too strict	2.1	1.3 - 3.2	0.001
	Family member with diagnosed/treated mental illness	4.5	1.7 - 11.5	0.002
	Often has serious arguments or conflict with family	1.5	1.1 - 2.2	0.039
Relationship stressors	Often has fights/ arguments with friends/classmates	1.5	1.1 - 2.2	0.043
	Ever been abused by partner (girlfriend/boyfriend)	2.0	1.2 - 3.1	0.005
Self-image	Feels lack of material possessions compared to others†	1.6	1.1 - 2.3	0.018

†Laptop, phone, gadgets, bike, car, make-up, accessories, fashionable clothes

Discussion

Our study aimed to estimate the prevalence of depression among college-going young adults in peri-urban Bangalore. We found that nearly one-third of the participants were depressed. A meta-analysis of depression and/or anxiety among students in China found a 13.1% to 76.2% prevalence of depression with a mean of 32.74% (21), matching our study findings. This proportion was also similar to that found among college students across three countries in Europe; Poland (34%), Bulgaria (39%), and Germany (23%) (22). However, our findings were lower than those in a study conducted among similarly aged undergraduate medical students in Puducherry, South India, where 48.4% students were screened as depressed (23), and much lower than studies among undergraduate medical students in Saudi Arabia (53.8%) (24), Gujarat (64%) (25), and Mangalore in Karnataka state, India (71.2%) (26). There is evidence in medical literature indicating that stress is linked to the development of depression (27). The difference in findings probably reflects the higher stress and pressure faced by medical students, where the rigors of academics are compounded by challenges of patient-care, whereas our study participants were enrolled in general degree courses. This is further supported by a study in China which found that a higher level of academic stress was associated with increased severity of depression (28).

Aside from the one-third who screened positive for major depressive disorders, our study also found that a further one-third of students had mild depression. This was also the case in the Puducherry study (23). This large proportion of depression among young adults in our study has far-reaching public health implications as depression, if undiagnosed and untreated, can lead to poor productivity, economic loss, interpersonal problems, substance abuse, and even suicide (29). Young adults are at a unique stage of their life where untreated psychiatric disorders can set them on a trajectory of social withdrawal and cognitive decline with tragic consequences.

When compared to young men, depression is higher among young women. This finding cuts across socio-economic and cultural differences and is more likely due to hormonal fluctuations experienced by women. Depression among

women tends to be linked strongly with relationship factors, whereas jobs and careers play an important role for men (30). This is echoed in our study, where the socio-demographic co-variables that were found to be significantly linked with depression were female gender and residing in the city. A systematic review among Chinese medical students also found that female students and city-dwelling students had significantly higher depression (21). A study among Chinese university students reported that older age and lower family income were linked to depression (31), but this was not found in our study.

The Chinese study also found that poor parental relationships were susceptible to depression (31). In our study, too, subjects who reported serious arguments/ disagreements with family and those who felt that parents were too strict were twice more likely to have depression. Young adults, especially those living with their parents, rely on family as an important source of support. Conflict with parents translates into little or no support from parents when facing emotional problems and a lack of family cohesiveness and emotional support, precipitating depression.

Those living in families with conflict may have trouble in their social relationships and may develop poor interpersonal and social skills, further worsening their depression. In the Mangalore study among medical students, it was revealed that the proportion of depression among those with family problems and a family history of depression was significantly higher (25). Our study looked at any mental illness in family history and found that this was a factor with the highest strength of association, with a nearly five times higher chance of depression. While there can be inherited genetic predisposition to depression, family life can also become stressful when a family member has a mental illness, and this conflict in the home environment can also contribute to depression (32). Inquiry about family history of mental illness can therefore be one of the ways of picking up potential depression in a young adult.

In our study, relationship issues aside from family were also linked with depression, like experiencing a break-up in a romantic relationship. This could be explained by the fact that a relationship break-up constitutes a stressful

life event and is a potent risk factor for depression (33). Relationship-conflict as a factor for depression was further highlighted by the fact that frequent fights and arguments with friends were also revealed to be a factor associated with depression in our study, which could indicate poorer social support among friends and poor interpersonal skills. In addition, students who suffered abuse from a significant other (partner abuse) were twice more likely to be depressed. Physical violence, sexual coercion, and psychological abuse can independently precipitate post-traumatic stress disorder symptoms (PTSD) and depression (34). This indicates a need to probe for the history of abuse among young adults diagnosed to have depression as well as screen for depression among young adults with a history of having physical and sexual violence. It also indicates a need for creating safe spaces for young adults in college, to talk, receive counseling, and facilitation of necessary lawful actions to be taken to address and prevent further abuse.

In our study, self-image issues like dissatisfaction with one's weight were linked to depression, though not significant after regression analysis. Evidence shows that body dissatisfaction is a prospective predictor of depression (35). The feeling of not having enough material possessions or enough spending money was also associated with depression. The drive for material possessions stems from inner disconnect and a changing value system that is preoccupied with possessions and the social image they project, which can lead to depression. Our study, however, did not explore this issue further by delving into the use of social media, which has increasingly found itself in the list of potential risk factors for depression. This could provide direction for further research into screen time and the use of social media in the Indian peri-urban cultural setting.

In the present study, smoking marijuana and alcohol consumption was linked to depression, though not significant after regression. Among Canadian college students, alcohol users were more likely to be depressed than cannabis and tobacco users (36). Marijuana and alcohol both cause increased risk-taking behavior during the 'high' phase, which later may leave the user with feelings of guilt, fear, and panic. Substance abuse

can lead to depression, which leads to further substance abuse in a vicious cycle.

Only one in ten students who were found to have depression had been to the college counselor to seek help or advice in the present study. A similar proportion was found in Canada, where 14.7% of college students with depression were diagnosed or treated by a medical professional (36). A slightly higher proportion (one-third) of students sought help from the college counselor in a study in Australia (37), which also revealed that confidentiality issues, invasion of privacy, attached stigma, reluctance to open up to a stranger, and lack of awareness of counseling services were some of the barriers to counseling identified by students (37). However, none of the students reported having consulted a psychiatrist. This may have been due to the lack of awareness of symptoms of depression or the stigma attached to seeking care for mental illness, the fear of being labeled as "mad" or "crazy," and being ostracized if their friends, classmates, or neighbors become aware they have a mental illness. This points us in the direction of qualitatively assessing barriers to health-seeking for depression among young adults in our study setting. Our study revealed that a substantial proportion of college-going young adults are depressed, indicating a need for mental health services at the institution level beyond counseling services. The poor health-seeking practice for depressive symptoms shows us a need for awareness generation among this population, focusing on seeking care for depressive symptoms and capacity building of health/paramedical personnel to ensure screening, referral, and follow-up of depression with timely diagnosis and treatment. Many of the risk factors for depression, like family and relationship stressors and issues with self-image, can be alleviated or mitigated through family and relationship counseling. Talking openly about mental health, engaging students in dialogue during education and awareness sessions on mental health, and encouraging equality between mental and physical illness, will help to destigmatize mental illness to an extent among college-going young adults. The study design was cross-sectional, which prevents conclusions regarding causality between depression and associated factors. The list of various risk factors

under six domains was prepared from an extensive review of literature, but by no means is an exhaustive one. This study was conducted in one college, and the findings may not be generalized to all colleges and may not represent those young adults who are not attending college. The diagnosis was based on a PHQ-9 score of ≥ 10 , which has high sensitivity and specificity in identifying patients with depression. However, we might have missed some cases, which may be viewed as a study limitation. In addition, we have no data on the number of participants who followed up with a specialist after referral. Another limitation of our study is that the participants self-administered the questionnaire. This could have resulted in underreporting conflict at home or in relationships, a history of mental illness, or having faced violence due to social desirability bias. Finally, our study did not explore the use of social media by the subjects. Social media usage in peri-urban India is rising and could be a risk factor for depression in young adults.

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Conclusion

We found a high proportion of young adults with depression in our study. Furthermore, in this study, we found several family and relationship stressors that were significantly linked to depression, like conflicts in the family, arguments with friends, history of partner abuse, and self-image issues. These findings reveal a requirement for awareness generation among young adults to de-stigmatize depression, to seek care for depressive symptoms. In addition, mental health services at educational institutions need to be strengthened by including opportunistic screening and referral for depression and counseling services.

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