

Original Research Article

A cross-sectional study on depression among government school going adolescents in a rural area of Delhi

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Received: 09 May 2025

Revised: 25 June 2025

Accepted: 02 July 2025

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ABSTRACT

Background: World Health Organization estimates that every year, about 20% of adolescents experiences a mental health problem. Adolescent depression is risk factor for school absenteeism, substance abuse and suicidal tendencies. Peer pressure, academic performance, bullying at school, substance use plays an important role in causing depression.

Methods: A cross-sectional study was conducted among class 11th students of government schools in a rural area of Delhi. Hindi validated version of patient health questionnaire (PHQ-9) was used along with a self-reporting questionnaire to collect sociodemographic data and information on variables associated with depression. A score of 10 or more was taken as cut-off for depression. Data analysis was done using statistical package for the social sciences (SPSS) version 20. Chi-square was used to test for association between qualitative variables, and a $p < 0.05$ was considered statistically significant.

Results: There were 286 males (52.7%) and 257 females (47.3%) among study participants. Their age ranged from 15-19 years, with a mean age of 16.7 ± 1.02 years (95% CI: 16.6-16.8). Majority of the study participants were from arts (395; 72.7%). The prevalence of depression was 28.2% ($n=153$) and was found to be significantly higher among students above 18 years, who consumed tobacco, alcohol and who had ever bullied somebody.

Conclusions: Study revealed that more than a quarter of the adolescent students of class 11th from rural government schools were depressed. Awareness regarding the signs and symptoms of depression should be raised through sensitization of teachers, family and peer groups.

Keywords: Depression, Adolescent, School

INTRODUCTION

Depression is one of the most common mental health conditions, affecting nearly 350 million people globally, including children and adolescents.¹ It is recognized as the single largest contributor to the global burden of disease among individuals aged 15 to 45 years, and was projected to become the second leading contributor to disability-adjusted life years (DALYs) across all age and sex groups by 2020, surpassed only by heart disease.^{2,3}

Clinically, depression is characterized by a constellation of symptoms, including persistent sadness, loss of interest or pleasure, low self-worth, sleep and appetite disturbances, fatigue, and poor concentration.⁴ According to the World Health Organization (WHO), depression is the leading cause of illness and disability among adolescents aged 10 to 19 years, affecting both boys and girls.⁵ The WHO underscored the global significance of this issue by declaring the theme for World Health Day 2017 as “Depression: Let’s talk”, and by identifying depression as a priority mental disorder in childhood and adolescence.^{6,7}

In the Indian context, adolescents constitute around 20% of the total population, yet mental health remains inadequately addressed in this age group.⁸ Evidence suggests that 30-50% of depressed individuals remain undiagnosed in primary care settings, indicating a critical gap in early detection and intervention.⁹

Adolescent depression is not only a psychological health issue but also a major risk factor for school absenteeism, substance abuse, and suicidal tendencies. Psychosocial variables such as peer pressure, academic performance, bullying, substance use, and family environment significantly influence the onset and course of depression. Timely identification of these determinants is essential for effective prevention and management.

Given the limited data on adolescent mental health in rural government schools of Delhi, the present study was undertaken to screen for depression among adolescents attending these schools and to identify socio-demographic and other associated factors contributing to depressive symptoms.

METHODS

The present cross-sectional study was conducted in three-government senior secondary schools of Fatehpur Beri area of New Delhi among one boy's school, one girl's school and one co-education school. All the students studying in class 11th in all streams were taken into the study. Students absent during all 3 visits to the school were excluded from the study. The study was conducted from November 2015 to April 2017.

Taking the prevalence of depression in adolescents as 18.4% as per study conducted by Bansal et al in 2009 among students of a public school, 95% confidence interval, 80% power, 5% absolute precision, design effect of 2 and non-response rate of 10% and using the formula $4pq/d^2$, the minimum sample size came out to be 528.²

The study tool consisted of a pre-tested self-administered questionnaire pertaining to socio-demographic data including age, sex, socio economic status, family type, substance and internet usage.

Patient health questionnaire-9 (PHQ-9) which is a 9-question multiple choice questionnaire was used to screen for depression. Each question has 4 options bearing a score from 0 to 3, maximum score that can be marked is 27 and the minimum being 0. The questions are related to the history of symptoms suggestive of depression in past two weeks (14 days). Hindi validated version of the questionnaire was used to carry out the study, for better understanding by the study participants. A total score of 10 and above was taken as a cut-off for determining the prevalence of major depression. The various categories for severity of depression on the basis of score on PHQ-9 are as given in Table 1.

Table 1: PHQ-9 score based classification of depression severity.

PHQ-9 score	Depression severity
0-4	None/minimal
5-9	Mild
10-14	Moderate
15-19	Moderately severe
20-27	Severe

The collected data was entered in Microsoft excel and presented in the form of tables and appropriate diagrams. The qualitative data was summarized as proportions and quantitative data as mean with confidence interval. Qualitative data was analysed by using Chi-square/Fisher exact test and t-test was applied for quantitative data.

Prior approval of the Institutional Ethical Committee, VMMC and Safdarjung Hospital was taken. Written approval from Directorate of School Education, New Delhi and prior consent from the principal of all the three schools was obtained. All the participants were informed about the purpose of the study, the risks and benefits of participation as well as also assured of complete confidentiality of information. The option of withdrawing from the study at any point of time was also explained to all the participants, and thereafter assent was obtained from the participants. For all those participants who were screened and found out to be positive for depression, their parents were contacted for referral consultation with Psychiatrist at Department of Psychiatry, VMMC and Safdarjung Hospital.

RESULTS

A total of 543 adolescents across three schools from a rural area of Delhi were screened for depression and the various factors associated with depression were studied.

There were 286 males (52.7%) and 257 females (47.3%) among the study participants. The age of the study participants ranged from 15-19 years, with a mean age of 16.7 ± 1.02 years (95% CI: 16.6-16.8). Two hundred seventy-one students (49.9%) belonged to government boy's school, 139 (25.6%) were from the government girl's school while 133 (24.5%) were from the government co-education school. Majority of the study participants were from the arts stream (395; 72.7%). Almost three-fourth of the study participants belonged to nuclear families (407; 75%), while 136 (25%) of the study participants were from joint families.

Table 2: Age and gender wise distribution of study participants in school (n=543).

Age (completed years)	Gender, N (%)		Total, N (%)
	Boys	Girls	
<18	204 (71.3)	220 (85.6)	424 (78.1)
≥18	82 (28.7)	37 (14.4)	119 (21.9)

Out of total study participants, 40 (7.4%) had ever tried smoking and 9 (1.7%) of them were currently smoking. 10 (1.8%) study participants had ever consumed smokeless tobacco products while 30 (5.5%) of the study participants had ever consumed alcohol.

322 (59.3%) considered themselves to be too thin while 112 (20.6%) perceived themselves to be too fat. 88 (16.2%) of the study participants believed that they look too ugly. It was found that 362 (66.7%) students had access to internet. Out of these, majority (352; 97.2%) used mobile phones to access the internet. The most common purpose of internet usage was social networking by the boys (154; 67.5%) and academic purpose by the girls (104; 76.6%).

Prevalence of depression

The median PHQ-9 score of the participants was 6, with an interquartile range of 3 to 10. The minimum score was zero, and maximum was 24.

Considering depression to be prevalent among those with a score above 10 ($n=153$), the prevalence of depression among study participants was 28.2%. It was observed that 206 (37.9%) study participants had none to minimal depression (93, 32.5% of the boys; 113, 44% of the girls), 184 (33.9%) had mild depression (112, 39.2% of the boys; 72, 28% of the girls); while 15 (2.8%) were found to have severe depression (4, 1.4% of the boys; 11, 4.3% of the girls) (Figure 1).

Out of those students who had experienced any of the nine problems in the PHQ-9 ($n=509$), majority of both the boys (197; 74.9%) and girls (149; 60.5%) had accepted that it was somewhat difficult for them of taking care of things, while 4 (1.5%) of the boys and 8 (3.3%) of the girls had found it extremely difficult to take care of things and to get along with the people.

The prevalence of depression was found to be significantly higher among students of 18 years and above age (107; 38.7%) as compared to those below 18 years (107; 25.2%), Gender however, was not found to be statistically associated with depression.

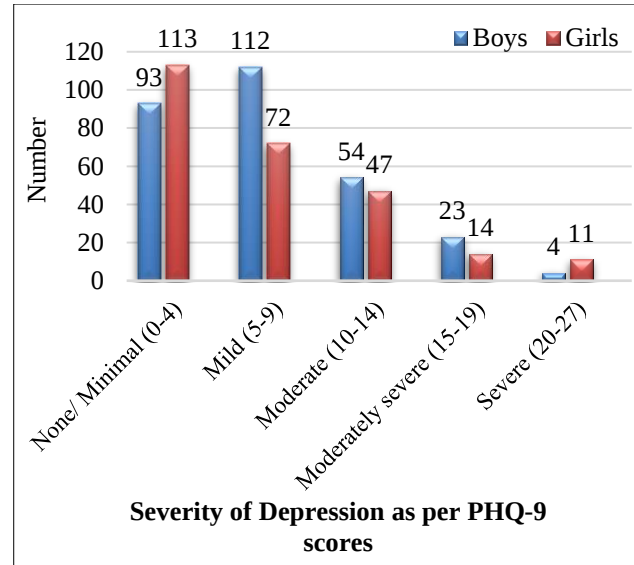


Figure 1: Distribution of study participants according to severity of depression and gender (n=543).

The prevalence of depression was significantly higher among those students who had ever smoked tobacco (22; 55%) and alcohol (21; 70%), however was not found to be associated with the consumption of smokeless tobacco (2; 20%) (Table 4).

The proportion of depression was found to be higher among students with abnormal body image perception of themselves (131; 29.6% versus 22; 21.8%) but it was not statistically significant. However, the prevalence of depression was found to be significantly associated with those who considered body image as a source of distress (106; 39.8%) and as an important part of their identity (92; 40.9%) ($p=0.000$ for both) (Table 5).

The prevalence of depression was also found to be higher in those students who had ever bullied somebody (59; 47.6%) and this association was also statistically significant ($p<0.05$). Those who had been bullied reported higher prevalence of depression (34; 35.4%) although this association was not found to be statistically significant ($p=0.082$) (Table 6).

Table 3: Distribution of study participants according to age, gender and prevalence of depression (n=543).

Age and gender	Depression, N (%)		Total, N (%)	P value*
	Present	Absent		
Age group (completed years)				
<18	107 (25.2)	317 (74.8)	424 (100.0)	0.004
≥18	46 (38.7)	73 (61.3)	119 (100.0)	
Gender				
Male	81 (28.3)	205 (71.7)	286 (100.0)	0.937
Female	72 (28.0)	185 (72.0)	257 (100.0)	

*Chi-square test

Table 4: Distribution of study participants according to history of substance use and prevalence of depression (n=543).

Substance use characteristic	Depression, N (%)		Total, N (%)	P value
	Present	Absent		
Ever smoked				
Yes	22 (55.0)	18 (45.0)	40 (100.0)	<0.001*
No	131 (26.0)	372 (74.0)	503 (100.0)	
Ever consumed alcohol				
Yes	21 (70.0)	9 (30.0)	30 (100.0)	<0.001*
No	132 (25.7)	381 (74.3)	513 (100.0)	
Ever consumed smokeless tobacco				
Yes	2 (20.0)	8 (80.0)	10 (100.0)	0.562#
No	151 (28.3)	382 (71.7)	533 (100.0)	

*Chi-square test, #Fisher exact test

Table 5: Distribution of study participants according to self-body image perception characteristics and prevalence of depression (n=543).

Body image perceptions	Depression, N (%)		Total, N (%)	P value*
	Present	Absent		
Abnormal body image perception				
Present	131 (29.6)	311 (70.4)	442 (100.0)	0.113
Absent	22 (21.8)	79 (78.2)	101 (100.0)	
Body image causing distress				
Yes	106 (39.8)	160 (60.2)	266 (100.0)	0.000
No	47 (17.0)	230 (83.0)	277 (100.0)	
Body image important				
Yes	92 (40.9)	133 (59.1)	225 (100.0)	0.000
No	61 (19.2)	257 (80.8)	318 (100.0)	

*Chi-square test

Table 6: Distribution of study participants according to peer influence and bullies and prevalence of depression (n=543).

Influence of peers and bullies	Depression, N (%)		Total, N (%)	P value*
	Present	Absent		
Been bullied/ragged in school				
Yes	34 (35.4)	62 (64.6)	96 (100.0)	0.082
No	119 (26.6)	328 (73.4)	447 (100.0)	
Ever bullied somebody				
Yes	59 (47.6)	65 (52.4)	124 (100.0)	0.000
No	94 (22.4)	325 (77.6)	419 (100.0)	

*Chi-square test

DISCUSSION

The age of the study participants ranged from 15-19 years, and more than half of the participants belonged to the age group of ≤ 18 years with a mean age of 16.7 ± 1.02 years. The study population comprised of 52.7% (286) boys and 47.3% (257) girls. As per Census 2011 of India, there was a similar proportion of boys (56.2%) and girls (43.8%) and there were 44,367 adolescents in Delhi in the age group of 15-19 years.¹⁰

In the present study, 75% (407) of the study participants belonged to nuclear families and 25% (136) of the study

participants were from joint families. As per our study majority of the study participants 76.6% (416) had 5-8 membered families. A similar study conducted by Jayanthi et al also reported a similar higher proportion of adolescents 77.5% (450) belonging to nuclear family.¹¹

Out of the total study participants, 7.4% (40) had ever tried smoking and 1.7% (9) of them were currently smoking which is similar to the finding of Narain et al who reported the prevalence of ever smoking among adolescents as 8.8% (419).¹² Makwana et al found a higher proportion of smokers as 14.6% (45) which may be due to interviewing

the adolescents aged 10-19 years in contrast to the self-administered questionnaire used in our study.¹³

Jayakrishnan et al in their study amongst rural adolescents in Kerala reported that prevalence of ever alcohol users was 5.6% which is almost similar to our study results.¹⁴

In present study 59.3% (322) of the study participants considered themselves to be too thin and 20.6% (112) to be too fat, while 3.9% (21) considered themselves to be normal. Latha et al in their study in Karnataka used the body shape questionnaire (BSQ) and reported that 38.7% (48) of the study participants felt that they were slim, 27.4% (34) normal and 26.6% (33) as thin. This difference in the two studies may be due to the use of a standardized questionnaire in the later study.¹⁵

In current study, 63.4% (344) of the participants got easily influenced by their friends. Krishnan et al reported that 42% (21) adolescents experienced peer pressure which is lower than our study. The reason for the difference may be due to use of a standardized rating scale i.e Steinberg and Monahan's Resistance to Peer Influence Scale in the later study.¹⁶

In the current study, it was observed that 17.7% (96) of the study participants reported facing bullying in the school, while 22.8% (124) accepted to rag or bully another student in the school ever. Other studies also reported the similar results of proportion of being bullied as 17% (16) by Samanta et al among adolescents of both urban and rural schools of West Bengal.¹⁷ Hazemba et al reported it to be 20% (439) in the Beijing Global School-Based Health Survey among 2,348 in-school adolescents.¹⁸ Liang et al in their study among adolescents studying in South Africa also reported that 19.3% (979) of the participants had ever been bullied.¹⁹

Jamir et al in the study conducted among adolescents attending one Government Hindi medium and one Private English medium co-ed school in Imphal, Manipur reported that 83.6% (138) of the study participants were bullied which is quite higher than our study results. The difference in the results may be due to the use of a standardized adolescent peer relations instrument-victim scale (APRI) in their study.²¹

Prevalence of depression

The overall prevalence of depression (PHQ score above 10) in the current study was 28.2%. Similar prevalence has been reported in other studies amongst school students ranging from 22.4% reported by Trivedi et al in Mangalore, 23.7% by Mohanraj et al in Chennai, 25% by Jayanthi et al in Thiruvallur (Tamil Nadu), and 29.9% by Vashisht et al in Ambala.^{11,21-23}

A study done by Chauhan et al in adolescents of Noida, Uttar Pradesh by using the PHQ-9 questionnaire reported the higher prevalence of depression as 38%, Verma et al

from Raipur used the Center for Epidemiologic Studies depression scale (CES-D) questionnaire and reported it as 59.5% while Muhil et al from Tamilnadu documented the prevalence of depression to be 41% by using the Goldberg depression questionnaire.²⁴⁻²⁶ This difference may be a result of including the categories of minimal depression in the overall prevalence and use of different scales as well as due to the rural- urban difference in the above studies.

In our study, moderate depression was found to be present in 18.6% (101), moderately severe among 6.8% (37) and severe depression in 2.8% (15). Patil et al from Mangalore, India reported 18% (90) of study participants as moderately depressed, 6% (30) as severely depressed and 2% (10) as extremely depressed which is almost similar to our study results.²⁷ Mohanraj et al also reported prevalence of moderate depression as 19.4% (187) and severe depression as 4.3% (41).²² Chauhan et al also reported similar prevalence of moderate depression as 23.5% (32) in their study.²⁴

In our study the prevalence of depression was found to be higher among students of age 18 years and above (38.7%; 46) as compared to those below 18 years (25.2%; 107), and this finding was found to be statistically significant (p value=0.004). Nagendra et al, Mohanraj et al, and Jayanthi et al had also documented significant association between age and depression with increasing depression in older adolescents in their respective studies.^{11,22,28}

In the current study, the prevalence of depression was found to be almost equal (28%) for both the sexes. Similar results were reported by Umesh et al who found that there is no statistical difference in depression with respect to sex of the students ($p=0.1052$).²⁹ This is in contrast to the results documented by Verma et al who reported that depression was more in females (59.49%) as compared to male (56.24%).²⁵ Muhil et al also reported that female participants to have high prevalence of depression (53%) than males (35%) while Nagendra et al reported that boys (59.3%; 1091) were significantly more depressed than girls (55.6%; 714).^{26,28}

In the current study, the prevalence of depression among those who had bullied others was found to be higher than those who never had bullied (47.6%; 59 versus 22.4%; 94). The high prevalence of depression among those who had ever bullied others might be due to the fact that these students have had more exposure to familial violence or abuse in any form which predisposes them to develop depression. Similar findings have been reported by Saluja et al in a cross-sectional study among both public and private school adolescents and reported that the prevalence of depression among students who had ever bullied others was 46% in females and 15% in males.³⁰ Jamir et al in their study applied correlation coefficient test between victimization of bullying and child depression scores and it was found to be positively correlated (correlation coefficient=0.483 and p value=0.000). The positive correlation denotes that more the person is bullied the more

they will be depressed.²⁰ Saluja et al reported that although the prevalence of involvement in bullying both as victims and as perpetrators was high, those who reported being involved more frequently had higher proportions of depression.³⁰

In our study the proportion of depression was found to be higher among students with abnormal body image of themselves, 29.6% (131) versus 21.8% (22), although this association was not statistically significant. Similar results were reported by Flores-Cornejo et al in their study in Peru which showed significant association between body image dissatisfaction and depressive symptoms (adjusted PR=3.7; 95% CI 2.8-4.9; $p<0.001$) and Lim et al in study conducted among adolescents of Korea also reported that those who were dissatisfied with their figures had an increased risk for depression (aOR, 1.373; 95% CI, 1.169-1.613; $p<0.001$).^{31,32}

In the present study, the prevalence of depression was significantly higher among those students who had ever smoked tobacco as compared to those who had not smoked tobacco ever (55%; 22 versus 26%; 131). It was also higher in those who had ever consumed alcohol (70%; 21) versus those who never consumed it (25.7%; 132). Espada et al in a study done on Spanish adolescents also reported similar results that smokers had higher scores on the child depression inventory scale than non-smokers (OR=0.93, CI 95% 0.90-0.95, $p<0.01$). Depressive symptoms appeared related to alcohol use significantly, i.e., users tended to score higher in depression than non-users (OR=0.94, CI 95% 0.92-0.96, $p<0.01$).³³

Limitations

The study was delimited only to students studying in class 11th of the selected schools, questionnaire used was of self-administered type and the cross-sectional nature of the study are a few limitations.

CONCLUSION

It was found that more than a quarter of the adolescents of class 11th government schools were depressed. The factors significantly associated with depression include age more than 18 years, being influenced by peers easily, ever smoked, ever taken alcohol, feeling distressed with their body image, considering their body image important and ever bullying somebody. A number of findings in the study are resonating with the previously conducted studies yet a bit different, as the current study was done in a rural area, among government school students and by using a validated questionnaire. The study recommends recognizing teenagers with depression to be the first step in improving depression management. Awareness regarding the signs and symptoms of depression and its harmful effects should be raised. Also to fill the lacunae further research should be carried out to identify the various factors associated with depression in this age group

so that specialized mental health care service can be provided to the school going adolescents.

The strengths of the current study include usage of a standardized and Hindi validated PHQ-9 for assessment of depression among the adolescents. Also, it was one of those few studies which aimed to screen the school going adolescents for depression in a rural area.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Salodia UP, Sethi S, Verma MK. A cross-sectional study on depression among government school going adolescents in a rural area of Delhi. *Int J Community Med Public Health* 2025;12:3581-7.