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Prevalence and factors associated with depression among higher secondary school adolescents of Pokhara Metropolitan, Nepal: a cross-sectional study

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ABSTRACT

Objective This study examined the prevalence and factors associated with depression among adolescents attending higher secondary schools in the Pokhara Metropolitan City of Nepal.

Design A cross-sectional study design was adopted.

Setting Four randomly selected higher secondary schools of Pokhara Metropolitan, Nepal.

Participants 312 randomly sampled higher secondary school students.

Methods The Center for Epidemiologic Studies Depression Scale was used to assess the level of depression among students. The data collected through a self-administered questionnaire were analysed using descriptive statistical methods such as frequency and percentage. χ^2 test and unadjusted OR (UOR) were calculated to assess the statistical relationship between depression and various variables at 95% CI, with level of significance at p<0.05.

Results The study found a high prevalence of depression among high school students, with more than two-fifths (44.2%) of students having depression. Furthermore, almost a quarter (25.3%) of the students were noted to have mild depression and 18.9% of the students expressed major depression. Students who had low perceived social support (UOR: 3.604; 95% CI 2.088 to 6.220), did not share their problems with anyone (UOR: 1.931; 95% CI 1.228 to 3.038) and had low self-esteem (UOR: 5.282; 95% CI 2.994 to 9.319) were at higher odds of being depressed.

Conclusion A high prevalence of depression was observed among high school students. It was also observed that students' level of perceived social support, self-esteem and help-seeking behaviour are somehow related to their mental well-being. Hence, improving social support and self-esteem may alleviate depression and mental distress among these adolescents.

INTRODUCTION

Depression is a common mental disorder characterised by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness, and poor concentration.[1] Depression

Strengths and limitations of this study

► This is one of the few studies that have measured the prevalence of depression among school-going adolescents in developing nations such as Nepal.
► The study used recognised screening tools to assess depression, self-esteem and level of perceived social support.
► The cross-sectional design limits the ability to draw causal conclusions in the study.
► Although the study was performed in the largest metropolitan city of Nepal, the findings cannot be generalised to the entire country due to the vast cultural diversity in Nepal.

has established itself as a common health problem, ranking third after cardiac and respiratory diseases, and is a major cause of disability.[2 3] The Global Burden of Disease Study has suggested unipolar major depression as one of the leading causes of disability-adjusted life-years in 2020.[3]

The adolescence period is considered a transitional stage where an individual experiences physical and psychological development and changes that are confined to a period from puberty to legal adulthood.[4] This period is stressful and is typically a period at risk of onset of several mental disorders.[5] It has been estimated that globally 10%–20% of children and adolescents are affected by mental health problems.[6] The WHO estimated that 16% of the global burden of disease and injury among adolescents aged 10–19 years is due to mental health conditions.[7]

Depression is a serious mental disorder among adolescents which can often affect family relationships, social functioning and academic performance.[8] It has been associated with risk of mood disorder, poor dietary habits, violent behaviour, drugs and

substance abuse, alcohol consumption, unprotected sex, sexually transmitted infections and suicidal ideation among students.[9–14] Studies suggest that a strong relationship exists between severity of depressive symptoms and suicidal ideation in college students.[15] Depressive disorders are consistently the most prevalent psychiatric disorder among adolescents who commit suicide, with a prevalence ranging from 49% to 64%.[16] Depression and suicides are of increasing concern to public health and colleges.[11] Thus by preventing depression, we can protect adolescents from this vicious cycle of maladaptive behaviour.

The rising prevalence of depression among adolescents has been a public concern throughout the world.[17] A meta-analysis based on 26 studies focusing on adolescents' mental health revealed that the overall prevalence of major depressive disorders among adolescents aged 13–18 years lies at 5.6%.[18] In the context of Asia, a study executed among adolescents of 9th–12th standards from 40 schools of Bihar, India in 2016 noted that almost half (49.2%) of the students had depression.[19] Likewise, a study conducted among secondary and higher secondary students of Malaysia noted that the overall prevalence of depression lies at 42.6%, with mild, moderate and severe depression at 21.5%, 18.1% and 3.0%, respectively.[20] Similarly, a study performed among Iranian female adolescents in secondary schools of Western Iran reported the overall prevalence of depression at 72.6%, diagnosed through the Center for Epidemiologic Studies Depression Scale (CES-D).[21]

In the context of Nepal, almost 24% of the total population consists of adolescents aged 10–19 years.[22] Although the adolescent population accounts for almost a quarter of the population of Nepal, very few studies have focused on adolescents' psychosocial problems. Among these limited studies, the National Mental Health Survey of Nepal 2020 reports the prevalence of mental distress among adolescents (age 13–17 years) to be 5.2%, with a similar rate of depression between male and female gender.[23] Similarly, a study performed among 787 adolescent students from 13 schools of the Hetauda Municipality of Nepal reported that one-fifth (17.03%) of adolescent students suffered from psychosocial dysfunction.[24] Another study conducted in Biratnagar City in Nepal noted that the overall prevalence of depression among high school students lies at 73%, with mild and severe depression at 59% and 14%, respectively.[25] Furthermore, a country-wide survey consisting of 6531 students from secondary and higher secondary levels illustrated that nearly 14% of the students had suicidal ideation, while 10.33% had suicidal attempts.[26] In the context of the present study, a study executed among undergraduate students of Pokhara Metropolitan City found that 38.2% were depressed.[27] However, there is no estimate available about the mental health status among children and adolescent populations in this region.

In developing countries such as Nepal depression is a largely unexplored topic for research and only a sparse number of relevant studies have been carried out. Studying depression among high school students is of significance because the onset of most of the lifetime mental disorders occurs during this period. Identifying the prevalence and factors associated with depression can help to lay the groundwork for evidence-based prevention interventions. In this scenario, this study aimed to assess the prevalence and factors associated with depression among high school students of Pokhara Metropolitan, Nepal.

METHODS

Research design

A cross-sectional study was conducted among higher secondary level students enrolled at different higher secondary schools of Pokhara Metropolitan in Nepal from June to December 2018.

Sample selection

The sample size was initially estimated at 281 using Cochran's formula at 95% CI, with a prevalence of depression at 76% based on a study performed among high school students of Morang District in Nepal in 2015.[25] By adjusting the initial sample size with 11% non-response rate, the optimum sample reached 312.

A simple random sampling technique was applied at multiple stages to obtain the required sample of students. For this, the number of higher secondary schools operating inside Pokhara Metropolitan was listed out (n=81). Among these, four schools were randomly selected through a random number table. The proportion to population size sampling technique was used to calculate the number of students to be selected from each selected school based on the total number of students enrolled. Simple random sampling was applied to select the required number of students from each selected school through the student attendance register. All randomly selected students were eligible for inclusion in the study as there were no exclusion criteria.

Data collection

The study was performed after obtaining permission from each selected academic institution and the students. The academic institutions and their teachers helped to arrange a data collection session for an hour, allowing researchers to distribute and explain each question to the students. Subsequently, students completed the survey in that time period in their classrooms.

A self-administered questionnaire which consisted of four sections was used for this study. The first section consisted of general information about students' socio-demographic profile and the nature of their schools. The second section consisted of the Rosenberg Self-Esteem Scale[28] to obtain students' level of self-esteem. The third section consisted of the Multidimensional Scale of Perceived Social Support[29] to assess students' level of perceived social support and questions related to their

help-seeking nature. The fourth section consisted of the CES-D[30] to assess the level of depression among the students.

The CES-D is a 20-item instrument with a 4-point scale rating for each item, ranging from 0 ('rarely or none of the time') to 3 ('most or all of the time'), while four of the items required to be reversed to calculate the total score.[30] The CES-D total score ranges from 0 to 60; a higher score indicates a greater risk of depression. In the original CES-D, a score of ≥16 indicated a subthreshold depression.[30] However, multiple studies have proposed variations in cut-off points for the CES-D to trace depression in different population subgroups.[31–34] A meta-analysis based on 28 studies that used the CES-D reported that an optimal cut-off score of 20 could be more adequate than the value of 16 as it has a sensitivity of 0.83 and specificity of 0.78, with a diagnostic OR of 16.64.[35] Considering these two variations in cut-off points in this study, we used a cut-off score of 18 to indicate subthreshold depression, which is the average value of the two predefined cut-offs. Furthermore, translation and back translation (English–Nepali–English) of the questionnaire were performed. The data collection tool was pretested in 10% (n=31) of the total sample size of students of Pokhara Metropolitan to enhance the tool's reliability and validity. The inter-item reliability (Cronbach's alpha) of the CES-D in this study was 0.82.

Data analysis

The collected data were entered using the EpiData V.3.1 software, while the Statistical Package for Social Sciences (SPSS) V.20 was used for analysis. The collected data were analysed using descriptive statistical methods such as frequency and percentage. χ^2 test and unadjusted OR were calculated to assess the statistical relationship between depression and various variables at 95% CI, with the level of significance at p<0.05.

Ethical consideration

Permission from each selected school was obtained prior to the studies. Informed consent from each student was obtained before their engagement in the study and students were allowed to withdraw at any time at their will. Parental consent was obtained from the parents of students who were below the age of 16. Students were provided with a consent form a few days prior to data collection and were requested to submit the form to the school if their parents agreed to their participation. Random numbers were assigned to the students rather than their names to maintain confidentiality of information.

Patient and public involvement

There was no patient and public involvement in the design, conduct, reporting or dissemination plans of our research. The randomly sampled higher secondary school students were involved as participants during the time of data collection after obtaining their informed consent.

Table 1 Sociodemographic characteristics of students sampled in the study

Variables	Frequency (N=312)	Percentage
Age		
<17	113	36.2
≥17	199	63.8
Gender		
Male	218	69.9
Female	94	30.1
Type of school		
Government	165	52.9
Private	147	47.1
Level of education		
Grade 11	117	37.5
Grade 12	195	62.5
Family type		
Nuclear	252	82.1
Joint	60	19.2
Living with		
Family	256	82.1
Alone	25	8
Friends	14	4.5
Relatives	17	5.4
Marital status of parents		
Live together	294	94.2
Separated/divorced	14	4.5
Parental loss	4	1.3
Father's education		
No formal schooling	13	4.2
Formal schooling	299	95.8
Mother's education		
No formal schooling	27	8.7
Formal schooling	285	91.3
Family history of depression		
Yes	4	1.3
No	308	98.7

RESULTS

Sample characteristics

The research questionnaire was distributed to a sample of 312 high school students, all of whom agreed to take part in the study and provided complete response to all questions, with a response rate of 100%. Of the 312 students who participated in this study, 218 (69.9%) were male and 94 (30.1%) were female. The average age of the students was 16.8 years (SD ±0.90), ranging from 14 to 20 years. In this study, 165 (52.9%) students were from government or public high schools, while 147 (47.1%) were studying at a private institute (table 1).

Table 2 Level of perceived social support and help-seeking behaviour among the participants

Variables	Frequency (N=312)	Percentage
Perceived social support		
Low	6	1.9
Moderate	71	22.8
High	235	75.3
Perceived support from a significant other		
Low	20	6.4
Moderate	9	2.9
High	283	90.7
Perceived support from peer		
Low	14	4.5
Moderate	5	1.6
High	293	93.9
Share problems with parents		
Yes	112	35.9
No	200	64.1
Share problems with friends		
Yes	91	29.2
No	221	70.8
Think about solution alone without sharing		
Yes	148	47.4
No	164	52.6
Self-esteem		
Low self-esteem	79	25.3
High self-esteem	233	74.7

With regard to perceived social support, the Multidimensional Scale of Perceived Social Support illustrated that almost three out of four students had a perception of higher social support. However, only 112 (35.9%) students reported sharing their problems with their parents and 91 (29.2%) reported sharing their problems with their friends (table 2).

Students' response on the CES-D

All the 312 sampled students provided a complete response on the CES-D, and based on their response it was observed that the interitem reliability (Cronbach's alpha) of the CES-D in this study was 0.82. It was noted that almost half (59.6%) of the students expressed that they rarely felt depressed during the past week. However, almost half (55.4%) of the students were rarely hopeful about their future and very few (11.2 %) said they were happy most of the time (table 3).

Prevalence of depression

This study found the overall prevalence of depression to be high, with more than two-fifths (44.2%) of the students having depression and with 138 students scoring >18 on the CES-D. Furthermore, a quarter (25.3%) of the students had mild depression, while 18.9% expressed major depression on the CES-D with a total score >25 (table 4).

Factors associated with depression among higher secondary school students

The univariate analysis performed through χ^2 test revealed that no significant association exists between depression and sociodemographic factors such as age, gender, living accommodation, parental relationship, education and family history of depression. However, it was noted that the level of depression was higher among students with a joint family structure. Compared with students with a nuclear family, those who were living in a joint family had 2.206 times more odds (χ^2=7.489, p<0.05, 95% CI 1.242 to 3.918) of being depressed (table 5).

With regard to perceived social support, univariate analysis showed a significant association exists between level of perceived social support and depression (χ^2=22.503, p<0.001). Moreover, students who perceived lower or moderate level of support from their significant other or someone important to them had 3.107 times more odds of being depressed than those who perceived a higher level of support. Furthermore, help-seeking behaviours or personal preference of coping with their problems also had a certain level of association with depression. Students who thought about solutions alone were more depressed than those who sought help. The odds of being depressed were observed to be lower in students who were sharing their problems with their parents (χ^2=15.445, p<0.001) and friends (χ^2=5.381, p<0.05) than those who did not share (table 6).

DISCUSSION

The present study showed that the overall prevalence of depression among high school students of Pokhara Metropolitan was 44.2%, with mild and major depression at 25.3% and 18.9%, respectively. This prevalence is slightly higher than the prevalence observed by another study executed in Pokhara Metropolitan in 2017 among undergraduate students from multiple disciplines, where the overall depression was noted at 38.2%.[27] This difference in prevalence could be due to the difference in the level of maturity among high school students and undergraduates.

The mental health status and the magnitude of mental health problems among children and adolescents are still not clear in Nepal. This is mostly due to absence of child and adolescent mental health policy, poor mental health services, and acute shortage of child and adolescent psychiatrists and related human resources.[36] There are limited published studies that assessed the mental health status of children and adolescents in Nepal. Among these limited studies, the National Mental Health Survey of Nepal 2020 reported the prevalence of mental distress among adolescents (age 13–17 years) at 5.2%.[23] Similarly, nearly one-fifth (17.03%) of adolescent

Table 3 Students' response on the CES-D

Items	During the past week			
	Rarely or none of the time, n (%)	Some or little of the time, n (%)	Occasionally or a moderate amount of time, n (%)	Most or all of the time, n (%)
I was bothered by the things that usually don't bother me.	134 (42.9)	115 (36.9)	47 (15.1)	16 (5.1)
I did not feel like eating; my appetite was poor.	168 (53.8)	86 (27.6)	42 (13.5)	16 (5.1)
I felt that I could not shake off the blues even with help from my family or friends.	135 (43.3)	106 (34)	55 (17.6)	16 (5.1)
I felt I was just as good as other people.*	113 (36.2)	80 (25.6)	77 (24.7)	42 (13.5)
I had trouble keeping my mind on what I was doing.	79 (25.3)	125 (40.1)	58 (18.6)	50 (16)
I felt depressed.	186 (59.6)	74 (23.7)	29 (9.3)	23 (7.4)
I felt that everything I did was an effort.	53 (17)	91 (29.2)	96 (30.8)	72 (23.1)
I felt hopeful about the future.*	173 (55.4)	62 (19.9)	41 (13.1)	36 (11.5)
I thought my life had been a failure.	194 (62.2)	82 (26.3)	24 (7.7)	12 (3.8)
I felt fearful.	143 (45.8)	105 (33.7)	33 (10.6)	31 (9.9)
My sleep was restless.	150 (48.1)	86 (27.6)	41 (13.1)	35 (11.2)
I was happy.*	141 (45.2)	100 (32.1)	36 (11.5)	35 (11.2)
I talked less than usual.	93 (29.8)	110 (35.3)	70 (22.4)	39 (12.5)
I felt lonely.	145 (46.5)	98 (31.4)	49 (15.7)	20 (6.4)
People were unfriendly.	158 (50.6)	88 (28.2)	40 (12.8)	26 (8.3)
I enjoyed life.*	143 (45.8)	87 (27.9)	50 (16)	32 (10.3)
I had crying spells.	183 (58.7)	72 (23.1)	34 (10.9)	23 (7.4)
I felt sad.	119 (38.1)	129 (41.3)	42 (13.5)	22 (7.1)
I felt that people disliked me.	138 (44.2)	111 (35.6)	37 (11.9)	26 (8.3)
I could not get 'going'.	141 (45.2)	91 (29.2)	51 (16.3)	29 (9.3)

*scoring of these positive items are reversed.
CES-D, Center for Epidemiologic Studies Depression Scale.

students were found suffering from psychosocial dysfunction in Hetauda Municipality.[24] Likewise, a country-wide survey among secondary-level and higher secondary-level students illustrated that nearly 13.59% of students had suicidal ideation.[26] Furthermore, a community-based study from Gokarneshwor Municipality of Kathmandu District noted that 13.1% of adolescents were suffering from depression when measured through the Patient Health Questionnaire.[37]

In comparison with depression among adolescents from other countries, the prevalence observed in this study is close to the study conducted among secondary and higher secondary students of Malaysia. The overall prevalence of depression was noted at 42.6%, with mild, moderate and severe depression at 21.5%, 18.1% and 3.0%, respectively.[20] Similar findings were shared by studies from India, where one study found that the prevalence of depression was 49.2% in four schools of Bihar and another study concluded that clinically significant depression lies as high as 57.7% in students from the higher secondary school of North Kerala.[19 38] In line with this, a study performed among Iranian female adolescents in the secondary schools of Western Iran reported the prevalence of severe depression diagnosed through CES-D at 52.6%, whereas the overall prevalence was noted at 72.6%.[21] This reveals that there is a high prevalence

Table 4 Level of depression among students based on CES-D score

Depression	Frequency	Percentage
No depression	174	55.8
Mild depression	79	25.3
Major depression	59	18.9

CES-D, Center for Epidemiologic Studies Depression Scale.

Table 5 Association of sociodemographic characteristics with depression

Characteristics	Depression		df	χ^2	P value
	Yes	No			
Age					
<17	56 (49.6)	57 (50.4)	1	2.038	0.153
≥17	82 (41.2)	117 (58.8)			
Gender					
Male	89 (40.8)	129 (59.2)	1	3.401	0.065
Female	49 (52.1)	45 (47.9)			
Type of school					
Government	71 (43.0)	94 (57.0)	1	0.205	0.651
Private	67 (45.6)	80 (54.4)			
Level of education					
Grade 11	58 (49.6)	59 (50.4)	1	2.166	0.141
Grade 12	80 (41.0)	115 (59.0)			
Family type					
Nuclear	102 (40.5)	150 (59.5)	1	7.489	0.006*
Joint	36 (60.0)	24 (40.0)			
Living accommodation					
Family	114 (44.5)	142 (55.5)	3	4.428	0.219
Alone	11 (44.0)	14 (56.0)			
Friends	3 (21.4)	11 (78.6)			
Relatives	10 (58.8)	7 (41.2)			
Parental relationship					
Live together	128 (43.5)	116 (56.5)	2	1.809	0.405
Separated/divorced	7 (50)	7 (50)			
Parental loss	3 (75.0)	1 (25.0)			
Father's education					
No formal schooling	5 (38.5)	8 (61.5)	1	0.183	0.669
Formal schooling	133 (44.5)	166 (55.5)			
Mother's education					
No formal schooling	15 (55.6)	12 (44.4)	1	1.537	0.215
Formal schooling	123 (43.2)	162 (56.8)			
Family history of depression					
Yes	1 (25.0)	3 (75.0)	1	0.607	0.436
No	137 (44.5)	171 (55.5)			

*P value significant at <0.05.

of depressive symptoms among high school students and that it is of public health concern.

In this study, no statistical association was observed between depression and sociodemographic characteristics of students, such as age, gender and living accommodation. A similar finding was observed among undergraduate students of Pokhara Metropolitan, where age and gender were not associated with students' level of depression.[27] The National Mental Health Survey of Nepal 2020 reported no difference in the prevalence of mental disorder between male and female gender, with

5.0% (95% CI 3.6% to 6.9%) of male and 5.3% (95% CI 4.2% to 6.7%) of female adolescents in Nepal found to have a certain degree of mental disorder.[23] It was also noted that parents' marital status and parental education level have no relation with students' depression. Similar findings were shared by the study performed among adolescent students in Iran, China and Malaysia.[20 21 39]

The students with low perceived social support from their significant other and peer groups were more depressed than students who had higher level of perceived social support. Similarly, students who did not

Table 6 Association of perceived social support and help-seeking behaviour with depression

| Variables | Depression | | df | χ^2 | P value | UOR | 95% CI | |
	Yes	No					Lower	Upper
Perceived social support								
High	86 (36.6)	149 (63.4)	1	22.503	<0.001†	1		
Low and moderate support	52 (67.5)	25 (32.5)				3.604	2.088	6.220
Perceived support from significant other								
High	118 (41.7)	165 (58.3)	1	7.930	0.005*	1		
Low and moderate	20 (69.0)	9 (31.0)				3.107	1.367	7.065
Perceived support from peer								
High	123 (42.0)	170 (58.0)	1	9.885	0.002*	1		
Low and moderate support	15 (78.9)	4 (21.1)				5.183	1.679	15.998
Think about solution alone without sharing								
Yes	78 (52.7)	70 (74.3)	1	8.193	0.004*	1.931	1.228	3.038
No	60 (36.6)	104 (63.4)				1		
Share problems with parents								
Yes	33 (29.5)	79 (70.5)	1	15.445	<0.001†	1		
No	105 (52.5)	95 (47.5)				2.646	1.618	4.328
Share problems with friends								
Yes	31 (34.1)	60 (65.9)	1	5.381	0.020*	1		
No	107 (48.4)	114 (51.6)				1.817	1.094	3.108
Self-esteem								
High self-esteem	80 (34.3)	153 (65.7)	1	36.533	<0.001†	1		
Low self-esteem	58 (73.5)	21 (26.6)				5.282	2.994	9.319

*P value significant at <0.05.
†P value significant at <0.001.
UOR, unadjusted OR.

share their problems with their family and friends were more depressed than those who did. This finding is in line with the conclusion drawn by a longitudinal study from Finland, where it was observed that lower perceived social support can be a risk factor for depression.[40] Furthermore, a study conducted among 348 adolescents studying in secondary level at government schools of Pokhara Metropolitan observed that perceived social support indirectly affects psychological well-being by affecting students' level of self-esteem.[41] Consistent with these past findings, in our study we noted that students with lower self-esteem were more depressed than students with higher self-esteem. This might be because students who experience higher social support might have higher self-esteem, resulting in better psychological well-being, as observed by Poudel and colleagues.[41] Moreover, in this study the psychosocial environment of the schools was not assessed, but this factor might be a potential confounder as social situations and classroom climate have been found to influence students' overall health and self-worth.[42 43]

Limitations
Although this study is one of the few studies that have assessed depression and its associated factors among higher secondary school adolescents of Nepal, it is not free from limitations and the findings should be interpreted based on these limitations. Despite the fact that the data for this study were obtained from higher secondary schools functioning in the largest metropolitan of Nepal, the study area still cannot capture all the cultural, racial and ethnic diversity of the country. Nepal is a small yet culturally rich and diverse country. Thus, the findings of this study might not be representative of all higher secondary school adolescents in Nepal.

Due to the nature of cross-sectional study, establishing a causal relationship between perceived social support, self-esteem and help-seeking behaviour and depression was not possible. Further study is suggested targeting adolescent populations.

CONCLUSION
There is a high prevalence of depression among high school students, with more than two-fifths of randomly sampled students found to have depression. This is a public health concern as depression at this stage of life can lead to several health hazards in the near future.

Furthermore, it was observed that students' level of perceived social support, self-esteem and help-seeking behaviour are somehow related to their mental well-being. Students with higher perceived social support, self-esteem and those who share their problems with family and friends were less likely to be depressed. Hence, improving the perceived level of social support and self-esteem by employing various sources may alleviate depression and mental distress among these adolescents. The school and families could adopt appropriate interventions such as monitoring and support to the students, student counselling, and stress management training programmes and workshops that enable and encourage students to share their problems and seek help when they experience any mental distress.

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