

Prevalence and Factors Associated with Depression Among High School Students in Ho Chi Minh City, Vietnam

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ABSTRACT

Background: Depression in high school students is a common mental health problem and requires evaluation for early intervention. The study was carried out to determine the prevalence of depression symptoms and associated characteristics among high school students in Ho Chi Minh City, Vietnam.

Methods: This cross-sectional study enrolled participants between February 2022 and June 2022. The instrument utilized was a questionnaire of socioeconomic-demographic variables, educational characteristics, and the self-reported depression scale obtained from the Centre for Epidemiological Studies-Depression (CES-D).

Results: 384 high school students (165 males and 219 females) were questioned. The CES-D had a mean score of 17.3, with 57.6% of participants reporting depressed symptoms. The frequency was 63.3% among male students (OR = 1.84, 95% CI = 1.19-2.83, p = .005). Multiple logistic regression revealed that adolescents with poor health, weak friendships, limited participation in school activities, family problems, financial worries, and negative educational environments were significantly more likely to experience depressive symptoms (odds ratios ranging from 1.60 to 9.97, confidence intervals spanning 1.03 to 78.05, and p-values from <.001 to .044).

Conclusion: The study emphasized the necessity of health promotion programs that target mental health awareness, improve social support networks, and introduce stress reduction techniques in schools to reduce the prevalence of depression among teenagers in Ho Chi Minh City, Vietnam.

Keywords: depressive symptom, school adolescents, socio-demography, family, Vietnam

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INTRODUCTION

Depression is a widespread mental health problem that impacts people worldwide, irrespective of age, gender, or social standing. High school students are a particularly vulnerable group among these. The shift from infancy to maturity, together with academic demands and societal transformations, might create difficulties during this time. Recently, there has been a rising worry on the escalating prevalence of depression among high school students, both worldwide and in Vietnam. It is essential to identify the risk factors linked to depression in this particular group to enable early intervention and offer the required support.¹

Thapar, Collishaw² revealed that depression affects between 4% to 8% of adolescents. The prevalence of this phenomenon rises with age, with larger rates observed in high school children in comparison to middle school adolescents. Depression is a major issue among high school pupils in Vietnam. Previous studies presented that a significant of secondary students in Can Tho City, Vietnam, had symptoms that may be considered equivalent to a diagnosis of depression.³ This proportion is also similar to high school students in Ho Chi Minh City, Vietnam, who reported suffering symptoms of depression.⁴ Depression is increasing among students due to factors like the COVID-19 pandemic, which include social isolation, prolonged online study, and a lack of social support.⁵ Moreover, the academic stress factor should be taken into account because Vietnamese students experiencing significant academic stress are more likely to develop depression.⁶

Various risk factors contribute to depression in high school adolescents, including individual, family, school, and community influences. Personal issues may encompass low self-esteem, inadequate academic achievement, and substance addiction.⁷ Family factors may encompass family discord, parental mental health challenges, and inadequate family support.⁸ School issues may encompass elevated academic demands, instances of bullying, and absence of supporting teacher-student connections.⁹ Community issues may encompass poverty and limited availability of mental health care.¹⁰

Early detection of these risk factors is essential to prevent the development of depression and reduce its effects on students' academic performance, social interactions, and general well-being. Schools are crucial in the early detection and intervention process. They can establish screening programs to detect kids who are at risk and offer supportive services including counselling and referrals to mental health services.¹¹

Several high schools in Ho Chi Minh City, Vietnam are now focusing on counselling to support their students. Nguyen Huu Canh High School in Binh Tan District is one of the leading schools in this initiative.¹² Nguyen Huu Canh High School in Binh

Tan District, Ho Chi Minh City, Vietnam was surveyed by the Aid for Social Protection Program Foundation Vietnam regarding the Prevention of Sexual Harassment among adolescents from October 17 to October 22, 2019.¹³ There is a lack of information about depression among high school students in Ho Chi Minh City, Vietnam. It is essential to establish the incidence of depression and associated factors among high school students in Ho Chi Minh City, Vietnam. The findings will aid in developing solutions to improve their learning environment and mental well-being.

The current study was to determine the occurrence of depression symptoms among students at Nguyen Huu Canh High School in Binh Tan District, Ho Chi Minh City, Vietnam in 2022, utilizing the Center for Epidemiologic Studies Depression Scale and exploring associated factors.

METHODOLOGY

Measures: This cross-sectional survey was conducted at Nguyen Huu Canh High School in Binh Tan District, Ho Chi Minh City, Vietnam in 2022. The following formula was used to determine the sample size: $n = \lceil \frac{z^2 \cdot 1 - \alpha / 2 p(1 - p)}{d^2} \rceil$.¹⁴ Where: n is the smallest sample size to be achieved; p is the expected prevalence: 39.8%⁴; d is the absolute error; $Z_{1-\alpha/2}$ is Z statistic for a confidence level of 95%. Determined to require a minimum of 367 participants, based on statistical calculations.

The questionnaire was delivered to students randomly on the day of the survey. The researchers clarified the research purpose briefly, while the second researcher gave hard copies of the questionnaires to the students. Participants provided verbal agreement before the research, and their participation was voluntary. When the questionnaire was returned to researchers, it was also considered informed consent from students. The questionnaire was distributed to 430 students, with 414 confirmed responses. Out of these, 384 fully completed questionnaires were analyzed. Data collection included collecting demographic information and comprehensive observations on the school environment of the participants.

The study also evaluated the individuals' risk of depression using the Center for Epidemiologic Studies Depression Scale (CES-D).¹⁵ The scale has been confirmed to be reliable and accurate for use with students in schools in Vietnam by Nguyen DT et al¹⁶ in 2013. The survey consists of 20 statements, such as "I felt lonely," rated on a four-point Likert scale from 0 = 'less than 1 day' to 3 = '5-7 days'. The alpha coefficients for the scale were .86 at Time 1 and .87 at Time 2. The score ranges from 0 to 60, with high scores indicating greater depressive symptoms. ≥ 16 is cut-off for clinical depression.^{15,16}

Data analysis: Data analysis was performed using SPSS 20 software. Multiple logistic regression model was used to assess the relationship between differ-

ent factors and the prevalence of depression. The reported results are adjusted Odds Ratio (OR) and 95% confidence intervals (95% CI). The p -value $< .05$ was considered significant.

Ethical Statement: Ethical In line with the ethical standards outlined in the Declaration of Helsinki and the guidelines set forth by the American Psychological Association regarding research involving human subjects, the current study meticulously followed ethical protocols.^{17,18}

Approval of Institutional Ethical Committee: The Ethical Committee of the Graduate Academy of Social Sciences, Vietnam has granted approval for this study on April 17, 2021 (Ref. No. 586/QD-HVKHXH).

RESULTS

The study sample consisted of high school students from Nguyen Huu Canh High School in Ho Chi Minh City, Vietnam. 43% of the sample were male and 57% were female, showing a greater representation of female students, as seen in Table 1.

The participants were evenly dispersed across different school grades, with a slight majority in the 12th grade (35.7%). The academic performance data from the previous semester indicated that the majority of students were classified as good (62.8%), followed by average (29.4%), and a small percentage were judged excellent (7.6%).

The average depression risk score, assessed using the CES-D scale, was 17.3 ± 7.2 for a sample of 384 students. The median depression risk score was 16, with an interquartile range of 13 to 21. Table 2 displays an analysis of depressive symptoms in high school students based on demographic factors such as gender, school grade, and previous semester's grade point average (semester 1, the school year 2021-2022). 57.6% of the participants, or 221 high school students, had depressive symptoms, while 42.4%, or 163 adolescents, did not.

Male participants showed a significantly higher

prevalence of depressive symptoms (63.3%, $n = 140$) compared to female participants (36.7%, $n = 81$). A logistic regression test confirmed the significance ($p < .05$) with an odds ratio of 1.84 (95% CI: 1.19 - 2.83), indicating that males were around 1.84 times more likely to display depressive symptoms. Females did not show a statistically significant difference in the chance of developing depressive symptoms compared to males (OR = 1.00).

Depressed symptoms did not show significant differences between 11th and 12th grades, as indicated by p -values of .113 and .798, respectively. The odds ratios for 11th and 12th grades compared to 10th grade were 1.51 (95% CI: .91 - 2.51) and 1.07 (95% CI: .66 - 1.73), respectively, suggesting no statistically significant higher risk.

The analysis found no significant differences in the distribution of depressive symptoms based on grade point average from the previous semester. The logistic regression test showed p -values below .05 for all comparisons. There were no significant differences in the odds ratios for experiencing depressive symptoms based on academic success. The odds ratios were 1.36 (95% CI: .63 - 2.95) for good grades and 1.18 (95% CI: .52 - 2.67) for ordinary grades compared to exceptional grades.

Table 1: Demographic background of participants

Characteristic	Participants (%)
Gender	
Male	165 (43)
Female	219 (57)
Grade Level	
10th	128 (33.3)
11th	119 (31)
12th	137 (35.7)
Grade Point Average last semester	
Excellent (8.0-10.0)	29 (7.6)
Good (6.5-7.9)	241 (62.8)
Average (5.0-6.4)	113 (29.4)
Weak (0.0-4.9)	1 (0.2)

Table 2: Prevalence of students having depressive symptoms

Demographic background	Depressive symptoms (%)	No depressive symptoms (%)	p -value*	OR (95% CI)
Total	221 (57.6)	163 (42.4)		
Gender				
Male	140 (63.3)	79 (48.5)	.005	1.84 (1.19 - 2.83)
Female	81 (36.7)	84 (51.5)		
School grade				
10th	69 (31.2)	59 (36.2)		1
11th	76 (34.4)	43 (26.4)	.113	1.51 (.91 - 2.51)
12th	76 (34.4)	61 (37.4)	.798	1.07 (.66 - 1.73)
Grade point average last semester (semester 1, school year 2021-2022)				
Excellent	15 (6.9)	14 (8.6)		1
Good	143 (64.7)	98 (60.1)	.434	1.36 (.63 - 2.95)
Average	63 (28.5)	50 (30.7)	.698	1.18 (.52 - 2.67)
Weak	0	1 (.6)		

Note: *, Statistical significance at $p < .05$; OR, Odds Ratio; Clinical depression cut-off point: ≥ 16 .

Table 3: Factors associated with depression symptoms among sample

Factors	Depressive Symptoms (%)	No depressive Symptoms (%)	p-value*	OR (95% CI)
Health status in the past week				
Good	81 (36.7)	74 (45.4)	-	1
Normal	114 (51.6)	82 (50.3)	.27	1.27 (.83 - 1.94)
Poor	26 (11.8)	7 (4.3)	.007	3.39 (1.39 - 8.29)
Relationship with friends in the past week				
Good	103 (46.6)	79 (48.5)	-	1
Normal	105 (47.5)	83 (50.9)	.886	.97 (.64 - 1.46)
Poor	13 (5.9)	1 (.6)	.028	9.97 (1.27 - 78.05)
Participation in school sports and arts activities in the last semester				
Did not participate	17 (7.6)	21 (12.9)	-	1
Participated in a few activities	81 (36.7)	44 (27.0)	.029	2.27 (1.09 - 4.76)
Participated in many activities	28 (12.7)	29 (17.8)	.675	1.19 (.52 - 2.72)
Participated in all activities	95 (43.0)	69 (42.3)	.144	1.70 (.83 - 3.46)
Exercise in the past month				
Every day	43 (19.5)	36 (22.1)	-	1
Several times a week	85 (38.5)	66 (40.5)	.788	1.08 (.62 - 1.86)
Several times a month	52 (23.5)	30 (18.4)	.248	1.45 (.77 - 2.73)
Did not exercise	41 (18.6)	31 (19.0)	.756	1.11 (.58 - 2.11)
Playing video games/social media in the past month				
Every day	92 (41.6)	58 (35.5)	-	1
Several times a week	77 (34.8)	65 (39.9)	.22	.75 (.47 - 1.19)
Several times a month	41 (18.6)	34 (20.8)	.339	.76 (.43 - 1.33)
Did not play	11 (5.0)	6 (3.7)	.787	1.16 (.40 - 3.30)
Marital Status of Parents				
Parents living together	191 (86.4)	147 (90.2)		1
Parents divorced/separated	11 (5.0)	3 (1.8)	.117	2.82 (.77 - 10.31)
Orphaned by father/mother	17 (7.6)	12 (7.4)	.826	1.09 (.50 - 2.35)
Other	2 (.9)	1 (.6)	.726	1.54 (1.38 - 17.19)
Family often has problems				
Never	119 (53.9)	107 (65.6)		1
Sometimes	98 (44.3)	55 (33.7)	.028	1.60 (1.05 - 2.44)
Often	4 (1.8)	1 (.7)	.256	3.60 (.39 - 32.78)
Students feel troubled by family issues (n=159)				
Never	11 (10.8)	17 (29.8)		1
Sometimes	76 (74.5)	37 (64.9)	.008	3.17 (1.35 - 7.48)
Often	15 (14.7)	3 (5.26)	.006	7.73 (1.79 - 33.19)
Students worried by family financial issues				
Never	34 (15.4)	51 (31.3)		1
Sometimes	133 (60.2)	95 (58.3)	.004	2.1 (1.26 - 3.49)
Often	54 (24.4)	17 (10.4)	<.001	4.76 (2.37 - 9.57)
Parents care. share with students				
Often	92 (41.7)	89 (54.6)		1
Sometimes	115 (52.0)	61 (37.4)	.006	1.82 (1.19 - 2.79)
Never	14 (6.3)	13 (7.9)	.921	1.04 (.46 - 2.34)
Family imposes academic goals on students				
Never	80 (36.2)	70 (42.9)		1
Sometimes	104 (47.1)	63 (38.7)	.108	1.44 (.92 - 2.26)
Often	37 (16.7)	30 (18.4)	.797	1.08 (.60 - 1.93)
Family scolds when student's academic performance is poor				
Never	84 (38.0)	56 (34.4)		1
Sometimes	110 (49.8)	91 (55.8)	.334	.81 (.52 - 1.25)
Often	27 (12.2)	16 (9.8)	.744	1.13 (.56 - 2.28)
Students' feelings when scolded by family for poor academic results				
Sad. discouraged	92 (67.2)	51 (47.7)		1
Normal	38 (27.7)	49 (45.8)	.002	.43 (.25 - .74)
Other	7 (5.1)	7 (6.5)	.295	.55 (.18 - 1.67)
Family scolds' students about issues other than academics				
Never	14 (6.3)	24 (14.7)		1
Sometimes	181 (81.9)	129 (79.1)	.014	2.41 (1.20 - 4.83)
Often	26 (11.8)	10 (6.1)	.003	4.46 (1.67 - 11.93)
Students' feelings when scolded by family on issues other than academics (n=349)				
Sad. discouraged	88 (41.9)	36 (25.9)		1
Normal	114 (54.3)	99 (71.2)	.002	.47 (.29 - .76)
Other	8 (3.8)	4 (2.9)	.756	.82 (.23 - 2.89)

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Factors	Depressive Symptoms (%)	No depressive Symptoms (%)	p-value*	OR (95% CI)
Perception of the Educational Program				
Light	7 (3.2%)	3 (1.8%)	-	1
Normal	199 (90.1%)	156 (95.7%)	.388	.55 (1.39 - 2.15)
Heavy	15 (6.7%)	4 (2.5%)	.595	1.61 (.28 - 9.23)
Student Pressure by Teaching Methods				
Never	58 (26.2%)	72 (44.2%)	-	1
Sometimes	155 (70.1%)	86 (52.8%)	< .001	2.24 (1.45 - 3.46)
Often	8 (3.6%)	5 (3.0%)	.251	1.99 (.62 - 6.41)
Teacher Concern for Students				
Never	8 (3.6%)	11 (6.8%)	-	1
Sometimes	127 (57.5%)	65 (39.9%)	.044	2.69 (1.03 - 7.01)
Often	86 (38.9%)	87 (53.4%)	.531	1.36 (.52 - 3.55)
Teacher Scolding Students				
Never	48 (21.7%)	49 (30.1%)	-	1
Sometimes	162 (73.3%)	108 (66.3%)	.074	1.53 (.96 - 2.44)
Often	11 (5.0%)	6 (3.6%)	.252	1.87 (.64 - 5.47)

Note: *, Statistical significance at $p < .05$; OR, Odds Ratio

Table 4: Multiple logistic regression model on depressive symptoms

	p-value (*)	OR (95% CI)
Gender	.036	2.57 (1.06 - 6.23)
Health status in the past week	.264	.65 (.30 - 1.39)
Family often has problems	.474	.41 (.04 - 4.75)
Students feel troubled by family issues	.252	.57 (.22 - 1.49)
Students worried by family financial issues	.927	1.04 (.46 - 2.36)
Students' feelings when scolded by family for poor academic results	.413	1.58 (.53 - 4.70)
Family scolds' students about issues other than academics	.028	.44 (.21 - .91)
Student pressure by teaching methods	.542	.77 (.33 - 1.80)
Teacher scolding students	.583	.75 (.27 - 2.08)

Note: *, Statistical significance at $p < .05$; OR, Odds Ratio

Our study found a substantial link between gender and depressive symptoms among high school students, with males being at a higher risk. There were no significant connections discovered between school grade or academic achievement in the previous semester.

Table 3 shows the relationship between various demographic and lifestyle factors and the presence of depressive symptoms among students. Factors examined included health status, relationships with friends, participation in school sports and arts activities, exercise frequency, engagement with video games/social media, marital status of parents, family dynamics, and perceptions of educational pressures.

Students reporting poor health status in the past week were significantly more likely to exhibit depressive symptoms (OR = 3.39, 95% CI [not provided], $p = .007$) compared to those reporting good health, suggesting a strong association between perceived poor health and depressive symptoms. A significant relationship was found for students reporting poor relationships with friends; they were more likely to have depressive symptoms (OR = 9.97, $p = .028$) than those with good relationships, indicating that quality of friendships plays a crucial role in students' mental health. Participation in a few school sports and arts activities was associated with a higher likelihood of depressive symptoms (OR = 2.27, $p = .029$) compared to non-participation, while no signif-

icant differences were found for more frequent participation. No significant associations were observed between the frequency of exercise, playing video games, or using social media and depressive symptoms, suggesting these factors do not independently predict depressive symptoms among students. Significant associations were observed in family dynamics; students who reported their family often has problems or felt troubled by family issues were more likely to exhibit depressive symptoms (OR = 1.60, $p = .028$ for family problems; OR = 3.17, $p = .008$ and OR = 7.73, $p = .006$ for being troubled by family issues, respectively). Additionally, concerns about family financial issues significantly correlated with depressive symptoms (OR = 4.76, $p < .001$ for often worried). While the marital status of parents showed a trend towards significance in divorced/separated parents, it did not reach statistical significance. Parental care and sharing with students often were associated with fewer depressive symptoms, highlighting the importance of parental support. Students who felt pressure from teaching methods sometimes or often were significantly more likely to report depressive symptoms (OR = 2.24, $p < .001$ for sometimes), emphasizing the impact of perceived educational pressure on mental health. Although teacher concern for students showed a significant association with depressive symptoms (OR = 2.69, $p = .044$ for sometimes concerned), scolding by teachers was not significantly associated with depressive symptoms.

It is noteworthy that the findings of the multiple logistic regression analysis revealed a significant association between Gender (OR = 2.57, $p = .036$) and Family scolds' students about issues other than academics (OR = .44, $p = .028$) with the prevalence of depressive symptoms among high school students. Refer to Table 4 for all the factors included in the multiple logistic regression model.

DISCUSSION

Our study's first crucial finding revealed a large prevalence of depression among high school students, with more than half (57.6%) exhibiting symptoms of depression. The results align with a study carried out in an urban area of Kathmandu, Nepal, which found that 56.5% of high school students exhibited depressed symptoms.¹⁹ This similarity indicates that the prevalence of depression among students in high school may be a worldwide concern, rather than limited to a particular area or society. A study in Northwest Ethiopia found a depression frequency of 41.4% among high school pupils.²⁰ The variance may stem from factors including geographical location, cultural disparities, or methodological inconsistencies in depression assessment.

The second key discovery of our study involves analyzing depression symptoms in high school students based on demographic factors such as gender, school grade, and grade point average from the previous semester. Our study shows a notably greater prevalence of depressive symptoms in males than in females. This aligns with prior studies that have identified elevated levels of depression in guys.²¹ Contrary to other research findings that show higher levels of depression in females, this study presents a different perspective.^{22,23} The inconsistencies may result from variations in sample characteristics or measuring techniques. Our investigation found no significant differences in depressed symptoms among different grade levels. Nevertheless, it goes against the results of another study that identified a notable rise in depression symptoms among students at advanced grade levels.²⁴ Depressive symptoms did not show any statistically significant differences based on grade point average categories (excellent, good, medium, and weak) from the previous semester. Yet, it goes against the results of a study on high school students in Turkey, which identified that having a lower grade point average was a separate risk factor for depression.²³

The third key discovery of our research demonstrates the relationship between different demographic and health factors, friendships, involvement in school sports and arts, frequency of exercise, interaction with video games and social media, parents' marital status, family interactions, perceptions of academic pressure, and the occurrence of depressive symptoms in high school students. This study's discovery of a strong connection between perceived

physical health issues and depression symptoms aligns with earlier research by Peng, Liang.²⁵ Interventions to enhance pupils' physical health may also positively impact their mental health. This study highlights the importance of excellent connections in students' mental health, aligning with Raniti, Rakesh²⁶ research that showed supportive friendships can help prevent depression. This research discovered that engaging in a limited number of school sports and arts activities was linked to an increased probability of experiencing depressive symptoms. This contrasts with the results of Eime, Young²⁷, who found that involvement in extracurricular activities was linked to reduced levels of depressive symptoms. This disparity could result from variations in the type or level of the activities examined, and requires additional scrutiny. This study's results align with existing research by not showing any strong connections between exercise frequency, video game playing, or social media use and depression symptoms. A study has reported favorable relationships, as noted by Eime, Young²⁷ and Santos, Mendes²⁸. Previous research by Shi, Tao²⁹, Wang, Zhang³⁰, and Zhang, Buchanan³¹ emphasizes the crucial role of the home environment in students' mental health, as seen by the strong connections found between different family dynamics and depressive symptoms. The strong correlation identified between perceived educational pressure and depressed symptoms aligns with Moksnes, Løhre³² research, highlighting the importance for educational institutions to take into account the mental health consequences of their teaching approaches.

CONCLUSION

The study thoroughly examined high school students' prevalence of depression and causes. Over half of the pupils surveyed showed depression. The prevalence of depression among high school pupils matches international data, demonstrating that it is widespread. The study challenged gender assumptions by showing that men had higher depression rates than women. The study found no correlation between depression and GPA. The study also showed how many factors affect students' mental health. Low perceived physical health was linked to depression, supportive friendships were good, and extracurricular activities had different effects on students' mental health. The study found that family ties and academic pressure had a greater impact on depression than internet use. The findings underline the need for comprehensive mental health interventions in schools that incorporate kids' psychosocial environments as well as academic performance. Our research on high school kids' depression progression emphasizes the necessity for comprehensive interventions that consider physical health, social interactions, family dynamics, and academic load.

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