ORIGINAL ARTICLES

Stress and associated factors among 12th-grade students of the Hung Yen High School for Gifted Students in 2024

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ABSTRACT

Objective: This study aimed to estimate the prevalence of stress symptoms and its associated factors among 12th-grade students of the Hung Yen High School for Gifted Students in 2024.

Methods: A cross-sectional study was conducted among two hundred and seventy-three 12th graders from the Hung Yen High School for Gifted Students. A self-administered structured questionnaire was used, focusing on the level of stress measured by the 10-item Perceived Stress Scale and its associated factors including personal, family, school, and peer characteristics.

Results: The proportion of students with low, moderate, and severe stress was 24.9%, 63.4%, and 11.7%, respectively. Significantly associated factors of stress included biological sex at birth, educational stress levels, level of care, advice and empathy from parents/caregivers, reluctance to comply with parents' requests, and teachers' encouragement.

Conclusions: The findings imply the need for high schools to promote mental health awareness and implement evidence-based and gender-tailored stress management programs, and promote collaboration between schools and families in creating a supportive and balanced environment for students.

Keywords: *Stress, Perceived Stress Scale, high school, students, Vietnam.*

INTRODUCTION

Stress is a natural human response when an individual faces pressure, which can have negative effects on physical health, mental health, and social relations. Richard Lazarus, an American psychologist, argues that stress results from an "imbalance between demands and resources" or occurs when "pressure exceeds a person's perceived ability to cope" (1). Experiencing mild stress can provide a positive impetus for growth. However, excessive and prolonged stress can lead to serious effects (2), including increased risk of depression and suicide – the third leading cause of premature death in young people (3). High school students are under an excessive pressure from studying and puberty related physical and psychological changes such that early stress detection and its related disorders are essential to provide timely psychological support for adolescents (4).

Studies on high school students show that stress is becoming increasingly common and alarming. In some countries, stress prevalence is high, such as 39% in Mexico (2018) (5). In Vietnam, a survey conducted in 2020 among students of four high schools in two metropolises reported high rates of stress among students. Specifically, the prevalence of students showing symptoms of stress in Ho Chi

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Minh City was 36.1% (6). In Hanoi, the prevalences were 21.0% among students, however, the rate was significantly higher among the sub-urban students than it was among the urban highschoolers (29.1% and 13.5%, respectively) (7). The identified associated factors of stress among highs school students were increased extracurricular activities and increased study pressure by parents; more frequent experience in excessive parental control and expectation in academic performance (7, 8). Though a study conducted in Hung Yen has identified stress prevalence among secondary school students (9), no studies have indicated the stress levels among Hung Yen province's high school students, particularly on gifted students who are often engaged in more intense training curriculum and limited physical activities.

The Hung Yen High School for Gifted Students was established for discovering and developing excellent students, where an advanced curriculum is employed with periodic academic assessments to maintain students' achievements in national and regional competitions. Students, especially those in grade 12, have pressure from peer competition and future orientation before the university entrance exam. In addition, the school does not have a health care and psychological counselling unit for the students (9). We aimed to identify the prevalence of stress and associated factors among students at the Hung Yen High School for Gifted Students in 2024. The study provides evidence informing interventions that promote mental health at the school and other settings of similar context.

METHODS

Study Design: location, and duration: A quantitative cross-sectional study.

Study site and time: The study was conducted from March to May 2024 at the Hung Yen High School for Gifted Students, Hung Yen city, Hung Yen province.

Study subjects: 12th-grade students studying at the Hung Yen High School for Gifted Students who were present at the time of data collection.

Sample size and sampling methods

Sample size was calculated using the formula for estimation of a proportion with an absolute precision. The significance level was $\alpha = 0.05$; the referenced proportion of students with stress was $p = 0.203$ (12), and the estimated error was $d = 0.06$, and the expected non-response rate of 5%. A design effect of 1.5 was used to account for the cluster sampling method described below. The calculated minimum sample size was 273 students.

Sampling methods: 273 students were recruited from the 11 classes using a clustered random sampling method in two steps. Step 1, all 12^{th} grade classes were selected. Step 2, in each class, an average of 25 students were randomly selected based on the list of students in each class.

Tools and methods of data collection

We contacted the school management board to request permission for the study implementation. The students and parents were provided with information on the purpose of the study, voluntary participation, and confidentiality isssues and instructions to complted the questionnaire.

The research tool was comprised of stress status measured by the PPS-10 (9); and four main groups of independent variables: 1) Personal characteristics; 2) Family factors; 3) School-related factors; 4) Friendship factors.

The PSS-10 involves 10 items, using a 5-point frequency scale for each item - from 0 (never) to 4 (very often) for six questions (perceived helplessness: questions 1, 2, 3, 6, 9, 10) or otherwise from 4 (never) to 0 (very often) for four questions (lack of self-efficacy: questions 4, 5, 7, 8). The total scores of the 10

items, were classified into 3 levels: mild stress (0-13 points), moderate stress (14-26 points), and severe stress (27-40 points). A binary dependent variable was computed using the three-level variable, where mild stress was considered as "no stress" and moderate to severe stress was considered as "stress". Questions on the PSS ask the respondent to rate their feelings and thoughts for the past month (10). The tool was also used in other studies in Vietnam (5, 11). In this study, we conducted a field test of the tool before implementing the data collection by asking six grade-12 students to take the survey and provide feedback on which questions were difficult to understand and then we revised the tool accordingly.

Processing and analyzing data

Data entry was conducted using the Epidata version 3.1. Descriptive statistics were used to describe the qualitative variables, presented as frequency and percentage. For discrete and continuous quantitative variables, the mean and standard deviation were calculated and presented.

To determine the factors associated with stress, univariate and multivariate Akaike Information Criterion (AIC) - based Stepwise Logistic Regression (ASLR) were used. Univariate logistic regression between the binary stress status and each independent variable was used to determine the shortlist of variables with p-value equal or less than 0.2 for the multivariate logistic regression. We have validated the key assumptions of the multivariate logistic regression including linearity of the Logit, no multicollinearity, and independent observations. The Wald test was used to validate the linearity assumption, where the Odds ratios could be interpreted with the incremental levels in each ordinal independent variable. The shortlisted variables were checked for multicollinearity using a collinearity matrix, in which we eliminated one variable of any variable pairs with correlation coefficient higher than 0.7 before the next modeling process. In addition, McFadden's Pseudo R^2 and Hosmer–Lemeshow test (Chi-square goodness-of-fit test) were used to back up the final selected model of ASLR.

Research ethics: Written informed consent was obtained from all students and their guardians. The study was approved by Hanoi University of Public Health's Ethics Committee (Approval decision number 85/2024/YTCC-HD3).

RESULTS

Characteristics of students participating in the study

The study describes characteristics of 273 students participated in the study. Female students accounted for 56.0% of the study sample. Students specialized in natural science subjects such as mathematics, physics, chemistry, biology, and information technology were predominant (60.8%). Most students had good academic performance and good behavioral conduct (82.4% and 97.8%, respectively). Nearly half of the students (45.1%) spent three hours or more on self-study every day.

Prevalence of stress symptoms

Table 1. Itemized stress scores of the PSS-10 among 12th graders of the Hung Yen High School for Gifted Students in 2024 (n = 273)

Content	Means	SD
Frequency of being upset in the preceding month caused by unexpected events	2.0	0.9
Frequency of feeling lack of control over important things in the preceding month	2.0	1.1
Frequency of feeling nervous or stress in the preceding month	2.1	1.2
Frequency of feeling unconfident about the person's ability to handle personal problems in the preceding month	1.9	0.9
Frequency of feeling that things happened as the student expected in the preceding month	2.1	1.0
Frequency of being unable to cope with all the things the student had to do in the preceding month	2.0	0.9
Frequency of being able to control irritations in the preceding month	1.8	1.0
Frequency of feeling on top of things in the preceding month	1.9	1.0
Frequency of being angry because of the things happened outside of the student's control in the preceding month	2.0	1.1
Frequency of feeling of inability to overcome difficulties which pile up so high in the preceding month	1.8	1.0

The sources of stress among students measured by the 10 items of the PSS-10 are presented in Table 2. The mean scores of the responses for each item ranged from 1.8 to 2.1 on a 4-point scale. Most of the responses tended to be consistent, especially some questions with relatively low standard deviation, such as items number 1, 4, and 6.

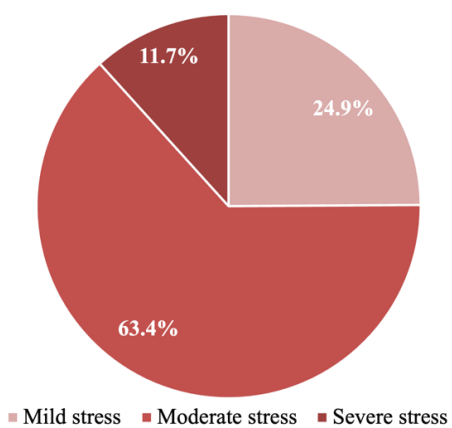

Figure 1. Stress levels among 12th graders of the Hung Yen High School for Gifted Students in 2024 (n = 273)

Figure 1 presents the stress levels classified by the PSS scale, with the proportions of low, moderate, and severe stress being 24.9%, 63.4% and 11.7% respectively. When students having moderate to severe stress were categorized as stressed cases, the proportion of stress cases among 273 participants was 75.1%.

Associated factors of high-school students' stress

Univariate logistic regression and multicollinearity validation were performed for 48 independent variables. Among those, 19 variables were shortlisted for the ALSR modeling process (the p-value of univariate logistic regression ≤0.2 and correlation coefficient <0.7). The detail results of univariate logistic regression and correlation coefficient are presented in the Supplement. The ASLR results identifying the best set of variables that predict stress among highschoolers are presented in Table 3.

Table 2. Associated factors of stress among 12th grade students identified by the multivariate AIC-based Stepwise Logistic Regression

Variable	Group	Stress status		Adjusted OR (95% CI)	p-value
		Yes n (%)	No n (%)		
Educational stress levels measured by the ESSA scale	Low (ref.)	79 (60.3)	52 (39.7)	3.9 (2.1 - 7.4)	**<0.01**
	Medium	82 (94.3)	5 (5.7)		
	High	44 (80.0)	11 (20.0)		
Gender	Male (ref.)	75 (62.5)	45 (37.5)	2.2 (1.1 - 4.3)	**0.02**
	Female	130 (85.0)	23 (15.0)		
Level of care by parents/ caregivers	High concern (ref.)	108 (78.8)	29 (21.2)	0.5 (0.3 - 0.9)	**0.02**
	Moderate concern	86 (76.8)	26 (23.2)		
	Less concern	11 (43.5)	13 (56.5)		
Parents give advice and show empathy when students have low grade/mistake	Yes (ref.)	100 (66.2)	51 (33.8)	4.6 (2.1 - 10.3)	**<0.01**
	No	99 (86.1)	16 (13.9)		
Reluctance to do their parents' requests	Never (ref.)	22 (73.3)	8 (27.7)	1.7 (1.1 -2.6)	**0.02**
	Rarely	57 (60.6)	37 (39.4)		
	Occasionally	108 (83.7)	21 (16.3)		
	Frequently	18 (90.0)	2 (10.0)		
Consensus on school's regulations	Totally disagree	7 (41.2)	10 (58.8)	1.6 (1.1 – 2.4)	**0.01**
	Disagree	5 (62.5)	3 (37.5)		
	Moderate	73 (79.3)	19 (20.7)		
	Agree	96 (80.0)	24 (20.0)		
	Totally agree	24 (66.7)	12 (33.3)		
Teachers' encouragement when the student does good things	Never (ref.)	12 (92.3)	1 (7.7)	0.6 (0.4 - 0.9)	**0.05**
	Rarely	31 (77.5)	9 (22.5)		
	Occasionally	104 (77.0)	31 (23.0)		
	Frequently	58 (68.2)	27 (31.8)		

Variable	Group	Stress status		Adjusted OR (95% CI)	p-value
		Yes n (%)	No n (%)		
Model fit statistics	AIC			235.51	
	McFadden's Pseudo R^2			0.2822	
	Hosmer–Lemeshow test			5.328	
	Hosmer–Lemeshow p-value			0.7220	

Note: The ordinal variables are significant for the Wald Test which indicates statistically significant linearity trends between ordinal levels of the independent variables and log-odds of the stress status (No/Yes) (p-value =< 0.05).

Table 2 presents the best set of predictors of stress among 12th graders in the Hung Yen High School for Gifted Students determined by the ASLR modeling approach. Though the Hosmer–Lemeshow test indicated an adequate goodness-of-fit model with the observed data, the set of variables could only explain 28.2% the variance in the stress status. The factors significantly associated with stress were biological sex, educational stress, level of care by parents/ caregivers, advice and empathy from parents/ caregivers, reluctance to comply with parents' requests, agreement with school's regulations, and teachers' encouragement. Students with a higher level of educational stress were almost four times more likely to have a general stress status (adjusted OR = 3.9). Female students were 2.2 times more likely to have PSS stress than their male counterparts. The lower levels of care given by parents/ caregivers the participants reported, the lower likelihood of stress was observed among the participants (adjusted OR = 0.5). Those who were more reluctant to their parents' requests were more likely to have stress (adjusted OR = 1.7). Students with higher levels of agreement with school's regulations were more likely to get stress (adjusted OR=1.6). Teachers' encouragement and understanding from parents were protective factors against stress. Students received more frequent encouragements from teachers and more advice, empathy from parents when they got mistakes were less likely to experience stress.

DISCUSSION

The study results provide the first evidence of stress among senior students at a high school for gifted students in Hung Yen province and some factors related to their stress.

The study found that 75% participants experienced moderate or severe stress measured by the PSS scale. High prevalence of stress among high school students has been reported in Vietnam and other countries. The prevalence is higher than the figures in other studies conducted among gifted highschoolers in Ho Chi Minh City using the same PSS-10 scale (28.4% and 33.8% for moderate and severe stress) (8, 11). The difference in study population could explain the higher prevalence in our study. A study conducted in Indian high school students using the PSS-10 showed a higher prevalence of moderate and severe stress than our study (88.1%) (12). These indicate high variability in stress prevalence among high school students, which could be moderated by regional socio-economic factors and school-based health promotion programs implemented in each school (8, 22). The findings also urge to implement mental healthcare for students of the gifted school, including screening for early detection of signs and symptoms and implementing appropriate interventions to alleviate stress in these students, especially those at the final year of high school.

In our study, female students were more likely

to report stress symptoms than their male counterparts. The same result was indicated in a study conducted among high school students in Can Tho City and another study in Bhutan (13, 14). This might have resulted from biological and psycho-social differences between male and female students during the adolescent period, in which hormonal and mental challenges in female students make it more difficult for them to adapt to internal and external stressors (15). The findings highlight the need for gender-sensitive mental health support programs in high schools.

Educational pressure was found to be associated with stress status in the gifted students, in which students reported higher levels of study pressure were more likely to get stress. A study conducted in Thua Thien-Hue found a similar relationship between study pressure and psychological stress (16). Adequate amount of academic pressure can help students develop more effective coping skills and confidence in their problem-solving abilities; however, excessive academic pressure can lead to psychological burden and stress (17). Our findings highlight the importance of keeping academic pressure at an appropriate level and balanced with relaxation opportunities. In addition, educational curricula should integrate the component for improving stress management skills among the students.

In this study, students reporting no advice and empathy from parents when they made mistakes or got low grades and those with more reluctance to their parents' requests were more likely to experience stress (adjusted ORs were 4.6 and 1.7, respectively). The adjusted ORs reflect strong associations and highlight the importance of parents' advice and understanding. However, this study revealed that a lower level of care given by parents/caregivers was associated with a lower likelihood of stress among the participants (adjusted OR = 0.5). These findings highlight the importance of appropriate care and suitable caring approaches from parents. It has been argued that in a culture where academic performance is often regarded as an important indicator of personal value and family honor, an overprotective parenting style (asking too much without understanding and empathy) plus parents' expectation may increase academic stress among high school students, especially the 12th graders who are going to take the important college entrance examination (18). Therefore, it is crucial for educators and parents to understand and address the impact of such pressure on students. It is important that schools implement programs and workshops to increase awareness about these effects and promote supportive and balanced environments at school and home.

The study findings indicated that teachers' encouragement was a protective factor against students' stress (adjusted OR = 0.6), which was consistent with results from other studies (19). It has been argued that teachers' encouragement or emotional support may be characterized by emotional closeness, recognition, and interest in students' concerns and can act as a resource that supports learning and mitigates the risk of stress among students (19). The study findings emphasized the importance of good teacher-student relationships and a supportive school environment in promoting students' mental health.

Study limitations: With a cross-sectional design, the study was unable to confirm the causal relationships between stress and associated factors among students. In addition, self-reported data might be subjected to recall bias. In addition, though the PSS tool was validated and used in other studies, it is not a diagnostic tool, only allowing for identification of symptoms suggestive of a stress diagnosis. To determine an accurate prevalence of stress, a clinical examination conducted by specialists are needed. Although this study provided some evidence of factors associated with stress, further qualitative assessments are needed for better understanding of how personal, family, peer, and school factors influence stress status among the students.

CONCLUSION

Our study has provided important insights into the level of stress and associated factors among 12th graders studying at a high school for gifted students in Vietnam. The study findings underscore the burden of stress among the students and identify important factors associated with stress including female gender, higher study pressure, higher level of care by parents, no advice and empathy from parents, imbalanced care of parents and teachers' encouragement. The study findings highlight the need for promoting evidence-based and gender-tailored stress management programs at the school which should prioritize female students and those with higher study pressure identified by periodical stress screening. These programs also need to promote school-family collaboration to create supportive and balanced environments for students.

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