

Prevalence of School Violence and Its Association with Depression, Anxiety, and Stress among Female Middle School Students in a Mountainous Province of Northern Vietnam: A Cross-Sectional Descriptive Study

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ABSTRACT

Background: School violence remains a public health concern in Vietnam, yet evidence from Northern mountainous regions is limited. The objectives were to assess school violence prevalence and its association with mental health outcomes among female middle school students.

Methods: A cross-sectional study was conducted among 699 students. Data collection occurred Jan–Jun 2025, with analysis through Jan 2026. Validated questionnaires and DASS-21 were used. Multivariate logistic regression estimated adjusted Odds Ratios (aOR) while controlling for age, ethnicity, area, and lifestyle.

Results: Violence prevalence was 71.5%, with psychological (68.2%), economic (35.5%), and physical (32.9%) modalities recorded. Anxiety was most frequent (28.5%), followed by depression (21.3%) and stress (10.6%). Physical violence was a consistent independent predictor for depression (aOR=2.55), anxiety (aOR=2.22), and stress (aOR=2.47). Additionally, insufficient sleep was associated with depression and stress; prolonged social media usage (>3 hours/day) with anxiety and stress; and lack of physical exercise with increased odds of depression.

Conclusion: Female students face a significant prevalence of victimization and emotional impairment. Interventions should integrate violence prevention with promotion of healthy sleep and exercise habits to safeguard student mental health.

Keywords: Mental health, adolescent, violence, students, Vietnam

ARTICLE INFO

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INTRODUCTION

School violence is defined as acts of abuse, mistreatment, physical assault, and health violations, including verbal insults, denigration of dignity, social isolation, and other intentional behaviors resulting in physical or psychological harm within educational institutions.¹ In recent years, school violence has emerged as a critical public health concern, manifesting across diverse educational levels with increasing complexity. These incidents exert profound adverse effects on students' academic performance, psychological well-being, and long-term quality of life.²

Adolescence is a critical developmental period characterized by rapid biological, cognitive, and social changes. During this stage, individuals are particularly vulnerable to environmental stressors and mental health challenges, which can have long-lasting effects on their adult life.³ Within this cohort, female middle school students undergo more pronounced psychophysiological transitions, increasing their vulnerability to mental health disorders. Substantiating this, the unicef (2022) comprehensive study on school-related factors in Viet Nam reported that female students have triple the odds of anxiety symptoms compared to males.⁴ Similarly, research by Barnawi MM et al⁵ identified a significant gender disparity, with females reporting markedly higher levels of depression, anxiety, and stress. Despite the rising prevalence of mental health issues among youth, empirical data documenting the specific burden of these disorders following exposure to school violence remain limited. Evidence suggests that violence is a traumatic experience with enduring detrimental effects on mental health. Specifically, prolonged negative psychological states- notably persistent sadness and hopelessness-are closely associated with experiences of direct bullying. Although both sexes are affected, female students exhibit significantly higher levels of psychological trauma and a markedly greater prevalence of mental disorders than male students.⁶ In Vietnam, Nguyen MH et al.⁷ (2023) confirmed a significant positive correlation between school violence and mental health challenges among middle school students. Furthermore, international literature indicates that adolescents frequently exposed to school violence face an elevated risk of depression and suicidal ideation.⁸ The decision to focus exclusively on female students is based on evidence suggesting that adolescent girls undergo more complex hormonal and psychophysiological transitions than boys, making them more susceptible to internalized mental health disorders like depression and anxiety following trauma. Additionally, in mountainous regions, female students often face unique gender-based social pressures and have different coping mechanisms for violence compared to males. Narrowing the focus allows for a deeper, gender-specific analysis of these vulnerabilities.

In Vietnam, while research on school violence has been extensive in major metropolises, empirical evi-

dence in regional hubs of the Northern mountainous area remains relatively scarce. Thai Nguyen serves as a representative socioeconomic and educational gateway for this region. Exploring this province provides a nuanced perspective on how school violence affects students in a transitional environment-where traditional ethnic values and modern academic pressures intersect. This study, therefore, aims to provide much-needed data that urban-focused research may not fully capture, contributing to a more comprehensive understanding of the mental health challenges faced by female students in this specific regional context.

The objective of this study is to assess the relationship between three types of school violence (physical, psychological, and economic) and three mental health outcomes (depression, anxiety, and stress) among female middle school students in a mountainous province of Northern Vietnam.

METHODOLOGY

Study Design and Setting: A cross-sectional descriptive study was conducted over a one-year period, from January 2025 to January 2026. The actual fieldwork and data collection phase took place between January and June 2025. Subsequently, the period from July 2025 to January 2026 was dedicated to rigorous data cleaning, statistical analysis, and the final synthesis of the study findings to ensure the accuracy and reliability of the reported results.

The research was carried out in Thai Nguyen, a representative mountainous province in Northern Vietnam. To ensure the findings adequately reflect the provincial context, the study included multiple middle schools selected from both central and non-central areas. By incorporating both settings, the study provides a comprehensive background to explore the associations between school violence and mental health issues-specifically depression, anxiety, and stress-among female students across diverse living environments in this mountainous region.

Participants: The study population included female students in Thai Nguyen province.

The study enrolled female students currently attending grades 6 through 9 at selected secondary schools who were present during the data collection period. Participants were required to be capable of understanding and completing the Vietnamese version of the study questionnaires. Enrollment was contingent upon voluntary assent from the students themselves along with written informed consent from their parents or legal guardians, in addition to administrative approval from the respective school authorities.

Students were excluded if they had a prior clinical diagnosis of severe mental health or neurological disorders, as identified through school records or reported by guardians, given the potential confounding influence on study outcomes. Those who were absent

during the data collection phase were also excluded. Furthermore, students who declined participation or submitted incomplete or internally inconsistent questionnaires were not included in the final analysis to ensure data integrity and reliability.

Variables: The study variables included demographic characteristics of female middle school students, and prevalence of three types of school violence experienced by participants, namely psychological violence, economic violence, and physical violence, along with a composite variable representing exposure to any form of school violence. Mental health outcomes comprising depression, anxiety, and stress were assessed using the DASS-21 scale. Additionally, factors associated with each of the three mental health outcomes, depression, anxiety, and stress, were examined independently as separate analytical variables.

Data Sources/Measurement: The Depression, Anxiety, and Stress Scale - 21 Items (DASS-21) was employed to assess the psychological status of the participants. This self-report instrument consists of 21 items, structured into three distinct subscales Depression, Anxiety, and Stress each comprising 7 items. This study utilized the Vietnamese version, formally translated and standardized by the National Institute of Mental Health. The DASS-21 has been rigorously evaluated for its psychometric properties and is validated for use within the Vietnamese context, demonstrating high cross-cultural reliability and validity. Extensive global literature further supports the scale's internal consistency and effectiveness in screening mental health disorders among adolescent populations.⁹ For the purpose of this study, students were identified as screening positives for mental health issues based on established cut-off scores, specifically: depression ≥ 10 , anxiety ≥ 8 , stress ≥ 15 . It is important to note that the DASS-21 was utilized exclusively as a screening tool to identify symptomatic individuals; therefore, these results represent the prevalence of psychological distress rather than clinically confirmed psychiatric diagnoses. This scale has been previously validated and widely used among Vietnamese adolescents, as well as in other regional contexts such as China.^{9,10}

School violence experiences were assessed using a structured questionnaire referencing key components of the Multidimensional Peer Victimization Scale¹¹ and the Revised Olweus Bully/Victim Questionnaire¹². We adapted this selection from previous Vietnamese studies by Nguyen PTH et al¹³ and Le THH et al¹⁴. The instrument demonstrated excellent internal consistency (Cronbach's alpha = 0.913) and evaluated three primary dimensions over a three-month recall period: psychological violence (9 items, including cyberbullying and social exclusion), physical violence (4 items), and economic violence (3 items). Additionally, the tool captured contextual data regarding perpetrators, timing, and locations of the incidents.

Operational Definitions of School Violence Types:

To ensure clarity and reproducibility, the three domains of school violence were operationally defined based on specific behaviors as follows:

- Physical Violence (4 items): Included behaviors such as being hit, kicked, pushed, or having objects thrown at them with the intent to cause bodily harm.
- Psychological Violence (9 items): Comprised acts of verbal abuse, spreading malicious rumors, social exclusion or isolation, public humiliation, threatening gestures, and cyberbullying (insults via social media).
- Economic Violence (3 items): Specifically referred to the forced surrender of pocket money, destruction of personal belongings (school supplies, books), or being coerced into paying 'protection fees' or buying items for others against their will.

Each behavior was assessed based on the students' self-reported frequency, providing a comprehensive view of their victimization experience

Study Size: The study population was randomly sampled from educational institutions across two representative zones, namely the central and non-central areas. Sample size for each subgroup was calculated using the standard proportion formula, incorporating a Z-score ($Z_{1-\alpha/2}$) of 1.96 corresponding to a 95% confidence interval. The prevalence estimate ($p = 0.635$) was derived from a prior study by Nguyen PTH et al.¹⁵ (2021), which reported a school violence prevalence of 63.5% among female middle school students. The absolute precision (d) was set at 0.0635, calculated as 10% of the prevalence value, to maintain methodological rigor in the sample size estimation process.

Applying these parameters, the minimum required sample size (n) was determined to be 221 students per area. To account for a potential 20.0% non-response or dropout rate and to mitigate confounding factors, the target sample size was adjusted to 265 students per area.

Sampling method: A multi-stage stratified cluster sampling technique was employed.

In the first stage, all secondary schools in Thai Nguyen Province were considered as the sampling frame and stratified into two administrative strata: central zones (wards) representing urban areas, and non-central zones (communes) representing rural and mountainous areas.

In the second stage, simple random sampling was utilized to select two secondary schools from each stratum, resulting in a total of four participating schools.

In the third stage, within each selected school, a systematic random sampling method was applied at the classroom level. Specifically, two classes were randomly selected from each grade level (Grades 6 through 9). All eligible female students within these

selected classes were invited to participate in the study.

Initially, 710 female students were approached. After excluding 5 students due to absence or sick leave, 705 students participated in the survey. Following data cleaning, 6 questionnaires were discarded due to being incomplete or having illogical responses. The final analytical sample consisted of 699 students, including 345 from central areas and 354 from non-central areas

Statistical Methods: Data were analyzed using IBM SPSS Statistics Version 26.0. Statistical significance was pre-determined at a p-value <0.05.

To maintain data integrity, a complete-case analysis approach was employed. Questionnaires with more than 10% missing items or significant internal inconsistencies were excluded. Of the 704 questionnaires initially collected, 5 were discarded, resulting in a final analytical sample of 699 students.

Descriptive statistics, including frequencies and percentages, were used to summarize participant characteristics and the prevalence of school violence and mental health outcomes. The associations between school violence and mental health status (depression, anxiety, and stress) were initially explored us-

ing Chi-square (χ^2 test).

Subsequently, multivariate logistic regression was performed to estimate adjusted Odds Ratios (aOR). To isolate the specific impact of each violence modality, three separate models were constructed for depression, anxiety, and stress. A forced entry method was utilized, incorporating all available covariates: individual characteristics (ethnicity, age), environmental factors (residential area), and behavioral habits (social media usage, sleep duration, and physical exercise). The stability of the estimates was confirmed by assessing multicollinearity, with all Variance Inflation Factor (VIF) values remaining below 5.0. Finally, the goodness-of-fit for each model was validated using the Hosmer-Lemeshow test ($p > 0.05$)

Ethics Statement: The study was not registered in a public clinical trial registry (such as PROSPERO) as it is a primary observational cross-sectional descriptive study. However, the study protocol and all research procedures were strictly reviewed and formally approved by the Ethics Committee of the University of Medicine and Pharmacy - Thai Nguyen University (Decision No: RES 1195-2024) prior to the commencement of data collection.

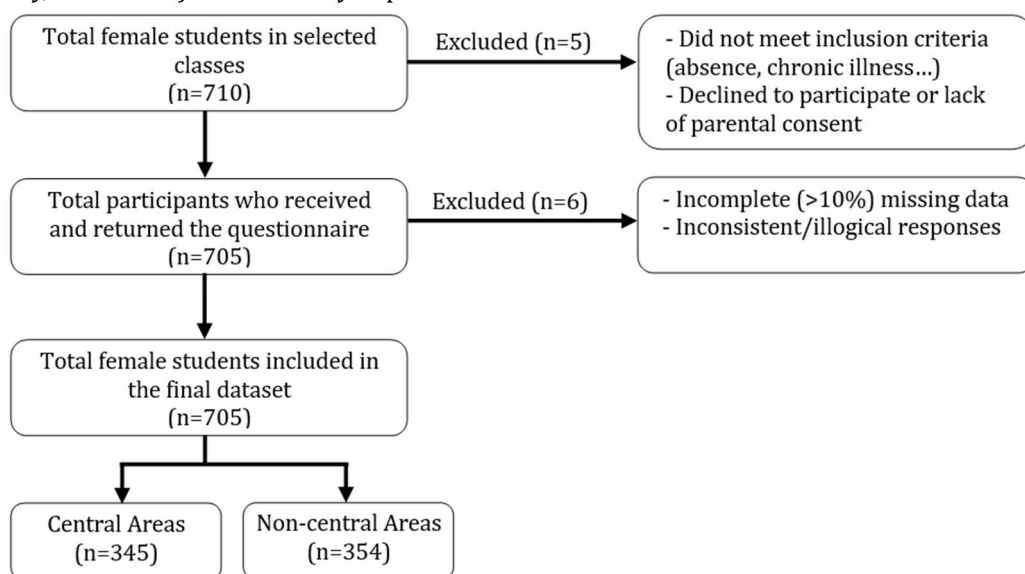


Figure 1: Flowchart of participant recruitment and selection process

RESULTS

The participant recruitment process is summarized in Figure 1. Initially, 710 students were approached, and after exclusions due to absence (n=5) and data cleaning (n=6), the final analytical sample comprised 699 female students (345 from central and 354 from non-central areas)

The demographic profile of the participants is summarized in Table 1. The final sample of 699 female students was predominantly composed of those from the Kinh ethnicity (75.8%), with a significant representation of ethnic minority groups (24.2%). This

distribution aligns with the broader socioeconomic and ethnic landscape of Thai Nguyen Province, which serves as a transitional gateway between the Northern delta and the mountainous regions. The participants had a mean age of 13.42±1.08 years, reflecting a balanced inclusion of students across the early adolescent stage (Grades 6–9), a period characterized by heightened vulnerability to school-based peer victimization and subsequent psychological distress.

The prevalence of school violence victimization among female students was notably high, with 71.5% of participants reporting involvement in at least one form of abuse. As shown in Table 2, psychological

violence emerged as the most pervasive modality, affecting over two-thirds of the cohort (68.2%).

Table 1: Demographic characteristics of female middle school students

Characteristics	Students (n=699) (%)
Ethnicity	
Kinh	530 (75.8)
Others	169 (24.2)
Age (Mean ± SD)	13.42±1.08

Table 2: Prevalence of various school violence modalities among participants (n=699)

Characteristics	Students (%)
Experienced psychological violence	477 (68.2)
Experienced economic violence	248 (35.5)
Experienced physical violence	230 (32.9)
School violence	500 (71.5)

Table 3 Prevalence of mental health outcomes (Depression, Anxiety, and Stress) according to DASS-21

Characteristics	Students (n=699) (%)
Depression	149 (21.3)
Anxiety	199 (28.5)
Stress	74 (10.6)

While less frequent than psychological abuse, the occurrences of economic (35.5%) and physical violence (32.9%) were still substantial. These findings highlight a complex landscape of peer victimization that extends far beyond simple verbal aggression, involving multiple overlapping dimensions of harm.

Regarding mental health status, screening results from the DASS-21 scale revealed a significant burden of psychological distress among the participants. Anxiety was identified as the primary psychiatric concern, occurring in 28.5% of the students. This was followed by significant rates of depression and stress, suggesting that a considerable proportion of female students in this mountainous region are experiencing symptomatic levels of emotional impairment that may require professional support.

Multivariable logistic regression identifies school violence and lifestyle habits as primary factors associated with depression among female students. Physical victimization showed the strongest association (aOR

= 2.55; 95% CI: 1.62–4.02; p < 0.001), followed by psychological violence (aOR = 2.04; 95% CI: 1.15–3.59; p = 0.014). Additionally, behavioral factors were significantly linked to higher odds of depression: insufficient sleep of less than 6 hours per day (aOR = 1.81; 95% CI: 1.21–2.70; p = 0.004) and lack of exercise (aOR = 2.05; 95% CI: 1.38–3.06; p = 0.0000). Notably, demographic variables (age, ethnicity) and social media use did not maintain statistical significance in the adjusted model, suggesting that direct experiences of violence and poor health hygiene have a more critical relationship with depression than broader demographic characteristics.

Multivariable analysis for anxiety confirms that school violence remains a significant associated factor. Female students experiencing physical violence (aOR = 2.22; 95% CI: 1.48–3.35; p = 0.000) and psychological violence (aOR = 1.94; 95% CI: 1.19–3.14; p = 0.007) had significantly higher odds of anxiety. Notably, economic violence showed a borderline significant association (p = 0.052). Unlike depression, anxiety was significantly driven by environmental and lifestyle factors: living in central areas (aOR = 1.49; 95% CI: 1.04–2.14; p = 0.031) and prolonged social media use (> 3 hours/day), which remained a robust predictor (aOR = 1.63; 95% CI: 1.12–2.38; p = 0.011) even after adjustment. These results suggest that for female adolescents, anxiety is primarily driven by interpersonal victimization, urban environmental pressures, and prolonged social media use.

Multivariable analysis for Stress identifies a distinct set of predictors. Physical violence remained a significant associated factor (aOR = 2.47; 95% CI: 1.34–4.53; p = 0.004), while psychological and economic violence lost their significance. The loss of statistical significance for psychological violence in the multivariable model for stress (p = 0.174) suggests that its impact was attenuated by the inclusion of more dominant predictors. Lifestyle and environmental pressures emerged as dominant drivers, with prolonged social media use (> 3 hours/day) showing the strongest association (aOR = 2.64; 95% CI: 1.55–4.48; p=0.000), followed by insufficient sleep (aOR = 1.92; 95% CI: 1.14–3.24; p = 0.014) and living in central areas (aOR = 1.79; 95% CI: 1.05–3.05; p = 0.032). These findings indicate that for female adolescents, stress is heavily influenced by social media engagement and urban environmental demand.

Table 4: Factors associated with Depression

Factors	Depression		cOR (95%CI)	P value	aOR (95%CI)	P value
	Yes (n=149) (%)	No (n=550) (%)				
Experienced physical violence (Ref - No)	85(37.0)	145(63.0)	3.71(2.54-5.40)	<0.001	2.55(1.62-4.02)	<0.001
Experienced psychological violence (Ref - No)	128(26.8)	349(73.2)	3.51(2.14-5.75)	<0.001	2.04(1.15-3.59)	0.014
Experienced economic violence (Ref - No)	80(32.3)	168(67.7)	2.64(1.82-3.82)	<0.001	1.29(0.82-2.05)	0.264
Ethnic Minorities (Ref - Kinh ethnicity)	39(23.1)	130(76.9)	1.15(0.76-1.73)	0.521	1.18(0.75-1.85)	0.474
Age >12 yrs (Ref ≤12 yrs)	117(22.2)	411(77.8)	1.23(0.80-1.91)	0.339	1.02(0.63-1.64)	0.952
Central Area (Ref - Non- central)	81(23.5)	264(76.5)	1.29(0.89-1.86)	0.168	1.46(0.98-2.18)	0.064
Social media use >3hours/day (Ref ≤3 hrs)	62(29.1)	151(70.9)	1.88(1.29-2.74)	0.001	1.43(0.94-2.17)	0.094
Sleep duration <6 hours/day (Ref ≥6 hrs/day)	64(30.0)	149(70.0)	2.06(1.39-2.95)	<0.001	1.81(1.21-2.70)	0.004
No Physical exercise participation (Ref - Yes)	87(28.6)	217(71.4)	2.15(1.49-3.11)	<0.001	2.05(1.38-3.06)	<0.001

cOR – Crude/unadjusted Odds Ratio; CI- Confidence interval; aOR – Adjusted OR

Table 5: Factors associated with Anxiety

Factors	Anxiety		cOR (95%CI)	p Value	aOR (95%CI)	p Value
	Yes(n=199) (%)	No(n=500) (%)				
Experienced physical violence (Ref - No)	106(46.1)	124(53.9)	3.46(2.45-4.88)	<0.001	2.22(1.48-3.35)	<0.001
Experienced psychological violence (Ref - No)	167(35.0)	310(65.0)	3.20(2.10-4.86)	<0.001	1.94(1.19-3.14)	0.007
Experienced economic violence (Ref - No)	105(42.3)	143(57.7)	2.79(1.98-3.92)	<0.001	1.50(0.99-2.26)	0.052
Ethnic Minorities (Ref - Kinh ethnicity)	49(29.0)	120(71.0)	1.03(0.71-1.52)	0.862	1.01(0.67-1.53)	0.945
Age >12 yrs (Ref ≤12 yrs)	154(29.2)	374(70.8)	1.15(0.78-1.70)	0.473	1.005(0.66-1.54)	0.981
Central Area (Ref - Non- central)	105(30.4)	240(69.6)	1.21(0.87-1.68)	0.256	1.49(1.04-2.14)	0.031
Social media use >3hours/day (Ref ≤3 hrs)	81(38.0)	132(62.0)	1.91(1.35-2.70)	<0.001	1.63(1.12-2.38)	0.011
Sleep duration <6 hours/day (Ref ≥6 hrs/day)	73(34.3)	140(65.7)	1.49(1.05-2.11)	0.024	1.29(0.89-1.87)	0.183
No Physical exercise participation (Ref - Yes)	90(29.6)	214(70.4)	1.10(0.79-1.54)	0.559	0.95(0.66-1.36)	0.771

cOR – Crude/unadjusted Odds Ratio; CI- Confidence interval; aOR – Adjusted OR

Table 6 Factors associated with Stress

Variables	Stress		cOR (95%CI)	p value	aOR (95%CI)	p value
	Yes(n=74) (%)	No(n=625) (%)				
Experienced physical violence (Ref - No)	45(19.6)	185(80.4)	3.69(2.24-6.07)	<0.001	2.47(1.34-4.53)	0.004
Experienced psychological violence (Ref - No)	64(13.4)	413(86.6)	3.29(1.65-6.53)	<0.001	1.74(0.78-3.87)	0.174
Experienced economic violence (Ref - No)	42(16.9)	206(83.1)	2.67(1.64-4.35)	<0.001	1.30(0.71-2.39)	0.397
Ethnic Minorities (Ref - Kinh ethnicity)	19(11.2)	150(88.8)	1.09(0.63-1.90)	0.75	1.12(0.62-2.02)	0.713
Age >12 yrs (Ref ≤12 yrs)	59(11.2)	469(88.8)	1.31(0.72-2.37)	0.375	0.98(0.51-1.88)	0.958
Central Area (Ref - Non- central)	45(13.0)	300(87.0)	1.68(1.03-2.75)	0.037	1.79(1.05-3.05)	0.032
Social media use >3hours/day (Ref ≤3 hrs)	41(19.2)	172(80.8)	3.27(2.00-5.35)	<0.001	2.64(1.55-4.48)	<0.001
Sleep duration <6 hours/day (Ref ≥6 hrs/day)	34(16.0)	179(84.0)	2.12(1.29-3.45)	0.002	1.92(1.14-3.24)	0.014
No Physical exercise participation (Ref - Yes)	44(14.5)	260(85.5)	2.06(1.26-3.36)	0.003	1.68(0.992-2.85)	0.053

cOR – Crude/unadjusted Odds Ratio; CI- Confidence interval; aOR – Adjusted OR

DISCUSSION

School violence: The research findings indicate that school-based violence among female students is a critical issue, with an overall prevalence reaching 71.5%. When compared to the report by Plan International¹⁵ (2015), which documented global prevalence rates ranging from 43% to 84%, it is evident that the results of this study sit toward the higher end of the global spectrum. This finding is further supported by Karmaliani R et al¹⁶ (2017), who reported that 75.3% of 6th-grade girls in Pakistan had experienced recurrent violence. Collectively, these data confirm that school-related violence against female students is no longer an isolated phenomenon but has evolved into a systemic challenge, necessitating coordinated, multisectoral interventions from both families and educational institutions.

Regarding specific modalities, psychological violence emerged as the predominant form, accounting for 68.2% of cases. This prevalence is comparable to the 59.5% reported by Arhuis-Inca W et al.¹⁷ (2022). This pattern may be intrinsically linked to the developmental characteristics of adolescence, a period where peer relationships are paramount. Consequently, emotional trauma in this cohort often manifests as internalized distress- occurring latently yet persisting long-term-profoundly impacting both the mental health and personality development of the students.

Although the prevalence of physical violence among

female students was 32.9%, lower than the 51.9% reported by Arhuis-Inca W et al.¹⁷ (2022), this figure reveals a concerning reality regarding the escalation of direct confrontations. From a behavioral perspective, physical violence in this study is interpreted as the terminal manifestation of accumulated and unresolved conflicts. When emotional regulation and mediation skills are insufficient, physical aggression serves as a mechanism for establishing social hierarchy or discharging psychological tension. For female students, such acts often represent a complete dissolution of social bonds, resulting in psychological trauma that is more enduring than the associated somatic injuries. Furthermore, the recorded rate of economic violence (35.5%) highlights a significant presence of financial pressure within the school environment, specifically involving the coerced allocation of funds or the unauthorized appropriation of personal property. This underscores the premise that various forms of violence do not exist in isolation.

The current findings depict a diverse and increasingly complex landscape of school violence among female students. While the high prevalence of psychological violence aligns with broader domestic and international trends, the substantial presence of physical and economic violence indicates an intensifying degree of interpersonal conflict. Consequently, there is an urgent need for school-based prevention programs to prioritize emotional intelligence education and non-violent conflict resolution skills, specifically tailored to the social dynamics of adolescent female students.

Students' mental health: Adolescence represents a critical transition characterized by profound physiological and psychological shifts, which significantly elevate the risk of stress, anxiety, and depression.^{2,18} In our study of 699 female middle school students, screening via the DASS-21 scale revealed that anxiety was the most frequent manifestation (28.5%), followed by depression (21.3%) and stress (10.6%). Recent data from Dong T et al¹⁹ (2025) on 1,486 female students also confirmed this pattern, with 631 cases of anxiety, accounting for 42.5% of the studied group.

While prevalence rates vary across studies, the collective evidence confirms that internalizing disorders are the predominant mental health challenges facing female middle school students. This underscores the urgent necessity of implementing early screening protocols. However, in comparing these rates, methodological differences must be acknowledged. Variations in prevalence across regional studies often stem from different measurement instruments and the specific socio-cultural contexts of the study populations.

The relationship between school violence and students' mental health: The multivariable analysis indicates that depressive symptoms among female students are primarily driven by a combination of interpersonal trauma and compromised health behaviors. Physical violence (aOR = 2.55; $p < 0.001$) and psychological violence (aOR = 2.04; $p = 0.014$) emerged as the primary independent predictors, consistent with findings by Durbeej N et al.²⁰ (2025), and Barnawi MM et al.⁵ (2023). Notably, the impact is exacerbated by physiological disruptions, specifically insufficient sleep (aOR=1.81) and physical inactivity (aOR=2.05); research by Wang X et al.²¹ (2021) supports this by highlighting the correlation between restricted sleep and increased depression. Similarly, Pueyo Gutiérrez-Rivas P et al²² (2025) demonstrated that higher engagement in physical activity, particularly team sports, is associated with better mental well-being in adolescents, with female students exhibiting greater vulnerability.

Anxiety symptoms in this demographic reflect a multifaceted interaction between safety threats and environmental stressors. The anxiety resulting from physical violence (aOR = 2.22) and psychological violence (aOR = 1.94) is reinforced by contemporary environmental pressures. This finding is consistent with Javier Guzmán Murillo et al.²³ (2024). Furthermore, prolonged social media usage (aOR=1.63; $p=0.011$) and residence in central urban areas (aOR=1.49; $p=0.031$) significantly increase the odds of anxiety, likely due to intensified academic competition and urban lifestyle demands. The borderline significance of economic violence (aOR=1.50; $p=0.052$) suggests that financial victimization serves as a latent stressor, contributing to a pervasive climate of apprehension.

The predictors identified for psychological stress

suggest a model of cumulative strain where physical violence and lifestyle pressures coexist. Physical violence (aOR = 2.47; $p = 0.004$), remains the dominant acute stressor, consistent with Hoang The Hai et al.²⁴ (2020) and Luo S et al.²⁵ (2023). This elevated stress is further exacerbated by insufficient sleep (aOR = 1.92), while the influence of central areas (aOR = 1.79) confirms that the demands associated with an urban lifestyle pose additional psychological burdens.

Notably, our multivariate analysis did not reveal a significant association between ethnicity or age and mental health outcomes. This lack of an ethnicity effect suggests that within the specific context of this mountainous province, female students - regardless of their ethnic background - are subject to similar sociocultural pressures and school environment dynamics. Furthermore, as the participants were clustered within a narrow developmental window of middle school, the uniform impact of school violence appears to transcend minor age differences. This indicates that victimization is a more potent driver of psychological distress than individual demographic characteristics in this setting.

LIMITATIONS

Several limitations must be acknowledged when interpreting these findings. First, the cross-sectional descriptive study design precludes the establishment of temporal precedence or causal inferences; therefore, the observed relationships should be viewed as associations rather than definitive causal links.

Second, the study may be subject to sampling bias, as recruitment was restricted to public school students, potentially limiting generalizability to out-of-school adolescents or those in private institutions.

Third, reliance on self-reported data for both victimization and mental health status introduces the risk of social desirability and recall biases. Finally, although the analysis controlled for several behavioral factors, it did not account for potential unmeasured confounders, such as family history of psychiatric disorders, or substance use, which may further modulate the relationship between violence and mental health.

Fourth, while our final sample size met the standard requirements for stability in logistic regression, the study was not originally powered based on a formal sample size formula for association. Consequently, this may limit the precision of findings for outcomes with lower prevalence, such as stress. Furthermore, as this study was exploratory, no formal multiple testing correction (e.g., Bonferroni) was applied across the three mental health outcomes. While this approach preserves the power to identify potential associations, it may increase the risk of Type I errors; therefore, statistical significance should be interpreted with caution in the context of multiple comparisons.

STRENGTHS

Despite certain limitations, this study possesses several notable strengths.

First, the achieved sample size (n = 699) provided sufficient statistical power for multivariate analysis. With a high number of events recorded for each outcome (e.g., 149 cases of depression and 199 of anxiety), the study maintained an adequate ratio of events per variable, enabling the stable detection of independent associations between violence modalities and mental health outcomes.

Second, to the best of our knowledge, this is among the first studies to exclusively investigate the intersection of school violence and psychological morbidity among female adolescents in a Northern mountainous province of Vietnam. By focusing on this culturally distinct and underrepresented region, the research provides critical empirical evidence that fills a significant knowledge gap in national and regional public health data.

Third, the study utilized highly reliable, internationally validated instruments, including the DASS-21 and a multidimensional peer victimization scale (Cronbach's alpha = 0.913), ensuring the psychometric integrity and cross-cultural comparability of the findings. Finally, the use of multivariate logistic regression allowed for the isolation of violence-specific impacts while adjusting for critical lifestyle confounders such as sleep hygiene and social media usage.

CONCLUSION

This study highlights a high prevalence of school-based violence among female middle school students (71.5%), with psychological violence being the most predominant modality. Screening via the DASS-21 scale further reveals significant mental health morbidity, particularly anxiety and depression. A primary finding is that physical violence serves as the most potent independent predictor, consistently associated with increased odds of all three mental health outcomes: depression, anxiety, and stress. These interpersonal traumas, compounded by excessive social media usage and urban lifestyle pressures, underscore an urgent need for holistic public health interventions. School-based programs should shift toward an integrated paradigm that combines violence prevention with the promotion of healthy sleep hygiene and balanced social media habits. Future research should utilize longitudinal designs to further clarify the causal pathways between multimodal victimization and long-term psychiatric outcomes in this vulnerable population.

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Availability of Data: The datasets analyzed during the current study are not publicly available due to the sensitive nature of the information regarding adolescent mental health and school violence. However, they are available from the corresponding author on reasonable request, provided that the request complies with ethical and legal requirements.

Declaration of Non-use of Generative AI Tools: The authors confirm that generative AI tools were used solely for language translation and copy-editing purposes to ensure the clarity and grammatical accuracy of the manuscript, as English is not the authors' native language. These tools were not used for data analysis, interpretation of findings, or the generation of scientific content. All AI-assisted refinements were carefully reviewed and validated by the authors.

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