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Mental health, substance use, and psychosocial difficulties in Vietnamese adolescents: A large school-based study with PCL-5 ROC screening

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ABSTRACT

This study investigated the prevalence of mental health symptoms, psychological strengths and difficulties, and substance use among Vietnamese secondary school students, and examined the relationships among these variables. A cross-sectional study was conducted with 1,062 students in grades 6 to 9 using standardized self-report instruments, including the Depression, Anxiety, and Stress Scale (DASS-21), the Strengths and Difficulties Questionnaire (SDQ), the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST), and the PTSD Checklist for DSM-5 (PCL-5). Data were analyzed using descriptive statistics, Pearson correlation, multiple regression, and receiver operating characteristic (ROC) analysis. The results showed that more than half of the students reported normal emotional states, although anxiety symptoms were more common than depression and stress. Peer problems were the most frequently reported psychological difficulty, and alcohol use was the most common substance use behavior. The SDQ scores were moderately correlated with DASS ($r = 0.557$) and PCL-5 ($r = 0.563$), while PCL-5 had a strong correlation with DASS ($r = 0.761$, $p < 0.001$). Regression analysis showed that both SDQ ($B = 0.385$, $p < 0.001$) and PCL-5 ($B = 0.440$, $p < 0.001$) significantly predicted DASS scores. ROC analysis indicated excellent discrimination (AUC = 0.983, 95% CI [0.976, 0.989]) with a school screening cut-off value of 28.5 (sensitivity = 0.955; specificity = 0.933). Because the reference classification was based on the same PCL-5 items, these results should be interpreted as evidence of internal consistency and preliminary screening usefulness rather than diagnostic validity against an independent clinical standard. Overall, the findings emphasize the importance of integrating school-based mental health screening into national education and health programs, strengthening collaboration between teachers and counselors, and developing preventive interventions that address adolescents' psychosocial contexts.

1. Introduction

Adolescence is a critical developmental period characterized by profound psychological, social, and neurobiological changes (Patel et al., 2022). During this stage, individuals face heightened vulnerability to mental health problems, including anxiety, depression, and stress, often exacerbated by increasing academic pressure, peer influence, and family dynamics (Patel et al., 2022). Globally, approximately 14% to 20% of adolescents experience mental health conditions (WHO, 2023; 2021), which are frequently associated with diminished academic achievement, higher school dropout rates, and engagement in risky behaviors (Nguyen-Thi et al., 2024). As most psychiatric disorders emerge during this formative period, unrecognized or untreated problems may persist into adulthood, underscoring the value of early detection and prevention (Patel et al., 2022).

Early adolescence is not only a critical stage for the onset of mental health difficulties but also for initial experimentation with substances such as alcohol or tobacco (Do et al., 2019; Nath et al., 2022). A robust, bidirectional relationship often exists:

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adolescents experiencing high psychological distress or trauma may resort to substance use as a maladaptive coping mechanism, while substance use itself, even at experimental levels, is associated with a higher likelihood of internalizing and externalizing problems (Brownlie et al., 2019). This can reinforce a negative cycle between poor mental health and maladaptive behaviors (Beck et al., 2021). Similarly, emotional and behavioral difficulties often coexist with symptoms of traumatic stress, with both predicting adverse mental health outcomes (Darnell et al., 2019).

In recent years, scholars have increasingly focused on the interaction between emotional and behavioral difficulties, trauma exposure, and substance use, often utilizing instruments such as the Depression, Anxiety, and Stress Scale (DASS-21), the Strengths and Difficulties Questionnaire (SDQ), and the PTSD Checklist for DSM-5 (PCL-5) (Goodman, 1997; Lovibond and Lovibond, 1995; Wortmann et al., 2016). However, most of this evidence originates from Western, high-income contexts. Evidence from low- and middle-income countries like Vietnam, where adolescents face intense social, economic, and academic pressures, remains limited (Dang et al., 2017; Xu et al., 2020).

In Vietnam, research on adolescent mental health, while growing, remains fragmented. Most studies examine separate domains (e.g., depression or stress) without simultaneously integrating post-traumatic stress symptoms or substance use behaviors (Van-Huynh and Tran-Chi, 2019; Duong et al., 2020; Tran et al., 2013). Recent surveys indicate a high prevalence of distress, and some tools like the SDQ have been validated (Dang et al., 2017; Sourander et al., 2025). However, the PCL-5 for school-based screening is underdeveloped. Empirical evidence that utilizes validated instruments with culturally relevant cut-off points is urgently required to enable early identification.

Therefore, the present study was conducted to (1) describe the prevalence and distribution of mental health symptoms, post-traumatic stress symptoms, psychological strengths and difficulties, and substance use among adolescents; (2) determine a threshold school-screening cut-off score for the PCL-5 using receiver operating characteristic (ROC) analysis; and (3) examine the relationships among these psychological difficulties and mental health outcomes. Based on the existing literature, the following hypotheses were proposed:

H1: Anxiety prevalence will be higher than depression and stress among adolescents.
H2: The PTSD Checklist for DSM-5 will demonstrate good discriminative validity in identifying students at risk of post-traumatic stress symptoms.
H3: The prevalence of substance use will be low overall, with alcohol being the most common substance among adolescents.
H4: Psychological strengths and difficulties will be positively associated with mental health.
H5: PTSD symptoms and psychological strengths and difficulties will positively predict mental health.

2. Method

2.1. Participants

The study comprised 1,062 Vietnamese secondary school students. Participants were drawn from grades 6 to 9 at several public secondary schools in Ho Chi Minh City, Binh Duong province, and Ba Ria Vung Tau province. There were 518 males (48.8%) and 544 females (51.2%) in the sample. Table 1 shows a summary of the descriptive statistics for the participants.

Table 1: Demographic characteristics (N = 1062)

Characteristics	n	Percent (%)
Location		
Ho Chi Minh City	364	34.3
Binh Duong	347	32.7
Ba Ria Vung Tau	351	33.1
Gender		
Male	518	48.8
Female	544	51.2
Grade		
Grade 6	227	21.4
Grade 7	349	32.9
Grade 8	300	28.2
Grade 9	186	17.5

2.2. Measurement

2.2.1. Depression, anxiety, and stress scale–21 items (DASS-21)

The DASS-21, developed by Lovibond and Lovibond (1995), is a widely used instrument designed to assess negative emotional states of depression, anxiety, and stress. It comprises 21 items divided into three subscales, each containing seven items. Respondents rate the frequency or severity of symptoms over the past week on a 4-point Likert scale. The DASS-21 has been validated across multiple cultures, including a Vietnamese version with strong psychometric properties (Tran et al., 2013). In the present study, the overall internal consistency reliability (Cronbach's α=0.934) and that of each subscale demonstrated high reliability, including depression (0.872), anxiety (0.771), and stress (0.847).

2.2.2. Alcohol, smoking and substance involvement screening test (ASSIST)

Developed by the WHO ASSIST Working Group (2002), the ASSIST is a brief screening instrument that assesses the risk level of substance use across various categories, including tobacco, alcohol, cannabis, amphetamines, and other drugs. The tool evaluates both lifetime and recent substance involvement through eight items, generating a risk score for each substance type. It has been translated

and adapted for use in several countries, including Thailand (Thai et al., 2025), demonstrating cultural validity and practical utility in adolescent samples. In the current study, internal consistency reliability was acceptable, with Cronbach's α=0.95. For descriptive analyses, ASSIST risk levels were categorized into low, moderate, and high involvement groups based on the instrument's standard scoring ranges for each substance. These categories were used to facilitate interpretation of substance use patterns in a school-based adolescent sample rather than to establish clinical diagnoses.

2.2.3. Strengths and difficulties questionnaire (SDQ)

The SDQ was originally developed by Goodman (1997) to evaluate children's and adolescents' behavioral and emotional aspects. It includes 25 items grouped into five subscales: Emotional symptoms, conduct problems, hyperactivity/inattention, peer problems, and prosocial behavior. Responses are rated on a 3-point Likert scale, and subscale scores can be combined to generate a total difficulties score. The SDQ has been validated in over 70 languages, including Vietnamese (Dang et al., 2017), and is extensively used in school-based and clinical research. In the current study, internal consistency reliability was acceptable, with Cronbach's α=0.84.

2.2.4. Posttraumatic stress disorder checklist for DSM-5 (PCL-5)

The PCL-5, developed by Blevins et al. (2015), is a 20-item self-report measure that assesses the presence and severity of PTSD symptoms consistent with DSM-5 criteria. Respondents rate each symptom on a 5-point Likert scale based on the past month. The PCL-5 has been validated across various populations and languages, including a Vietnamese adaptation with strong psychometric support (Tan et al., 2019).

In the current study, internal consistency reliability was acceptable, with Cronbach's α=0.95. An exploratory factor analysis (EFA) was performed using the principal component method with Varimax rotation to evaluate the structural validity of the Vietnamese version of the PCL-5. The KMO value was 0.951, confirming excellent sampling adequacy, while Bartlett's test of sphericity was significant, χ^2 (190) = 15869.879, p<0.001, indicating that the data were appropriate for factor analysis. Two components with eigenvalues exceeding 1 were identified, accounting together for 61.74% of the total variance.

The factor loadings ranged between 0.54 and 0.80, showing that all items loaded meaningfully on their respective components. These findings provide empirical support for the reliability and factorial coherence of the Vietnamese-adapted PCL-5 (Blevins et al., 2015; Field, 2024; Hair et al., 2019).

2.3. Procedure

Data collection was initiated only after ethical approval had been obtained from the Ho Chi Minh City University of Education. The study adhered to the principles of the Declaration of Helsinki and complied with the ethical standards outlined in the American Psychological Association's Ethical Principles of Psychologists and Code of Conduct. Prior to data collection, formal authorization was secured from all participating schools, and meetings were conducted with school administrators to explain the study's objectives, procedures, and safeguards for participant protection.

All participants were informed that taking part was completely voluntary and that they had the freedom to stop at any moment without any penalty and that their responses. The research assistants trained in adolescent data collection administered the self-report questionnaires (DASS-21, ASSIST, SDQ, and PCL-5) in classroom settings under standardized instructions. The administration took approximately 15–20 minutes. All responses were collected anonymously, and no identifying information (e.g., names, student IDs) was recorded.

2.4. Data analysis

All data were analyzed using IBM SPSS Statistics version 24. Descriptive statistics, including frequencies and percentages, were employed to summarize participants' demographic characteristics. Prior to inferential analyses, the normality of data distribution was examined for all measurement scales based on skewness and kurtosis values as suggested by D'Agostino et al. (1990). Following the confirmation of data normality, inferential statistical analyses were performed, including Pearson's correlation to examine associations among variables and multiple regression analyses to explore predictive relationships between psychological constructs.

Multiple linear regression analysis was conducted to examine whether psychological strengths and difficulties (SDQ) and posttraumatic stress symptoms (PCL-5) significantly predicted Depression, Anxiety, and Stress Scale (DASS-21) scores (Hair et al., 2019). DASS-21 scores were specified as the dependent variable, whereas SDQ and PCL-5 scores were entered as the independent variables. The regression model was expressed as:

$$DASS = \beta_0 + \beta_1(SDQ) + \beta_2(PCL - 5) + \varepsilon$$

where, β_0 is the intercept, β_1 and β_2 are the regression coefficients, and ε is the error term.

Receiver Operating Characteristic (ROC) curve analysis was conducted to determine an optimal screening cut-off score for posttraumatic stress symptoms among students using the total score of the PTSD Checklist for DSM-5 (PCL-5) as the test variable. Given that this study was implemented in a

non-clinical, school-based setting, the ROC analysis aimed to identify a screening threshold rather than a diagnostic cut-off. The reference standard was established based on the DSM-5 symptom cluster algorithm derived from PCL-5 item-level responses (i.e., at least one B item, one C item, two D items, and two E items rated 2 = "moderately" or higher), which classified participants into "probable PTSD risk" and "non-risk" groups (Mandrekar, 2010). Specifically, each PCL-5 item was dichotomized using a symptom severity threshold of ≥ 2 ('moderately' or higher). Participants were classified as being at probable PTSD risk if they endorsed at least one intrusion symptom (Cluster B), one avoidance symptom (Cluster C), two negative alterations in cognition and mood symptoms (Cluster D), and two arousal symptoms (Cluster E), consistent with DSM-5 symptom pattern criteria. Sensitivity, specificity, Youden's Index (J = sensitivity + specificity – 1), and the area under the curve (AUC) with 95% confidence intervals were calculated to evaluate the discriminative validity of the PCL-5 (Akobeng, 2007). The analysis prioritized sensitivity to minimize false negatives in the school context, with the optimal cut-off identified based on the highest Youden's Index value. Internal validation of the AUC estimates was performed using bootstrapping (1,000 resamples).

3. Results

3.1. The prevalence of mental health issues among adolescents

Descriptive statistics for depression, anxiety, and stress scores are summarized in Table 2. More than half of the participants reported normal levels of depression (56.8%), followed by mild (10.1%), moderate (19.4%), severe (6.3%), and extremely severe (7.4%) symptoms. For anxiety, 37.3% of students were classified as normal, 10.7% mild, 25.1% moderate, 6.6% severe, and 20.2% extremely severe.

Regarding stress, 64.0% of participants reported normal levels, 10.8% mild, 11.4% moderate, 9.4% severe, and 4.3% extremely severe. These findings indicate that while many participants experienced normal emotional states, a notable proportion reported moderate to extremely severe symptoms, particularly for anxiety. So, hypothesis 1 (H1) was accepted.

Table 2: Prevalence of depression, anxiety, and stress among adolescents

Variable	Normal n (%)	Mild n (%)	Moderate n (%)	Severe n (%)	Extremely severe n (%)
Depression	603 (56.8)	107 (10.1)	206 (19.4)	67 (6.3)	79 (7.4)
Anxiety	396 (37.3)	114 (10.7)	267 (25.1)	70 (6.6)	215 (20.2)
Stress	680 (64.0)	115 (10.8)	121 (11.4)	100 (9.4)	46 (4.3)

Receiver operating curves (ROC) analyses were carried out to determine the optimal cutoff score for the PCL-5 among secondary school populations. ROC is a commonly used method to visualize the sensitivity and specificity of a diagnostic test. ROC curves allow the identification of the best cut-off score for the test by determining the maximum of the area under the curve (AUC). As presented in Fig. 1 and in Table 3, PCL-5 reached the highest-level balanced sensitivity and specificity at a threshold cut-off score of 28.5.

Fig. 1 shows the false positive rate (1-specificity) and the true positive rate (sensitivity). Values corresponding to the breakpoint near the upper left corner of the curve maximize both sensitivity and specificity. The area under the curve was 0.983, indicative of good overall accuracy.

As shown in Table 3, ROC analysis showed excellent discriminative ability (AUC = 0.983, 95% CI [0.976, 0.989], p < 0.001). The threshold *school-screening* cut-off for PCL-5 was 28.5, yielding sensitivity = 0.955, specificity = 0.933, and Youden's J = 0.888. As the reference algorithm was derived from the same PCL-5 items, these results reflect internal validity and should be interpreted as screening rather than diagnostic performance. Accordingly, the AUC, sensitivity, and specificity values primarily reflect internal agreement within the instrument and should not be interpreted as evidence of external diagnostic accuracy. So, hypothesis 2 (H2) was accepted. Based on DSM-5 cluster criteria, 26.9% of participants met the threshold for PTSD, while 73.1% did not meet the criteria (Table 4).

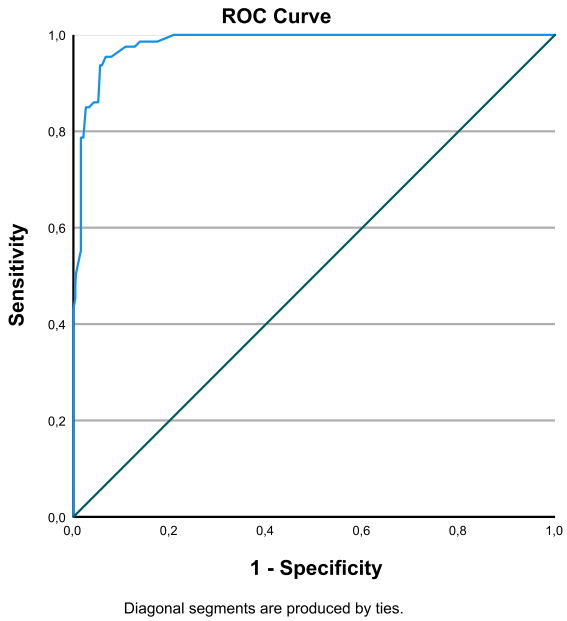

Fig. 1: Receiver operating characteristics curves (ROC curve) of the PCL-5 using different cutoff scores

Table 5 shows the prevalence of psychological strengths and difficulties and the level of substance use. Regarding psychological strengths and difficulties, students had the most problems with peer problems (39.8%), followed by conduct problems (19%), emotional problems (15.7%),

prosocial behavior (14%), and finally hyperactivity-inattention problems (10.5%). In contrast, at the low risk level, students had fewer problems with emotional problems (79.8%), hyperactivity-inattention problems (78.5%), conduct problems (63.8%), and peer problems (12.4%).

Table 3: ROC analysis results for the PCL-5

Instrument	Optimal cut-off	AUC (95% CI)	Sensitivity	Specificity	Youden's J
PCL-5	28.5	0.983 (0.976–0.989)	0.955	0.933	0.888

Table 4: Prevalence of probable PTSD among secondary school students

Classification	n (%)
No probable PTSD	776 (73.1)
Probable PTSD	286 (26.9)
Total	1062 (100.0)

For substance use level, many students reported low involvement across all substance categories. Specifically, 96.0% reported low use of tobacco products, 84.8% low alcohol involvement, and 98.7% low cannabis use. Other substances such as cocaine (95.0%), amphetamine-type stimulants (97.7%), inhalants (91.8%), sedatives and sleeping pills (93.0%), hallucinogens (96.3%), opioids (96.8%), and other drugs (95.9%) were also reported at low levels of use. These findings suggest that while most students displayed low engagement in substance use, alcohol consumption and peer-related difficulties emerged as more prominent issues in this population. So, hypothesis 3 (H3) was accepted.

Table 5: Distribution of SDQ categories among participants

Variable	Low n (%)	Moderate n (%)	High n (%)
Strengths and difficulties questionnaire (SDQ)			
Emotional problems	848 (79.8)	47 (4.4)	167 (15.7)
Conduct problems	678 (63.8)	182 (17.1)	202 (19.0)
Hyperactivity-inattention problems	834 (78.5)	117 (11.0)	111 (10.5)
Peer problems	132 (12.4)	507 (47.7)	423 (39.8)
Prosocial behaviors	755 (71.1)	158 (14.9)	149 (14.0)
Alcohol, smoking and substance involvement screening test (ASSIST)			
Tobacco products	1019 (96.0)	40 (3.8)	3 (0.3)
Alcohol	901 (84.8)	151 (14.2)	10 (0.9)
Cannabis	1048 (98.7)	10 (0.9)	4 (0.4)
Cocaine	1009 (95.0)	53 (5.0)	0 (0)
Amphetamine-type stimulants	1038 (97.7)	24 (2.3)	0 (0)
Inhalants	975 (91.8)	84 (7.9)	3 (0.3)
Sedatives and sleeping pills	988 (93.0)	66 (6.2)	8 (0.8)
Hallucinogens	1023 (96.3)	35 (3.3)	4 (0.4)
Opioids	1028 (96.8)	34 (3.2)	0 (0)
Other drugs	1018 (95.9)	44 (4.1)	0 (0)

3.2. Preliminary analysis between mental health, psychological strengths and difficulties, and PTSD

Table 6 showed the correlation matrix between mental health, psychological strengths and difficulties, and PTSD among adolescents. A Pearson correlation analysis was performed to examine the relationships among mental health, psychological strengths and difficulties, and PTSD. The results indicated a significant positive correlation between mental health and behavioral-emotional aspects, $r(1030) = 0.557$, $p < 0.001$. A strong positive correlation was also found between mental health and PTSD, $r(1030) = 0.761$, $p < 0.001$. Additionally, psychological strengths and difficulties were positively correlated with PTSD, $r(1030) = 0.557$, $p<0.001$. These findings support the proposed hypothesis that higher levels of mental health problems are associated with greater behavioral-emotional aspects and PTSD symptoms, hypothesis 4 (H4) was confirmed.

As shown in Tables 7, 8, and 9, the corrected coefficient Adjusted R square was 0.602, indicating almost 60.2% variation in the dependent variable (DASS-21) due to a one-unit change in independent variables (SDQ, PCL-5). The model fit was significant, $F(2,1059) = 804.003$, $p < 0.001$, indicating that SDQ and PCL-5 jointly contributed to the prediction of DASS scores. The Durbin–Watson statistic (DW = 1.93) indicated no serious autocorrelation among residuals. Both predictors were statistically significant. SDQ ($B = 0.385$, $SE = 0.048$, $\beta = 0.189$, 95% CI [0.235, 0.468], $p < 0.001$) and PCL-5 ($B = 0.440$, $SE = 0.016$, $\beta = 0.654$, 95% CI [0.396, 0.473], $p < 0.001$) significantly predicted DASS-21 scores. The final regression model is: DASS = 0.385(SDQ) + 0.440(PCL-5). So, hypothesis 5 (H5) was confirmed.

Table 6: Correlation matrix between each dimension of mental health issues

Variable	DASS	SDQ	PCL-5
DASS	1		
SDQ	0.557***	1	
PCL-5	0.761***	0.563***	1

***p<0.001

Table 7: Results of the regression model

Model	R	R-squared	Adjusted R-squared	Std. error of the estimate	Durbin-Watson
1	0.776	0.603	0.602	0.40207	1.927

Table 8: One-way ANOVA results in the regression model's hypothesis of fitness

Model		Sum of squares	df	Mean square	F	p
1	Regression	259.950	2	129.975	804.003	< 0.001
	Residual	171.198	1059	0.162		
	Total	431.147	1061			

Table 9: Multiple linear regression coefficients predicting DASS-21 scores

Predictor	B	SE	β	t	p	95% CI	
						Lower	Upper
Intercept	0.013	0.038	-	0.331	0.741	-0.153	0.033
SDQ	0.385	0.048	0.189	8.063	< 0.001	0.235	0.468
PCL-5	0.440	0.016	0.654	27.933	< 0.001	0.396	0.473

Dependent variable: DASS-21 score; B: Unstandardized regression coefficient; SE: Standard error; β: Standardized regression coefficient; CI: Confidence interval; SDQ: Strengths and difficulties questionnaire; PCL-5: PTSD checklist for DSM-5

4. Discussion

An important methodological consideration of the present study concerns the ROC analysis used to propose a school-based screening cut-off for the PCL-5. Because the reference classification of probable PTSD was derived from the same PCL-5 item set using a DSM-5 symptom cluster algorithm, the resulting discrimination indices primarily reflect internal consistency rather than validation against an independent clinical gold standard. Consequently, the proposed cut-off score should be interpreted as a preliminary, context-specific screening threshold intended for use in school settings, and it requires future validation using structured diagnostic interviews. Within this methodological context, the present findings remain informative in describing the distribution of mental health symptoms, trauma-related distress, behavioral–emotional difficulties, and substance use among Vietnamese adolescents, as well as the robust associations observed among these constructs.

The pattern of results suggests that anxiety is the most prevalent mental health issue among Vietnamese adolescents, a finding consistent with global evidence highlighting the rise of anxiety symptoms in youth populations over the past decade (Bie et al., 2024; Nguyen-Thi et al., 2024). In contrast, symptoms of depression, stress, and PTSD appeared less frequently, possibly reflecting both cultural norms around emotional expression and contextual resilience factors such as family cohesion and community support. This pattern aligns with prior research showing that Asian adolescents often internalize emotional distress and present anxiety-related manifestations more readily than depressive or stress-related symptoms (Nguyen-Thi et al., 2024; Salari et al., 2024).

Regarding trauma-related symptoms, the ROC analysis demonstrated excellent diagnostic accuracy of the PCL-5, with an optimal cut-off point suitable for school-based screening rather than clinical diagnosis. This threshold was slightly lower than those reported in Western adult populations (Ashbaugh et al., 2016; Marx et al., 2022), a difference that may be attributed to cultural variations in symptom expression and reporting (Tan et al., 2019). Such findings reinforce the importance of developing culturally sensitive screening norms for adolescents in non-Western settings, where trauma-related experiences may be underreported. The validated performance of the PCL-5 supports its practical use for early identification of at-risk students, facilitating timely psychological support and referral pathways in school-based settings (Li et al., 2020; Xu et al., 2020; Yang et al., 2025).

The findings also revealed that substance use among Vietnamese adolescents was generally limited in both frequency and intensity, consistent with previous local studies suggesting that sociocultural norms and parental supervision discourage substance experimentation (Do et al., 2019). However, even infrequent use should not be overlooked, as early engagement with substances can serve as a maladaptive coping mechanism for stress or emotional strain (Nath et al., 2022; Nguyen et al., 2021). Alcohol remains the most culturally accepted and accessible substance, and while moderate consumption may be normalized in social contexts, it can increase vulnerability to anxiety and depression when combined with peer pressure and academic demands (Nguyen et al., 2021; Thai et al., 2025). International literature has shown that early initiation of substance use often co-occurs with emotional dysregulation, lower school engagement, and reduced well-being (Brownlie et al., 2019; Nath et al., 2022). Through the lens of the transactional model of stress and coping, these behaviors may be interpreted as short-term attempts to alleviate distress that ultimately reinforce avoidance and dependency patterns (Holahan et al., 2005). This highlights the need for integrative prevention strategies that build resilience and emotional regulation skills in early adolescence.

Additionally, the observed correlations among mental health problems, behavioral–emotional aspects, and PTSD symptoms reflect the interdependence of these domains. These relationships align with prior evidence indicating that internalizing difficulties often co-occur with emotional dysregulation and trauma-related distress (Conti et al., 2023; Cooley et al., 2019). Emotional and behavioral challenges may amplify vulnerability to psychological symptoms, while exposure to trauma during adolescence further increases susceptibility to anxiety and depression (Pynoos et al., 1999; Zahn–Waxler et al., 2000). Such interconnected patterns support theoretical models emphasizing shared etiological mechanisms of

distress, in which impaired emotion regulation mediates the link between stress exposure and psychopathology (Young et al., 2019). Within school environments, these difficulties may be manifested as behavioral issues, academic disengagement, or peer conflict (Lin and Guo, 2024). Accordingly, trauma-informed, school-based programs that incorporate emotional regulation training and peer support could help reduce the risk of escalation from subclinical discomfort to diagnosable mental disorders (Maloney et al., 2024).

5. Limitations

Several limitations of this study should be noted. First, its cross-sectional design restricts causal interpretations of the relationships among trauma exposure, behavioral–emotional difficulties, and mental health outcomes. Longitudinal research is needed to track developmental changes and test causal pathways. Second, the data were based on self-report measures, which may be influenced by recall bias or social desirability, particularly regarding sensitive topics such as substance use and emotional distress. Third, the sample was drawn exclusively from urban schools in southern Vietnam, potentially limiting the generalizability of the findings to rural or ethnically diverse populations. Finally, the absence of multi-informant data, such as parent or teacher evaluations, limits the ability to cross-validate adolescents' self-perceptions of mental health and functioning.

6. Implications

Despite these limitations, the study provides meaningful implications for research, policy, and educational practice. The validation of the PCL-5 as a reliable school-based screening tool demonstrates its potential for large-scale implementation in Vietnamese educational contexts. Integrating validated instruments such as DASS-21, SDQ, and PCL-5 into regular school health programs could facilitate early detection and timely psychological support for at-risk students. Moreover, the findings highlight the importance of developing trauma-informed educational frameworks that train teachers to recognize early signs of distress, enhance peer-support networks, and incorporate socioemotional learning into curricula. Policymakers should prioritize preventive mental health strategies that address both internalizing and externalizing symptoms, promote resilience, and reduce stigma associated with psychological help-seeking among adolescents.

7. Conclusion

In conclusion, this study advances the understanding of adolescent mental health in Vietnam by providing integrated insights into emotional distress, trauma-related symptoms, behavioral–emotional functioning, and substance use. The overall low prevalence of severe mental health problems suggests a generally resilient adolescent population; however, the elevated presence of anxiety and trauma-related distress indicates ongoing psychosocial challenges that merit attention. By establishing an empirically derived PCL-5 cut-off score and confirming significant associations among psychological constructs, the research contributes both theoretically and practically to the field of adolescent mental health assessment. Future efforts should aim to strengthen school-based screening systems, develop culturally responsive prevention programs, and foster emotionally supportive educational environments to safeguard the mental well-being of Vietnamese adolescents. Future research should prioritize external validation of the proposed PCL-5 screening threshold by comparing school-based PCL-5 scores with gold-standard clinical interviews. Such studies are essential to establish predictive validity and inform national guidelines for adolescent mental health screening in Vietnam.

List of abbreviations

ANOVA	Analysis of variance
ASSIST	Alcohol, Smoking and Substance Involvement Screening Test
AUC	Area under the curve
B	Unstandardized regression coefficient
CI	Confidence interval
DASS	Depression, Anxiety, and Stress Scale
df	Degrees of freedom
DSM-5	Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
DW	Durbin–Watson statistic
EFA	Exploratory factor analysis
KMO	Kaiser–Meyer–Olkin measure of sampling adequacy
PCL	PTSD Checklist
PTSD	Post-traumatic stress disorder
R	Correlation coefficient
ROC	Receiver operating characteristic
SDQ	Strengths and Difficulties Questionnaire
SE	Standard error
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organization
β	Standardized regression coefficient

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Compliance with ethical standards

Ethical considerations

This study was conducted in compliance with the regulations of the Ethics Advisory Council of Ho Chi Minh City University of Education (June 25, 2024) for Project No. CS.2024.19.03TĐ and adhered to the

ethical principles of the Declaration of Helsinki and its later amendments.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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