

The Association Between Childhood Trauma and Prodromal Psychotic Symptoms in Nursing Undergraduates: Mediating Roles of Depression and Anxiety

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Background: Childhood trauma is associated with mental health, and nursing undergraduates who exhibit prodromal psychotic symptoms may be more vulnerable to the effects of childhood trauma. This study aims to investigate the mediating role of depression and anxiety in the relationship between childhood trauma and prodromal psychotic symptoms among undergraduate nursing students.

Methods: We conducted a questionnaire survey among nursing undergraduates at Nantong University, China from December 25 to 29, 2024. General information, Childhood trauma questionnaire-short form (CTQ-SF), Prodromal questionnaire-brief version (PQ-B), Depression, anxiety, and stress scales (DASS-21) were used for survey. Pearson correlation analysis and mediation effect test were used to analyze the correlation and effect.

Results: A total of 271 valid questionnaires were collected. The prevalence of prodromal psychotic symptoms in nursing undergraduates was 26.6%. The overall score of prodromal psychotic symptoms showed a positive correlation with both the total score and dimensions of CTQ-SF and DASS-21 ($P < 0.05$). Only physical abuse and sexual abuse showed significant mediating pathways. Specifically, depression and anxiety mediated the association between physical abuse and prodromal psychotic symptoms, the indirect pathway accounted for 49.53% of the total association. Depression and anxiety mediated the association between sexual abuse and prodromal psychotic symptoms, the indirect pathway accounted for 49.01% of the total association.

Conclusion: Our findings suggest potential pathways that may inform future intervention strategies to reduce prodromal psychotic symptoms and improve negative emotions in nursing undergraduates, especially those with childhood traumatic experiences. However, causal inferences cannot be drawn due to the cross-sectional design. Limitations include the single-institution sample and reliance on self-report measures.

Plain Language Summary: Why was the study done? Nursing students often face high levels of stress during their training. Some may have experienced difficult or traumatic events in childhood. This study wanted to understand whether childhood trauma is associated with early signs of psychosis in nursing students, and whether feeling depressed or anxious helps explain this association.

What did the researchers do and find? The researchers surveyed 271 nursing students in China. Students who had experienced physical or sexual abuse in childhood were more likely to report early signs of psychosis. Students who felt depressed or anxious were also more likely to report these signs.

What do these results mean? The findings suggest that supporting nursing students who feel depressed or anxious may help reduce the impact of childhood trauma on their mental health. Nursing schools should consider regular mental health check-ins and provide support for students who have experienced trauma.

Keywords: childhood trauma, prodromal psychotic symptoms, nursing undergraduate, depression, anxiety

Introduction

Prodromal psychotic symptoms are early indicators of schizophrenia.¹ A systematic review highlighted that majority of patients (78.3%) exhibited prodromal psychotic symptoms prior to the onset of psychosis.² In the prodromal phase,^{3,4} often referred to as the “ultra-high risk” period for psychosis, many patients experienced the emergence of sub-clinical psychotic symptoms and a gradual decline in functioning, leading to significant distress. Individuals experiencing prodromal symptoms often feel distressed and are aware of their mental condition, frequently seeking assistance.^{1,5} Research has found an association between prodromal psychotic symptoms and a variety of non-psychotic disorders, as well as an increased risk of developing clinical mental illness.^{6,7} Identifying prodromal psychosis is crucial for preventing or delaying mental disorders and reducing the duration of untreated psychosis.⁸ Most mental disorders manifest before age 24,⁹ yet the mechanisms behind psychosis development remain unclear.^{10–13}

Childhood trauma encompasses various forms, such as physical, emotional, and sexual abuse, and neglect.¹⁴ Childhood trauma affects 4–16% of children in high-income countries,^{15–17} and may be even more prevalent among nursing students. While the general population shows a prevalence of 12.5–13.3% for four or more adverse childhood experiences, this rate exceeds 40% among nursing students.¹⁸ Childhood adversity has been linked to an increased risk of prodromal psychotic symptoms.^{19–21}

Childhood trauma is associated with higher levels of psychological distress and impairment.²² Nursing undergraduates face elevated risks of depression and anxiety due to demanding academic and clinical expectations,^{23–25} with depressive symptom prevalence reported as high as 32.6–38.7%.^{26,27} Childhood trauma can lead to depression²⁸ and negatively impacts nursing students’ learning, work efficiency, career development, and quality of life.^{17,29,30} Research suggests that childhood trauma is linked to a 2–3 times higher risk of depression, and over half of global cases of anxiety with depression may stem from childhood traumatic experiences.³¹ Therefore, we suspect that childhood trauma may increase depression and anxiety in nursing undergraduates.

A systematic review revealed that psychotic symptoms, depressive symptoms, and anxiety are common precursors to psychotic episodes.³² Depressive and psychotic symptoms frequently co-occur in both subclinical and clinical populations.³³ For instance, a community study found that 27% of adolescents and young adults with anxiety or depression symptoms also experienced psychotic symptoms.³⁴ Additionally, a significant percentage of individuals with depression (14–18.5%) reported experiencing psychotic symptoms at some point in their lives.^{35,36} The study also found that the appearance of one symptom may predict the development of other symptoms.³⁷ For example, if depressive symptoms become more severe, psychotic symptoms may progress.³⁸ Although depression co-exists with prodromal symptoms, depression may worsen prodromal symptoms. It has also been reported that anxiety is a risk factor for psychotic experiences.³⁹ Therefore, we hypothesize that depression and anxiety are positive predictors of psychotic prodromal symptoms.

Certain mental health issues may emerge during early adulthood, with research suggesting that approximately 12–50% of college students globally meet the criteria for at least one mental disorder.⁴⁰ Hence, college students represent a unique demographic for exploring the impact of childhood trauma on mental health outcomes in adulthood.⁴¹ Early screening and intervention for college students may also help improve outcomes for affected individuals, thereby significantly reducing the economic burden on society. While previous studies have established associations between childhood trauma and psychotic symptoms, two key gaps remain. First, it is unclear whether these associations hold specifically in nursing undergraduates—a high-stress population facing unique academic and clinical stressors, including intensive coursework, clinical rotations with exposure to suffering and death, and high-stakes professional examinations. Second, no study to date has explicitly tested whether depression and anxiety simultaneously mediate the trauma-psychosis link in this population. Therefore, the novelty of this study lies in (1) focusing on nursing undergraduates in China, and (2) testing a dual mediation model in this understudied population. In summary, this study proposes the following research hypotheses:

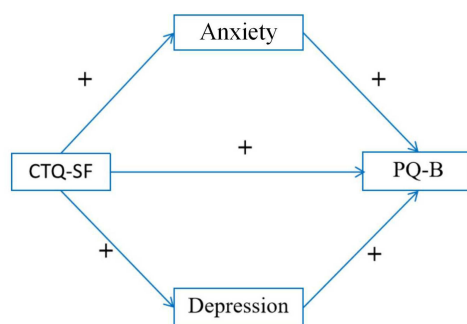


Figure 1 Hypothetical model of this study. The + sign indicates a positive hypothesized pathway; the - sign indicates a negative hypothesized pathway.

1. Childhood trauma is significantly associated with prodromal psychotic symptoms in undergraduate nursing students.
2. Anxiety and depression play a mediating role in the association between childhood trauma and prodromal psychotic symptoms in undergraduate nursing students.

Based on these theoretical assumptions, a hypothetical model has been developed and is presented in [Figure 1](#).

Methods

Participants

A cross-sectional survey was carried out among undergraduate nursing students at Nantong University in China from December 25 to 29, 2024. The inclusion criteria were: (1) age ≥ 18 years; (2) Current full-time undergraduate nursing students. Exclusion criteria are: (1) Nursing undergraduates in their fourth year engaged in clinical practice; (2) Individuals who are receiving psychological treatment. The sample size was calculated using PASS software. This study utilized the unconditional power calculation method, with a sample size of 155 achieving 90% power to detect a ρ^2 of at least 0.2 from 20 independent variables, at a significance level (alpha) of 0.05, with an actual ρ^2 value of 0.4. Considering a 20% dropout Rate, at least 194 cases would ultimately be needed. 287 undergraduate nursing students were invited to participate, and 271 completed the questionnaire, resulting in a total effective rate of 94.4%.

The questionnaires were distributed using the “Questionnaire Star” system (an online platform for collecting questionnaires: www.wjx.cn), with counselors explaining the purpose, methods, and significance of the study before distributing the questionnaires. Participants were notified that their participation was voluntary and ensured that their responses were anonymous. Students who agreed to participate completed the questionnaire using a smartphone scan code. The survey was estimated to take around 10 minutes to complete. To maintain survey quality, the online interface was designed to permit only one response per unique internet protocol address. Additionally, incomplete questionnaires could not be submitted.

Measures

General Information Questionnaire

We designed a general information questionnaire for nursing undergraduates, included grade, gender, academic performance, residence, monthly living expenses, whether the student was an only child, family structure (eg., single-parent family), personality, number of friends, emotional state, non-suicidal self-injury, and weekly exercise frequency.

The Prodromal Questionnaire-Brief Version (PQ-B)

The PQ-B⁴² is a self-report questionnaire designed to identify individuals at risk for mental illness, consisting of 21 items. Participants respond to their experiences from one month ago with a “yes/no” format, and those who answer “yes” rate the distress level of their symptoms using a 5-point Likert scale. The total score is the sum of all item scores. Zhang et al⁴³ and Xu et al⁸ translated the PQ-B into Chinese and demonstrated its good reliability and validity among Chinese outpatient populations. They established the cutoff criteria for the Chinese version as follows: total score ≥ 7 (and distress score ≥ 24) for identifying individuals at risk. In this study, the prevalence of positive screening was determined using the total score cutoff of ≥ 7 .

Childhood Trauma Questionnaire-Short Form (CTQ-SF)

The CTQ-SF⁴⁴ is a widely used self-reported questionnaire for assessing childhood trauma and abuse experiences. The scale consists of 28 items divided into five dimensions: emotional neglect, physical neglect, emotional abuse, physical abuse, and sexual abuse. Each item is rated on a 5-point Likert scale, with higher scores indicating greater severity of childhood trauma exposure. A score exceeding the cutoff value in any dimension (emotional neglect ≥ 15 , physical neglect ≥ 10 , emotional abuse ≥ 13 , physical abuse ≥ 10 , sexual abuse ≥ 8) is considered to have a history of childhood trauma. The Chinese version of the childhood trauma scale has shown good psychometric properties in Chinese adolescents.⁴⁵

Depression, Anxiety, and Stress Scales (DASS-21)

The DASS-21 is a self-report tool designed to assess levels of depression, anxiety, and stress.⁴⁶ Each subscale—depression, anxiety, and stress—consists of seven items rated on a 4-point Likert scale from 0 (not at all) to 3 (very much or most of the time). The total scale ranges from 0 to 42 points, with depression scores ≥ 10 points, anxiety scores ≥ 8 points, and stress scores ≥ 15 points considered clinically significant. Higher scores indicate greater levels of depression, anxiety, and stress.

Ethics

This study received approval from the ethics committee of the affiliated hospital. All participants were informed about the study's purpose at the start of the questionnaire. Participation in the survey was voluntary, with participants being guaranteed confidentiality, privacy, and anonymity. They were also informed of their right to withdraw from the study at any time without facing any consequences. Researchers ensured that all collected data were treated confidentially and used exclusively for research purposes.

Participants who scored above the cutoff on the PQ-B (≥ 7) or on the DASS-21 subscales (depression ≥ 10 , anxiety ≥ 8), or who reported a history of childhood trauma (any CTQ-SF dimension exceeding cutoff) or non-suicidal self-injury (NSSI), were considered at potential risk. These participants were provided with written information about university counseling services and encouraged to seek support. Contact information for the study team was also provided for those wishing to discuss their responses further.

Statistical Analysis

Data were analyzed using SPSS 25.0. Normally distributed continuous data were presented as mean $\pm$ standard deviation. Independent sample *t*-tests were used for comparing two groups, while one-way analysis of variance was used for multiple group comparisons. Pearson correlation analysis was conducted for correlation assessment. Additionally, a theoretically driven hierarchical multiple linear regression was performed. The model was built in three blocks: Block 1 included demographic variables; Block 2 added the five CTQ-SF subscales (emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect); Block 3 added the DASS-21 subscales (depression, anxiety, stress). This forced-entry approach avoids the bias associated with stepwise selection. Multicollinearity was examined via variance inflation factor (VIF). Statistical significance was determined using a significance level of $P < 0.05$. For mediation analysis using the PROCESS macro, simulation studies indicate that a sample size of 200–300 provides adequate statistical power (≥ 0.80) to detect small-to-medium indirect effects with 5,000 bootstrap resamples. A pathway relationship model was established. The significance test of regression coefficient was conducted using Bootstrap method (repeated sampling 5,000 times), and standard error and 95% confidence interval (CI) were obtained. If the 95% confidence interval did not contain 0, it indicated a significant mediating effect.

Results

The Information of the Participants

There were 56 males (20.7%) and 215 females (79.3%). There were 126 freshmen (46.5%), 98 sophomores (36.2%), and 47 juniors (17.3%). Residence, personality, and non-suicidal self-injury had statistical significance ($P < 0.05$). Nursing undergraduates who lived in towns and villages had higher scores for prodromic psychotic symptoms than those who lived in

downtown, introverted nursing students had higher scores than extroverted nursing students, and the scores of those who had experienced non-suicidal self-injury were higher than those who did not. The participant information is shown in Table 1.

Hierarchical Multiple Linear Regression Analysis

The prevalence of prodromal psychotic symptoms in nursing undergraduates was 26.6%. A hierarchical multiple regression analysis was performed with PQ-B total score as the dependent variable. In Block 1, demographic variables (residence, personality, and NSSI) explained 5.9% of the variance ($R^2 = 0.059$, adjusted $R^2 = 0.049$, $P < 0.001$). In Block 2, adding the five CTQ-SF subscales significantly improved the model ($\Delta R^2 = 0.157$, $P < 0.001$), with physical abuse ($\beta = 1.596$, $P = 0.025$) and sexual abuse ($\beta = 2.124$, $P = 0.002$) emerging as significant predictors. In Block 3, the inclusion of DASS-21 subscales further substantially increased explained variance ($\Delta R^2 = 0.231$, $P < 0.001$), bringing the total adjusted R^2 to 0.423. In the final model (Table 2), anxiety ($\beta = 0.605$, 95% CI: 0.118–1.092, $P = 0.015$) and depression ($\beta = 0.685$, 95% CI: 0.231–1.139, $P = 0.003$) remained significant independent predictors, whereas stress was not significant ($\beta = 0.226$, $P = 0.305$). Sexual abuse retained significance ($\beta = 1.301$, 95% CI: 0.175–2.427, $P = 0.024$), while physical abuse became marginally non-significant ($\beta = 1.041$, $P = 0.094$) after controlling for emotional distress, suggesting the presence of a mediating effect of emotional distress. All VIF values in the final model were below 4.2 (range: 1.045–4.146), indicating no severe multicollinearity.

Table 1 Demographic Variables for the Study Sample (N= 271)

Variables		Total Students (n =271)	Mean±SD	F/t	P
Gender	Female	215(79.3)	6.47±11.90	1.857	0.064
	Male	56(20.7)	10.30±19.37		
Grade	Freshman	126(46.5)	7.47±14.09	1.670	0.190
	Sophomore	98(36.2)	8.52±14.96		
	Junior	47(17.3)	4.09±9.82		
	Senior	10(3.7)	1.00±0.00		
Academic performance	Excellent	38(14.0)	8.00±13.28	1.337	0.263
	Good	135(49.8)	6.02±11.91		
	Medium	84(31.0)	9.44±17.19		
	Poor	14(5.2)	4.14±7.53		
Residence	Downtown	82(30.3)	4.26±8.56	2.379	0.018
	Towns & village	189(69.7)	8.57±15.40		
Monthly living expenses (CNY ¥)	≤1500	108(39.9)	7.23±13.18	0.030	0.976
	>1500	163(60.1)	7.28±14.27		
Only child of family	Yes	113(41.7)	7.27±14.76	0.012	0.990
	No	158(58.3)	7.25±13.16		
Single-parent family	Yes	35(12.9)	5.91±11.62	0.617	0.537
	No	236(87.1)	7.46±14.13		
Personality	Introverted	143(52.8)	9.20±15.26	2.457	0.015
	Extroverted	128(47.2)	5.10±11.70		
Number of friends	0	2(0.7)	20.00±24.04	2.368	0.071
	1-3	77(28.4)	8.49±13.73		
	4-6	68(25.1)	9.43±17.40		
	>6	124(45.8)	5.10±11.05		
Emotional state	In a relationship	52(19.2)	9.92±17.66	1.549	0.123
	Single	219(80.8)	6.63±12.71		
Non-suicidal self-injury	Yes	8(3.0)	20.50±21.86	2.784	0.006
	No	263(97.0)	6.86±13.36		
Weekly exercise times	0	34(12.6)	11.15±14.48	2.173	0.116
	1-3	199(73.4)	7.14±14.10		
	>3	38(14.0)	4.42±11.01		

Table 2 Hierarchical Multiple Linear Regression Analysis of Factors Associated with Prodromal Psychotic Symptoms (Final Model)

Variables	β	SE	β^*	95% CI		t	P	VIF
				Lower	Upper			
(Constant)	-16.457	4.746	–	-25.802	-7.111	-3.468	0.001	–
Block 1: Demographics								
Residence	1.962	1.419	0.065	-0.832	4.757	1.383	0.168	1.045
Personality	-1.233	1.321	-0.045	-3.834	1.369	-0.933	0.352	1.070
Non-suicidal self-injury	4.765	4.015	0.058	-3.142	12.672	1.187	0.236	1.136
Block 2: Childhood Trauma								
Emotional abuse	0.297	0.431	0.043	-0.550	1.145	0.691	0.490	1.829
Physical abuse	1.014	0.603	0.098	-0.173	2.201	1.683	0.094	1.588
Sexual abuse	1.301	0.572	0.121	0.175	2.427	2.275	0.024	1.330
Emotional neglect	-0.180	0.218	-0.050	-0.610	0.250	-0.825	0.410	1.710
Physical neglect	0.243	0.397	0.037	-0.540	1.025	0.610	0.542	1.679
Block 3: Emotional Distress								
Stress	0.226	0.220	0.095	-0.207	0.658	1.029	0.305	3.961
Anxiety	0.605	0.247	0.230	0.118	1.092	2.447	0.015	4.146
Depression	0.685	0.231	0.244	0.231	1.139	2.970	0.003	3.153

Notes: β^* : Standardized Coefficients, Model Fit: $R^2 = 0.447$, Adjusted $R^2 = 0.423$, $F = 19.006$, $P < 0.001$.

Common Method Bias Test

Harman's single-factor test was conducted to assess common method bias. The unrotated factor analysis yielded 4 factors with eigenvalues >1 , and the first factor explained 32.69% of the variance ($<40\%$), suggesting that common method bias was not a major concern.

Descriptive Statistics and Correlation Analysis

The relevant analysis results are shown in Table 3. Prodromal psychotic symptoms were positively correlated with the total score of DASS-21 ($r=0.623$, $P < 0.001$) and CTQ-SF ($r=0.339$, $P < 0.001$). Prodromal psychotic symptoms are also associated with the three dimensions of DASS-21: depression ($r=0.590$, $P < 0.001$), anxiety ($r=0.596$, $P < 0.001$), stress ($r=0.559$, $P < 0.001$) and five dimensions of CTQ-SF: emotional abuse ($r=0.345$, $P < 0.001$), physical abuse ($r=0.332$, $P < 0.001$), sexual abuse ($r=0.331$, $P < 0.001$), emotional neglect ($r=0.164$, $P = 0.007$), and physical neglect ($r=0.206$, $P < 0.001$) were also positively correlated. There is a positive correlation between CTQ-SF and DASS-21 and between all dimensions ($P < 0.001$).

Testing for Mediating Effect

It is important to note that the following mediation results are based on cross-sectional data. While statistically feasible, this approach cannot establish temporal sequence or causality. Therefore, these results should be interpreted as exploratory and hypothesis-generating, not as confirmatory evidence of causal mechanisms. In the mediation models, demographic covariates identified as significant in univariate analyses (residence, personality, and NSSI) were entered as control variables in the PROCESS covariate box to ensure consistency with the hierarchical regression framework. The study utilized the bias corrected percentile bootstrap method with 5000 sampling samples to estimate the 95% confidence interval (CI) of the mediation and moderation effects. Results indicate statistical significance when the CI does not encompass the value of 0. The mediating roles of depression and anxiety in physical abuse and psychiatric prodromal symptoms (Figure 2) and the mediating roles of depression and anxiety in sexual abuse and psychiatric prodromal symptoms (Figure 3) were examined respectively. Stress was not included as a mediator because it did not demonstrate an independent contribution in the hierarchical regression when depression and anxiety were simultaneously controlled.

As shown in Table 4, A indicates that physical abuse was directly associated with prodromal psychotic symptoms, with a direct pathway of 1.6400 (95% CI: 0.6397–2.6404, $P=0.001$), accounting for 50.47% of the total effect. The

Table 3 Results of Correlation Analysis of CTQ-SF, DASS-21, and PQ-B Among Nursing Undergraduates

Variables	PQ-B	Stress	Anxiety	Depression	DASS-21	Emotional Abuse	Physical Abuse	Sexual Abuse	Emotional Neglect	Physical Neglect	CTQ-SF
PQ-B	1										
Stress	0.559**	1									
Anxiety	0.596**	0.834**	1								
Depression	0.590**	0.779**	0.790**	1							
DASS-21	0.623**	0.942**	0.939**	0.913**	1						
Emotional abuse	0.345**	0.333**	0.338**	0.312**	0.352**	1					
Physical abuse	0.332**	0.277**	0.278**	0.274**	0.296**	0.567**	1				
Sexual abuse	0.331**	0.231**	0.302**	0.245**	0.278**	0.362**	0.385**	1			
Emotional neglect	0.164**	0.126*	0.209**	0.196**	0.187**	0.368**	0.276**	0.296**	1		
Physical neglect	0.206**	0.137*	0.226**	0.188**	0.195**	0.312**	0.259**	0.330**	0.606**	1	
CTQ-SF	0.339**	0.272**	0.351**	0.317**	0.335**	0.685**	0.592**	0.564**	0.852**	0.751**	1
Mean	7.26	6.35	5.32	4.46	16.13	6.20	5.51	5.39	9.43	6.63	33.16
SD	13.82	5.79	5.26	4.92	14.88	2.01	1.34	1.29	3.82	2.08	7.72

Note: ** $P < 0.01$, * $P < 0.05$.

Abbreviations: PQ-B, The prodromal questionnaire-brief version; DASS-21, Depression, Anxiety, and Stress Scales; CTQ-SF, Childhood trauma questionnaire-short form.

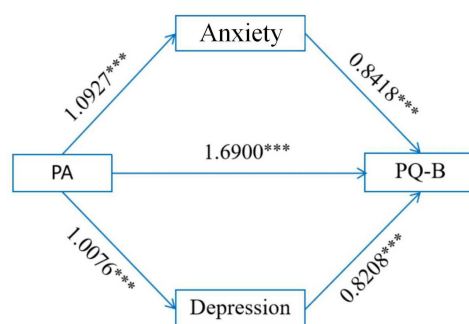


Figure 2 Mediating role of depression and anxiety between physical abuse and prodromal psychotic symptoms. *** $P < 0.001$.

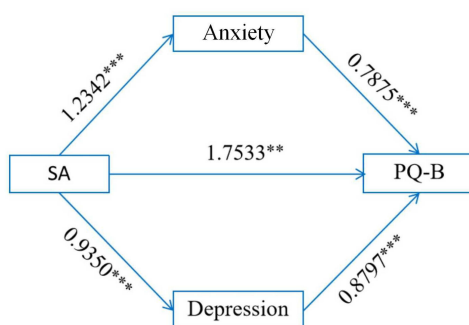


Figure 3 Mediating role of depression and anxiety between sexual abuse and prodromal psychotic symptoms. *** $P < 0.001$, ** $P < 0.05$.

indirect pathways through anxiety and depression were also statistically significantly associated with prodromal psychotic symptoms of nursing undergraduates. The indirect effects were 0.8888 (95% CI: 0.3430–1.5287, $P < 0.05$) and 0.7208 (95% CI: 0.1588–1.4816, $P < 0.05$), respectively, accounting for 27.35% and 22.18% of the total effects. B indicates that sexual abuse was directly associated with prodromal psychotic symptoms of nursing undergraduates, with a direct pathway of 1.7241 (95% CI: 0.6939–2.7543, $P = 0.001$), accounting for 50.99% of the total association. The indirect pathways through anxiety and depression were also significantly associated with prodromal psychotic symptoms of nursing undergraduates. The indirect effects were 0.9419 (95% CI: 0.3099–1.6912, $P < 0.05$) and 0.7150 (95% CI: 0.1407–1.5272, $P < 0.05$), accounting for 27.86% and 21.15% of the total effects, respectively.

Table 4 Analysis of Mediating Effects of Childhood Trauma, Depression, Anxiety and Prodromal Psychotic Symptoms

	Effect	SE/Boot SE	95% CI		P value	Percentage Mediated
			LL CI/Boot LL CI	UL CI/Boot UL CI		
A Physical abuse						
Direct effect	1.6400	0.5081	0.6397	2.6404	0.001	50.47%
Physical abuse→ Anxiety→ PQ-B	0.8888	0.3038	0.3430	1.5287	<0.05	27.35%
Physical abuse→ Depression→ PQ-B	0.7208	0.3404	0.1588	1.4816	<0.05	22.18%
Total indirect effects	1.6096	0.3978	0.8476	2.4095	<0.05	49.53%
Total effect	3.2496	0.5910	2.0859	4.4133	<0.001	100%
B Sexual abuse						
Direct effect	1.7241	0.5232	0.6939	2.7543	0.001	50.99%
Sexual abuse→ Anxiety→ PQ-B	0.9419	0.3618	0.3099	1.6912	<0.05	27.86%
Sexual abuse→ Depression→ PQ-B	0.7150	0.3592	0.1407	1.5272	<0.05	21.15%
Total indirect effects	1.6569	0.5063	0.6913	2.6748	<0.05	49.01%
Total effect	3.3810	0.6053	2.1892	4.5728	<0.001	100%

Abbreviation: PQ-B: The prodromal questionnaire-brief version.

Discussion

In this study, we explored the associations among childhood trauma, depression, anxiety, and prodromal psychotic symptoms in nursing undergraduates. Physical and sexual abuse were directly associated with prodromal psychotic symptoms, and were also indirectly associated with prodromal psychotic symptoms through depression and anxiety. However, given the cross-sectional design, causal relationships cannot be inferred, and the mediation findings should be interpreted as exploratory rather than confirmatory.

Nursing undergraduates living in urban and rural areas had higher scores for prodromal psychotic symptoms than those living in urban centers, which may be related to social support, stress levels, and access to health resources provided by different living environments.⁴⁷ Urban and rural areas may have lower feelings of community connection and more limited access to medical and mental health services than urban center, which can lead to a lack of appropriate support and intervention in the face of stress, increasing the risk of mental health problems. The higher scores for prodromal psychotic symptoms among introverted nursing students than extroverted nursing students may reflect differences in social and emotional processing among introverts. Introverted individuals may engage less socially, which reduces the support they receive from relationships and increases feelings of loneliness.⁴⁸ In addition, introverts may also be more prone to self-reflection in the face of stress, which can further exacerbate feelings of anxiety and depression, thereby increasing the risk of prodromal psychotic symptoms. Nursing undergraduates with non-suicidal self-injury experience had higher scores for prodromal psychotic symptoms than those without such experience. Non-suicidal self-injury (NSSI) is often an unhealthy mechanism used to cope with feelings of stress, anxiety, or depression.⁴⁹ The presence of this behavior indicates that the individual may not have developed healthier strategies for emotional regulation, and therefore such students may have been more vulnerable in terms of mental health and precursors to psychotic symptoms.

Childhood trauma has been associated with long-term alterations in stress regulation systems, which may increase the risk of subsequent mental health problems.^{50–53} Traumatic childhood experiences are associated with unhealthy emotion-regulation strategies, such as repressing emotions, over-dependence, or avoidance. These strategies may help relieve distress in the short term, but in the long term, they may be linked to impaired ability to deal with stress and emotions, which is associated with an increased risk of later mental illness.⁵⁴ Childhood trauma may also affect an individual's social skills and cognitive functioning,⁵⁵ leading to difficulties in establishing and maintaining healthy relationships among peers, and difficulties in handling complex tasks and decision-making. This lack of social and cognitive functioning, in turn, may increase loneliness, social isolation and academic and occupational difficulties,⁵⁶ further contributing to mental health problems. Traumatic childhood experiences can also affect how individuals perceive the world, themselves, and others.⁵⁷ For example, a child who has experienced abuse may develop a cognitive pattern that sees the world as dangerous and himself as worthless. Such mental patterns can lead to negative feelings of self, poor relationships, and maladaptive coping behaviors, further deepening psychological trauma and possibly contributing to the development of prodromal psychotic symptoms.²¹

As a violent traumatic experience, physical abuse is associated with adverse psychological development in children and adolescents, including chronic stress response.⁵⁸ Long-term chronic stress is associated with the occurrence of depressive symptoms, such as low mood, loss of interest and so on. At the same time, constant uncertainty and fear are associated with anxiety symptoms. These two emotional states not only affect an individual's daily functioning, but can further deteriorate into more serious psychological problems.⁵⁹ Individuals with symptoms of depression and anxiety are more likely to report precursor psychotic symptoms, which may partly reflect an abnormal response of the brain to extreme stress.⁶⁰

Because of its aggressive and shameful nature, sexual abuse is associated with deep psychological trauma. This trauma is related to an individual's sense of self-worth and trust. Victims may report depressive symptoms related to guilt and shame,⁶¹ and anxiety symptoms related to fear of re-victimization.⁶² These two emotional responses may work together as a cycle of negative emotions that are associated with daily life and social functioning. Depression and anxiety, as mediating variables, may be associated with reduced ability to deal with stress and may be related to psychotic symptoms,⁶³ as these mental states are associated with neurochemical imbalances that are linked to psychotic disorders such as schizophrenia.

Childhood trauma is associated with an increased risk of prodromal psychotic symptoms, and this association may be partly explained by states of depression and anxiety. This highlights the importance of psychological intervention and support for nursing students who have experienced trauma.⁶⁴ Specifically, this means that the College of Nursing should implement targeted screening procedures to identify students affected by trauma, and provide appropriate mental health resources and support to mitigate the effects of depression and anxiety, and prevent the exacerbation of mental health problems.

The findings of this study have important implications for nursing education practice and strategies. Educators and school administrators should recognize that providing a supportive learning environment is critical to students' mental health. Further, this highlights the need to include mental health and well-being education in the nursing curriculum.⁶⁵ In this way, students can gain a better understanding of mental health issues, including how to recognize and respond to symptoms of depression and anxiety in themselves or their classmates.⁶⁶ Developing specific intervention strategies for nursing students who have already experienced childhood trauma is another important direction for future research. These strategies may include customized mental health intervention programs,⁶⁷ enhanced social support networks, and training for educators to improve their ability to identify and intervene with students' mental health issues.

Implication

The findings suggest that nursing schools may benefit from implementing trauma-informed mental health screening, tailored psychological interventions, and clear referral pathways for at-risk students.

It is also important to acknowledge the limitations of this study. First, the cross-sectional design precludes causal inferences. The mediation analysis, while statistically feasible, cannot establish temporal precedence; the indirect pathways identified represent statistical decompositions of covariance rather than causal mechanisms. Longitudinal or interventional designs are needed to confirm whether depression and anxiety truly mediate the pathway from childhood trauma to prodromal symptoms. Second, the single-institution sample may limit generalizability. Third, reliance on self-report measures represents another constraint. Future research should adopt longitudinal designs, expand sampling across multiple institutions, and incorporate objective measures such as physiological indicators or neuroimaging data. Further investigation into protective factors—such as psychological resilience, social support, and self-compassion—could inform the development of more strengths-based and effective intervention strategies.

Conclusion

Given the cross-sectional design, causal inferences cannot be drawn from this study, and the findings should be interpreted as exploratory. The findings suggest a potential mediating pathway of depression and anxiety in the association between childhood trauma (physical abuse and sexual abuse) and prodromal psychotic symptoms. These results suggest that addressing negative emotions, such as depression and anxiety, may be associated with lower levels of prodromal symptoms. However, longitudinal or interventional studies are needed to determine whether reducing depression and anxiety leads to decreased prodromal symptoms. If confirmed, tailored psychological interventions for nursing students with a history of childhood trauma could be considered in future practice.

Relevance to Clinical Practice

This study suggests that depression and anxiety may mediate the association between childhood trauma and prodromal psychotic symptoms in nursing undergraduates. These findings underscore the importance of implementing trauma-informed mental health screening and intervention programs within nursing education. Early identification and management of negative emotions may be associated with lower risk of psychosis prodrome, supporting the development of targeted psychological support strategies for at-risk students.

Abbreviations

CTQ-SF, Childhood Trauma Questionnaire-Short Form; DASS-21, Depression, Anxiety, and Stress Scales-21; PQ-B, Prodromal Questionnaire-Brief Version; NSSI, Non-suicidal self-injury; HPA, Hypothalamic-pituitary-adrenal.

Data Sharing Statement

The raw data supporting the conclusions of this article are available from the corresponding author, Jian Gu (e-mail: gujianntu@163.com), upon reasonable request.

Ethics Approval and Consent to Participate

This study was conducted in accordance with the Declaration of Helsinki. Approval was obtained from the Ethics Committee of The Sixth People's Hospital of Nantong (Ethics approval number: NTLYLL2023016). All participants were informed about the study's purpose, methods, and their rights prior to enrollment. Participation was entirely voluntary, and written informed consent was obtained from all participants before data collection.

Consent for Publication

Not applicable. This manuscript does not contain any individual person's data in any form (including individual details, images, or videos). All participants consented to the publication of anonymized data through signed informed consent forms.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare that they have no competing interests.

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