ORIGINAL RESEARCH

Association between stress and coping strategies in Chinese nursing students: A cross-sectional study

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ABSTRACT

Background and objective: Stress and mental health concerns have increasingly been studied among Chinese nursing students. Understanding stress levels in this population is essential for addressing their psychological well-being. This study aims to examine the stress levels of Chinese nursing students and explore their association with coping strategies.
Methods: This cross-sectional study surveyed 180 Chinese nursing students from a medical university in Anhui during the 2022/23 academic year. Data were collected using an online self-report questionnaire assessing demographic details, stress levels (Student Nurse Stress Index), and coping strategies (Brief COPE Inventory). Descriptive statistics, correlation analysis, and stepwise regression were used for data analysis.
Results: A total of 170 nursing students completed the survey, revealing a mean stress level of 52.99. Regression analysis indicated that denial, self-blame, and acceptance significantly predicted stress, with acceptance associated with lower stress and denial and self-blame linked to higher stress.
Conclusions: This study highlights the impact of cultural factors on stress responses and emphasizes the potential benefits of promoting acceptance as a coping mechanism among Chinese nursing students.

Key Words: Nursing students, Coping strategies, Stress, Psychometric properties

1. INTRODUCTION

Stress is characterized by the dynamic interaction between an individual and their environment and is a pervasive aspect of modern life. Nursing, in particular, is a demanding and stressful profession worldwide, especially during the COVID-19 pandemic.[1] Stress among nursing students is a well-researched issue, with many studies identifying factors contributing to heightened stress levels, including academic demands, clinical responsibilities, and personal challenges.[2,3] Clinical training has been found to be more stressful than academic coursework, with common stressors involving gaps in knowledge and skills.[4] Initial clinical experiences often introduce additional stressors,[5] such as the fear of making mistakes, managing emergencies, adapting to specialized units, and handling inconsistencies in clinical practice.

In China, nursing students face unique stressors related to cultural and societal expectations, which may intensify their stress.[6] Although nursing students do not bear full responsibility for patient care, they encounter many of the same challenges as practicing nurses, such as interacting with healthcare professionals, navigating hospital hierarchies, managing difficult patient interactions, and coping with emotional chal-

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lenges. Additionally, academic stressors, including heavy coursework and the demanding nature of nursing programs, often isolate nursing students from social activities enjoyed by their peers.[7]

Moderate stress can serve as a motivator, driving students to work harder and achieve their goals.[8] However, excessive stress can lead to negative outcomes such as anxiety,[9] depression,[10] and diminished academic performance.[11] While stress is an inevitable aspect of nursing education, effective coping strategies can mitigate its adverse effects and promote academic success.[12]

Coping strategies refer to behavioral and cognitive approaches employed to address crises, challenging conditions, and demands perceived as stressful.[13] These strategies, shaped by individual characteristics and contextual influences, play a pivotal role in managing stress. Theoretical frameworks commonly classify coping strategies into two primary categories: emotion-focused and problem-focused. Emotion-focused strategies are designed to regulate emotional responses to stress, whereas problem-focused strategies aim to alter the environment or resolve the root cause of stress.[13] These strategies can be further subdivided into specific responses,[14] with their effectiveness largely contingent on how well they align with the nature of the stressor. Since individuals vary in their coping preferences, no single strategy is universally effective.[15]

For nursing students, coping strategies are essential tools for managing the daily stress inherent in their academic and clinical responsibilities.[16] Longitudinal research demonstrated that stress levels fluctuate based on the coping strategies utilized. While some studies identify the first year of nursing education as the most stressful period,[17] others point to later years due to the added pressures of clinical responsibilities.[18] Stress levels may increase or decrease as students advance through their studies, influenced by their experiences and coping approaches. However, interpreting these fluctuations requires careful consideration of differences in nursing curricula across countries.

While the significance of understanding stress and coping mechanisms among nursing students is well-recognized, limited research exists on how Chinese nursing students cope with stress and which strategies are most effective. Given the influence of cultural and educational contexts, research is needed to explore coping mechanisms in this population and identify strategies that can effectively alleviate their stress.

Aims

This study aimed to examine stress levels and their association with coping strategies among Chinese nursing students.

2. METHODS

2.1 Study design

This study utilized a cross-sectional, descriptive design and followed the guidelines outlined in the STrengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement for reporting.[19]

2.2 Participants

A convenience sampling approach was used to recruit Chinese nursing students enrolled in undergraduate programs at a medical university in Anhui, China during the 2022/23 academic year. Inclusion criteria: Nursing students aged 18 years or older, able to provide informed consent. Exclusion criteria: Students on academic leave or diagnosed with a mental health condition.

2.3 Sample size

We used G*Power 3.1.9.7 to calculate the sample size for this study. For the F test (Linear multiple regression, Fixed model), the effect size was set at 0.15, the alpha error probability at 0.05, the power at 0.85, and the number of predictors at 16. The calculated sample size was 157. Considering a 15% attrition rate, a sample size of 180 participants was deemed appropriate.

2.4 Data collection

The surveys were conducted online, with data collected through a 15-minute self-report questionnaire distributed to students. Before completing the questionnaires, participants were briefed on the study's aims and provided with clear instructions for completing the scales. They were also thoroughly informed about the study's objectives, the voluntary nature of their participation, and their rights to confidentiality. The principal investigator was available to answer any questions.

2.5 Measures

We designed a self-administered questionnaire that included demographic information, the Student Nurse Stress Index (SNSI), and the Brief Coping Orientation to Problems Experienced (COPE) Inventory. A pilot test with five participants was conducted to ensure the rigor of the process, as well as the clarity and relevance of the questionnaire content.

Stress levels were measured using the SNSI, a validated instrument specifically designed to assess stress in nursing students.[20] The SNSI comprises 22 items grouped into four factors: academic load, clinical concerns, interface worries, and personal problems. A five-point Likert scale is used, with responses ranging from 1 (not stressful) to 5 (extremely

stressful). The total score ranges from 22 to 110, with higher scores indicating greater perceived stress. The SNSI has been validated among Chinese nursing students, demonstrating strong reliability,[21] with a Cronbach's alpha of 0.940 in this study. Permission to use the tool was obtained from its developer.

Coping strategies were evaluated using the Brief COPE Inventory, a 28-item self-report questionnaire that assesses various coping strategies in response to stress.[22] The Brief COPE employs a four-point Likert scale, ranging from 1 ("I haven't been doing this at all") to 4 ("I've been doing this a lot"). The 28 items could be divided into 14 coping strategies, with higher scores indicating more frequent use of a given strategy. The Brief COPE has been validated in Chinese students,[23] demonstrating good reliability, with a Cronbach's alpha of 0.777 in this study. This inventory is freely available online (https://www.psy.miami.edu/faculty/cc arver/brief-cope.html) for academic purposes.

2.6 Data analysis

Descriptive statistics were used to analyze the demographic data, stress levels, and coping strategies. The normality of the data was assessed using the Kolmogorov-Smirnov test. Pearson correlation analysis was conducted to examine the relationships between coping strategies and stress levels. Stepwise regression analysis was performed to identify predictors of stress. The independent variables included 14 coping strategies, age, and gender, while the dependent variable was stress level. Variance inflation factor (VIF) was used to assess multicollinearity. All analyses were conducted using SPSS Version 20. IBM Corp., Armonk., and a significance level of $p < .05$ was considered statistically significant.

2.7 Ethical considerations

Ethical approval obtained from the institutional review board of Fudan University's Nursing School. Informed consent secured from all participants, and confidentiality maintained.

3. RESULTS

3.1 Descriptive statistics for demographic characteristics, stress levels, and coping strategies

A total of 180 nursing students participated in the survey. Ten questionnaires were excluded due to incomplete responses, resulting in 170 valid participants. The mean age of the participants was 22.5 years (SD = 1.0), ranging from 18 to 25 years. The majority (90%, n = 153) were female, and all were in their fourth year of study. None of the participants reported having a chronic illness.

The mean SNIS score ranged from 22.00 to 88.00, with a mean of 52.99 (SD = 15.05). The most frequently used coping strategies among nursing students were active coping,

positive reframing, and acceptance, while substance use was the least utilized strategy. See Table 1 for detailed results.

Table 1. Descriptive statistics for coping strategies and stress levels

Variables	Min	Max	Mean ± SD
Self-distraction	3.00	8.00	5.21 ± 1.15
Active coping	2.00	8.00	6.36 ± 1.35
Denial	2.00	7.00	3.73 ± 1.19
Substance use	2.00	8.00	2.55 ± 1.11
Use of emotional support	2.00	8.00	4.65 ± 1.32
Use of instrumental support	3.00	8.00	5.52 ± 1.18
Behavioral disengagement	2.00	8.00	3.39 ± 1.09
Venting	2.00	7.00	4.39 ± 0.99
Positive reframing	2.00	8.00	6.14 ± 1.38
Planning	2.00	8.00	5.69 ± 1.15
Humor	2.00	7.00	4.04 ± 1.12
Acceptance	3.00	8.00	6.12 ± 1.29
Religion	2.00	8.00	3.64 ± 1.29
Self-blame	2.00	8.00	4.68 ± 1.11
Stress level	22.00	88.00	52.99 ± 15.05

3.2 Results of correlation analysis

We used Pearson's correlation after confirming the normality of the data. Denial, use of emotional support, behavioral disengagement, venting, humor, religion, and self-blame were positively correlated with stress. In contrast, planning, positive reframing, acceptance, and active coping were negatively correlated with stress. See Table 2 for detailed results.

3.3 Results of stepwise regression analysis

A stepwise regression analysis was conducted to examine the relationship between stress levels (dependent variable) and 14 coping strategies, as well as gender and age (independent variables). Variables were entered and removed from the model based on a significance threshold of $p < .05$ for inclusion.

The final model identified three coping strategies as significant predictors: denial, acceptance, and self-blame. These predictors collectively accounted for 15.4% of the variance in stress levels (adjusted $R^2 = 0.15$, F(3, 167) = 11.14, $p < .001$).

Specifically, acceptance was negatively associated with stress ($\beta = -0.22$, $p = .002$), suggesting that individuals who adopt this strategy experience lower levels of stress. In contrast, denial was positively associated with stress ($\beta = 0.23$, $p = .004$), indicating that this strategy is linked to higher stress levels. Similarly, self-blame also demonstrated a positive association with stress ($\beta = 0.19$, $p = .01$). See Table 3 for detailed results.

Table 2. Association between coping strategies and stress level

	Self-Distraction	Active coping	Denial	Substance use	Use of emotional support	Use of instrumental support	Behavioral disengagement	Venting	Positive reframing	Planning	Humor	Acceptance	Religion	Self-blame	Stress level
Self-distraction	1	.311**	.029	.061	.290**	.249**	.144	.228**	.268**	.336**	.118	.326**	.144	.251**	.062
Active coping	.311**	1	-.262**	-.348**	.034	.309**	-.272**	-.030	.571**	.551**	-.052	.560**	-.186*	-.035	-.189*
Denial	.029	-.262**	1	.410**	.089	-.064	.330**	.232**	-.369**	-.139	.194*	-.292**	.365**	.069	.308**
Substance use	.061	-.348**	.410**	1	.065	-.170*	.471**	.227**	-.353**	-.080	.165*	-.203**	.389**	.129	.110
Use of emotional support	.290**	.034	.089	.065	1	.477**	.333**	.439**	.191*	.237**	.245**	.126	.281**	.250**	.160*
Use of instrumental support	.249**	.309**	-.064	-.170*	.477**	1	.118	.245**	.322**	.323**	.201**	.341**	.061	.135	.047
Behavioral disengagement	.144	-.272**	.330**	.471**	.333**	.118	1	.420**	-.272**	-.099	.281**	-.207**	.359**	.382**	.223**
Venting	.228**	-.030	.232**	.227**	.439**	.245**	.420**	1	-.035	.102	.234**	-.013	.210**	.379**	.242**
Positive reframing	.268**	.571**	-.369**	-.353**	.191*	.322**	-.272**	-.035	1	.503**	-.022	.529**	.014	.013	-.234**
Planning	.336**	.551**	-.139	-.080	.237**	.323**	-.099	.102	.503**	1	-.010	.554**	.118	.100	-.165*
Humor	.118	-.052	.194*	.165*	.245**	.201**	.281**	.234**	-.022	-.010	1	-.011	.305**	.275**	.172*
Acceptance	.326**	.560**	-.292**	-.203**	.126	.341**	-.207**	-.013	.529**	.554**	-.011	1	-.089	.039	-.273**
Religion	.144	-.186*	.365**	.389**	.281**	.061	.359**	.210**	.014	.118	.305**	-.089	1	.160*	.190*
Self-blame	.251**	-.035	.069	.129	.250**	.135	.382**	.379**	.013	.100	.275**	.039	.160*	1	.197**
Stress level	.062	-.189*	.308**	.110	.160*	.047	.223**	.242**	-.234**	-.165*	.172*	-.273**	.190*	.197**	1

$**p < .01$, $*p < .05$.

Table 3. Results of stepwise regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Standard Error	Beta			Lower	Upper
Variables	Denial	2.955	.942	.234	3.138	.002	1.095	4.815
	Acceptance	-2.546	.877	-.216	-2.902	.004	-4.278	-.813
	Self-blame	2.533	.967	.187	2.621	.010	.625	4.442

Notes. Model Summary: Adjusted $R^2 = 0.15$, F (3, 167) = 11.14, $p < .001$, VIF values < 5.0.

4. DISCUSSION

This cross-sectional study investigated stress levels and their associations with coping strategies among Chinese nursing students. The reported stress levels in our sample were comparatively lower than those found in previous studies conducted in China. For instance, Guo et al.[6] reported SNSI-CHI scores ranging from 22 to 110, with a mean of 58.46 (SD = 13.90). The observed differences might stem from variations in sample characteristics. While Guo's study included nursing students across all academic years, our study focused solely on fourth-year students. This distinction is significant, as fourth-year students generally exhibit lower stress levels due to their advanced academic and clinical experiences. Having completed most of their coursework and clinical practice, they face fewer academic and clinical concerns. Furthermore, their maturity and confidence in managing responsibilities contribute to reduced stress related to academic, clinical, and personal challenges.

Our study identified specific coping strategies associated with stress levels, revealing both universal patterns and culturally unique characteristics. Consistent with previous research conducted in student populations from other countries, such as Ethiopia and the United States,[24,25] denial and self-blame were found to be positively associated with higher stress levels.

Denial, as a psychological defense mechanism, involves refusing to acknowledge reality, often by ignoring or minimizing distressing experiences.[26] For instance, a student may deny feelings of being overwhelmed or stressed, even when there are clear indications of elevated stress levels. Some researchers argue that denial may serve a protective function during the initial stages of a stressful event, providing temporary relief, but it can hinder long-term recovery.[27] Also, past research has demonstrated that third-year students employ denial as a coping strategy more frequently than their peers in other academic years.[28] Future research should explore this association through longitudinal designs to better understand the evolving role of denial across different stages of nursing education. Self-blame involves attributing responsibility for negative events or outcomes to oneself, even when such attributions may not be accurate or justified.[29] This distorted form of reasoning can lead individuals to believe they could have prevented or altered an outcome, even in situations beyond their control. For example, a student may blame themselves for underperforming on an exam, despite the influence of external factors. Research indicates that

self-blame amplifies feelings of guilt and shame, thereby exacerbating stress levels rather than alleviating them.[30] These findings aligned with cultural tendencies in Chinese society that prioritize harmony and discourage confrontation. Within this context, nursing students may suppress their emotions or internalize stress. Denial can manifest as avoidance of academic or clinical challenges, while self-blame may stem from the high expectations imposed by students themselves and their families. In collectivist cultures, such expectations intensify feelings of responsibility and guilt, further amplifying stress when students perceive themselves as failing to meet these standards.[31]

Conversely, acceptance emerged as a coping strategy associated with lower stress levels. Acceptance involves acknowledging and embracing stressful situations without attempting to deny, avoid, or altera them.[32] Instead of resisting or battling stressors, individuals employing acceptance adjust their mindset to reconcile with the reality of their circumstances. This approach enables them to conserve emotional energy, focus on adaptive responses, and foster resilience. Research suggested that acceptance might help to reduce the mental and emotional strain associated with denial or self-blame, ultimately promoting lower stress levels and a healthier psychological outlook.[33] Acceptance as a coping strategy aligns with traditional Chinese philosophies, such as Confucianism and Taoism, which emphasize adaptability, balance, and the acceptance of life's challenges.[34] For nursing students, adopting acceptance fosters resilience by reframing challenges as opportunities for growth rather than insurmountable barriers. This perspective alleviates the emotional burden of stress and encourages a balanced, adaptable outlook, contributing to both their academic success and overall well-being.

4.1 Implications for nursing education

First, stress management programs for nursing students should consider the varying stressors encountered at different academic stages, tailoring interventions to address these specific challenges. Next, coping strategies are closely linked to stress levels, underscoring the importance of building effective intervention-oriented coping skills. For instance, training programs and workshops can help students adopt acceptance-based approaches, enabling them to reframe challenges as opportunities for growth while reducing the emotional strain associated with stress. Finally, cultural influences on coping strategies, such as the collectivist emphasis on harmony and responsibility in Chinese society, highlight the need for culturally sensitive support mechanisms. Counseling and educational initiatives should incorporate these cultural dimensions to effectively alleviate the internalized stress and

guilt often experienced by nursing students.

4.2 Limitations

First, the cross-sectional design limits the ability to establish causal relationships between stress levels and coping strategies. Second, the study focused exclusively on fourth-year nursing students, which may limit the generalizability of the findings to students in other academic years or to nursing students in different countries or cultural contexts. Stress levels and coping strategies may vary across different stages of the nursing education process, and future research should include samples from a broader range of academic years and settings. Additionally, the self-reported nature of the data presents another limitation. While self-report questionnaires are commonly used in stress research, they are subject to biases such as social desirability and recall bias, which can affect the accuracy of the reported stress levels and coping strategies. Finally, while this study identified associations between coping strategies and stress, it did not explore underlying factors that may influence the use of specific coping strategies, such as personality traits, family background, or prior experiences with stress.

5. CONCLUSION

In conclusion, this study examined stress levels and coping strategies among Chinese nursing students, revealing that denial and self-blame exacerbate stress, whereas acceptance serves as an effective coping mechanism. The findings also highlighted specific coping strategies associated with stress levels, uncovering both universal patterns and culturally unique characteristics.

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AUTHORS CONTRIBUTIONS
XC and CC contributed to the conception and design of this study; CC and JB performed the statistical analysis; CC, XC, and JB drafted the manuscript; and CC critically reviewed the manuscript and supervised the whole study process. All authors read and approved the final manuscript.

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CONFLICTS OF INTEREST DISCLOSURE
The authors report no conflicts of interest in this work.

INFORMED CONSENT

Obtained.

ETHICS APPROVAL

The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of Fudan University' School of Nursing.

The Publication Ethics Committee of the Sciedu Press.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

PROVENANCE AND PEER REVIEW

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

DATA SHARING STATEMENT

No additional data are available.

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