Original Article

doi:10.31674/mjn.2026.v18i03.006

MJN

Prevalence of Social Anxiety Symptoms and Associated Factors among Undergraduate Nursing Students in Shandong Province, China: A Cross-Sectional Study

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ABSTRACT

Background: Social anxiety symptoms are highly prevalent during emerging adulthood, particularly among undergraduate nursing students, who confront multifaceted stressors - including academic pressure, professional role expectations, and demanding clinical training environments. However, region-specific evidence on social anxiety in this population remains scarce, especially among nursing students enrolled in universities across Shandong Province, China. **Objectives:** To estimate the prevalence of screening-positive social anxiety and identify associated sociodemographic, academic, and psychosocial factors among undergraduate nursing students at a selected university in Shandong Province, China. **Methods:** A quantitative, descriptive, cross-sectional study was conducted with 435 undergraduate nursing students from one university in Shandong Province, China. A two-stage sampling design was used: one university was randomly selected from the 12 accredited undergraduate nursing programs in Shandong Province (stage 1), and all eligible students at the selected university were invited to participate (stage 2). Data was collected via an online, self-administered questionnaire. All statistical analyses were performed using SPSS version 27.0. **Results:** The prevalence of screening-positive social anxiety symptoms was 19.8% (86/435). Univariate analyses revealed significantly higher prevalence of social anxiety among students reporting distant family relationships ($P < 0.001$), negative parenting styles ($P = 0.042$), dissatisfaction with physical appearance ($P < 0.001$), introverted personality traits ($P < 0.001$), low self-efficacy ($P < 0.001$), and poor academic performance ($P < 0.001$). Multivariable logistic regression identified three independent predictors of screening-positive social anxiety: extroverted personality (odds ratio [OR] = 0.543; 95% confidence interval [CI]: 0.299–0.986), high perceived stress (OR = 3.042; 95% CI: 1.873–4.941), and high self-efficacy (OR = 0.543; 95% CI: 0.383–0.771). **Conclusion:** Among undergraduate nursing students at a selected university in Shandong Province, the prevalence of screening-positive social anxiety was 19.8%. Personality traits, perceived stress, and self-efficacy emerged as significant and independent predictors.

Keywords: Nursing Students; Perceived Stress; Shandong Province; Social Anxiety

INTRODUCTION

Social anxiety symptoms are characterized by an extreme fear of social interaction and performance situations (Wang *et al*., 2026). These symptoms are highly prevalent in emerging adulthood, including undergraduate nursing students aged 18–24 years. Nursing students face a convergence of academic pressure, stringent professional demands, and complex clinical environments, making psychological distress particularly pronounced (Calderón-Cruz *et al*., 2025). Globally, nursing students encounter diverse challenges during clinical training, including cultural, educational, organizational, and job-related stressors that drain them both physically and psychologically (Negm *et al*., 2024; Toqan *et al*., 2023). Recent studies in conflict-affected regions have further highlighted the elevated stress burden on nursing students, underscoring the need for targeted interventions that address both stress

Received: April 14, 2026 Received in revised form: October 4, 2026 Accepted: October 19, 2026

levels and resilience (Aqtam *et al*., 2025; Ayed *et al*., 2025). Social anxiety may impair nursing students' clinical communication, performance in simulation-based learning, adjustment to clinical placements, teamwork, and professional identity development. A mixed-methods study of 501 nursing students found a 37.9% social anxiety prevalence, with "being the center of attention" the most anxiety-generating clinical situation and avoidance safety behaviors the dominant coping pattern (Eskiyurt, 2026). Early identification is therefore important for nursing education and future workforce quality. As one of the Chinese provinces producing the largest number of nursing graduates annually, the mental health status of nursing students in Shandong Province directly impacts the quality of the future healthcare workforce. However, research specifically targeting social anxiety in this population remains limited.

Previous studies have identified multiple potential influencing factors of social anxiety among nursing students. Introverted personalities and low self-efficacy have been shown to be associated with higher social anxiety levels and poorer academic performance (Jia & Yue, 2025). Social anxiety levels among Chinese university students increased significantly following the COVID-19 pandemic, particularly among younger individuals with smaller social networks (Wang *et al*., 2026). Psychological capital is negatively correlated with psychological distress, and perceived stress was positively associated with psychological distress (Sun *et al*., 2022). Self-identity negatively predicts social anxiety, and the association between fear of negative evaluation and social anxiety is weakened by perceived social support (Guo *et al*., 2025). Furthermore, family functioning, alexithymia, and negative life events have been found to be significantly associated with social anxiety (Chu *et al*., 2023).

Although several studies have investigated social anxiety among nursing students across China, research specifically targeting Shandong Province remains insufficient. Existing literature within Shandong Province has largely focused on general mental health surveys of university students or mixed-discipline samples, lacking dedicated analyses of the prevalence and independent predictors of social anxiety specifically among undergraduate nursing students, who represent a particularly high-risk group. To the best of our knowledge, few studies have specifically examined social anxiety prevalence and its predictors among undergraduate nursing students in Shandong Province using SIAS/SPS and a probability sampling approach. In a multicenter study of 2,024 nursing students from ten Chinese universities including Shandong, social anxiety was the second strongest predictor of depression, exceeded only by sleep condition (Li *et al.*, 2025). Therefore, this study aims to determine the prevalence and potential influencing factors of social anxiety among undergraduate nursing students at a selected university in Shandong Province, China, and to provide data support for subsequent targeted interventions.

METHODOLOGY

Study Design and Participants

The current study used a quantitative descriptive cross-sectional design and was conducted between August and September 2025 (Wang & Cheng, 2020). The source population comprised 6,060 undergraduate nursing students enrolled in the 2022–2023 academic year across 12 universities in Shandong Province, East China. Inclusion criteria were UG nursing students enrolled in Shandong province universities during the study period who were able to understand and read Mandarin (Chinese). Exclusion criteria were students who were on approved leave or in the process of transferring and students who reported a previous clinical diagnosis of social anxiety disorder, depression, or another mental disorder and were currently receiving or under follow-up for treatment. Diagnostic status was based on self-report; no clinical records were accessed.

Sample Size

With a margin of error of 5%, a confidence level of 95%, and a population size of 6,060, the calculated minimum sample size was 362. An additional 20% for non-response (73 samples) was added using the formula n×(1+non-response rate): 362×1.20=434.4, rounded up to 435. Thus, the target sample size for this study was 435.

The selected university had 520 eligible students; all 520 were invited (census invitation), which exceeded the target of 435. A total of 438 questionnaires were returned (response rate 84.2%). After validity screening, 3 invalid questionnaires were excluded, yielding 435 valid questionnaires, all of which were included in the final analysis. The final valid sample met the prespecified target of 435, and no additional invitations were required (Figure 1).

Data Sampling

This study used a two-stage sampling design.

Stage 1 (University-level random selection): One university was randomly selected from the 12 accredited undergraduate nursing programs in Shandong Province.

Stage 2 (Census invitation within the selected university): All 520 students who met the eligibility criteria at the selected university were invited to participate; no random sampling of students was performed at this stage.

Eligibility Screening: All 520 students on the roster met the inclusion criteria; no students were excluded at eligibility screening. Questionnaire validity screening was a separate data-cleaning step: 438 questionnaires were returned, 3 invalid questionnaires were excluded, and 435 valid questionnaires were analyzed.

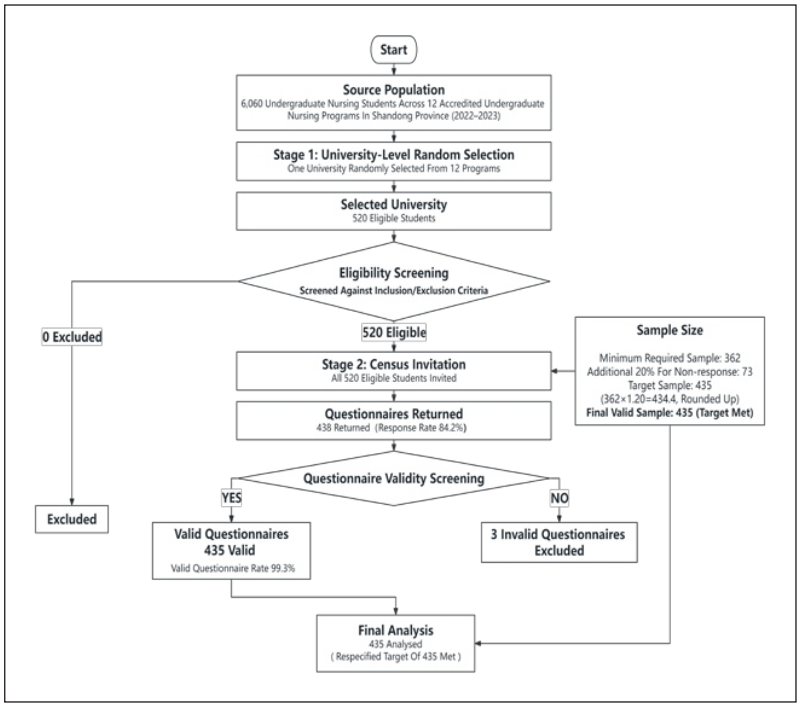


Figure 1: Participant Flow and Sampling Procedure

Study Instruments

All scales used were adapted and validated for the Chinese context. The cross-sectional design adhered to the STROBE reporting guideline. The questionnaire collected demographic information, including age, gender, grade, family relationship quality, parenting style, appearance satisfaction, academic performance, and family economic status. This study used the SIAS and SPS developed by Mattick and Clarke (1998) and revised by Ye *et al.* (2007). SIAS (19 items) measures social interaction anxiety, while SPS (20 items) measures anxiety in scrutiny situations; both use 5-point Likert scales. Ye *et al*. (2007) translated and validated the SIAS and SPS in Chinese university student and clinical samples. In that validation, the recommended screening cut-offs were SIAS > 42 and SPS > 37. These thresholds were derived to balance sensitivity and specificity for identifying individuals with elevated social anxiety symptoms rather than to confirm a clinical diagnosis. Because the present study aimed to estimate screening-positive prevalence rather than diagnostic prevalence, these cut-offs were adopted a priori. Participants meeting either threshold were classified as screening-positive for social anxiety symptoms. Cronbach's α was 0.927 for SIAS and 0.942 for SPS. The PSS-10, developed by Cohen *et al*. (1983) and revised by Liu et al. (2019), was used. This 10-item scale assesses perceived stress (0 = never, 4 = very often), and Cronbach's α was 0.796. The GSES, developed by Schwarzer *et al*. (1995) and revised by Liu et al. (2019), was used. This 10-item scale measures general self-efficacy (1 = completely incorrect, 4 = completely correct), and Cronbach's α was 0.961. PSS-10 and GSES scores were dichotomized as described above and entered as categorical variables. Perceived stress was dichotomized as heavy vs not heavy, with very low, low-to-moderate, and medium-to-high stress combined as the reference category. Self-efficacy was dichotomized as high vs not high, with very low, low-to-moderate, and medium-to-high self-efficacy combined as the reference category.

Data Analysis

SPSS (version 27.0) was used for analyses. Descriptive statistics (frequencies/percentages for categorical data; mean ± standard deviation or median for continuous data) were calculated. Inferential statistics included Chi-square tests and Mann-Whitney U tests (for non-normal continuous variables). Multiple binary logistic regression was fitted with screening-positive social anxiety symptoms (binary:1=screening-positive; 0 = screen-negative) as the dependent outcome variable. A-priori variable-entry rule: all variables returning $P < 0.05$ in bivariate single-factor analyses were entered simultaneously into the initial multivariable model. The final reported model retained three statistically significant independent predictors: personality trait, perceived stress, and general self-efficacy.

For categorical predictors in regression: introverted personality was set as the reference category for the personality variable. PSS-10 and GSES scores were dichotomized as described above and entered as categorical variables. Odds ratios (OR) together with their corresponding 95% confidence intervals (CI) are reported. Statistical significance was defined at $P < 0.05$.

Ethical Consideration

The research obtained ethical clearance from the Medical Research Ethics Committee, Universiti Malaysia Sarawak (UNIMAS), Malaysia with reference number FME/25/78 on 29th July 2025.

RESULTS

Of the 520 eligible students at the selected university, all 520 were invited (census invitation). A total of 438 questionnaires were returned (response rate 84.2%); 3 invalid questionnaires were excluded, leaving 435 valid questionnaires, all of which were analyzed (Figure 1). The final valid sample met the prespecified target of 435.

Demographic Characteristics

As shown in Table 1, among 435 participants, 335 (77.0%) were female, 168 (38.6%) were aged 20 years, 261 (60.0%) were from the 2023 cohort, 239 (54.9%) were from rural areas, and 184 (42.3%) had a family monthly income of 3,001-6,000 RMB.

Table 1: General Characteristics of Study Research Subjects

Demographic Characteristics	Class	Participants (n)	Constituent Ratio (%)
Age	18 years old	15	3.4%
	19 years old	100	23%
	20 years old	168	38.6%
	21 years old	100	23%
	22 years old	41	9.4%
	23 years old	10	2.3%
	24 years old	1	0.2%
Sex	Male	100	23%
	Female	335	77%
Grade	Class of 2022	174	40%
	Class of 2023	261	60%
Home area	City area	196	45.1%
	Rural area	239	54.9%
Household income	<3,000	64	14.7%
	3,001-6,000	184	42.3%
	6,001-10,000	129	29.7%
	>10,000	58	13.3%

Prevalence of Social Anxiety

Among the 435 participants, 86 met the prespecified SIAS/SPS cut-off criteria and were classified as screening-positive for social anxiety symptoms, corresponding to a prevalence of 19.8% (86/435) as shown in Figure 2.

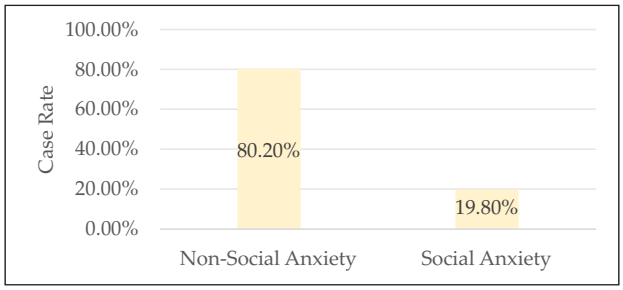


Figure 2: Prevalence of Social Anxiety among Participants (Based on SIAS/SPS Cut-off Scores)

Table 2 tabulated the distribution of social anxiety symptoms across the students with different demographic characteristics. Screening-positive social anxiety differed significantly across several characteristics, including family relationship, parenting style, physical appearance satisfaction, personality, academic performance, perceived stress, and self-efficacy (all $P < 0.05$). The relationship with family was found to be strongly associated with social anxiety. The findings revealed that 66.7% of the students with distant family relationships exhibited social anxiety, compared with only 15.7% of students with close family relationships. In addition, family upbringing style also showed a significant association - 40.0% of the students who experienced negative parenting styles reported social anxiety, whereas only 18.8% of those with positive parenting styles also had social anxiety.

Satisfaction with physical appearance was similarly related to social anxiety ($P < 0.05$). Among the students who were dissatisfied with their appearance, 40.6% experienced social anxiety, compared with just 10.0% among those who were satisfied about their physical appearance. Family history of social phobia showed a non-significant trend (38.1% vs 18.8%; $P = 0.060$) and should be interpreted cautiously. Further, personality traits were found to be significantly associated with social anxiety as well ($P < 0.05$); 26.2% of the introverted students had social anxiety, whereas only 10.9% of extroverted students encountered social anxiety. Academic performance ranking also demonstrated a significant relationship ($P < 0.05$). Students with weak academic performance reported the highest social anxiety levels (62.5%), while those with higher academic performance showed the lowest rate (13.4%) of social anxiety.

Furthermore, stress levels were found to be associated with higher prevalence of social anxiety ($P < 0.05$). Students in high-stress environments reported a social anxiety rate of 28.1%, whereas students with low- or low-to-moderate stress levels demonstrated substantially lower rates, i.e., below 2%. Finally, self-efficacy was found to be significantly associated with social anxiety ($P < 0.05$). Students with low-to-moderate self-efficacy showed the highest social anxiety level (50.0%), whereas those with high self-efficacy had the lowest rate (13.1%).

Table 2: Characteristics of Participants with and without Screening-positive Social Anxiety (n = 435)

Variable	No SA (n = 349), n (%)	SA (n = 86), n (%)	χ^2	*P*
Age			7.108	0.299
18	10(66.7)	5(33.3)		
19	78(78)	22(22)		
20	137(81.5)	31(18.5)		
21	83(83)	17(17)		
22	34(82.9)	7(17.1)		

23	7(70)	3(30)		
24	0(0)	1(100)		
Sex			0.407	0.523
Male	78(78)	22(22)		
Female	271(80.9)	64(19.1)		
Grade			1.169	0.280
Class of 2022	144(82.8)	30(17.2)		
Class of 2023	205(78.5)	56(21.5)		
Family Relationship			19.026**	<0.001
Normal	52(64.2)	29(35.8)		
Close	296(84.3)	55(15.7)		
Drift Apart	1(33.3)	2(66.7)		
Family Upbringing			4.155*	0.042
Positive	337(81.2)	78(18.8)		
Negative	12(60.0)	8(40.0)		
Monthly Household Income			3.133	0.372
<3,000	54(84.4)	10(15.6)		
3,001-6,000	150(81.5)	34(18.5)		
6,001-10,000	103(79.8)	26(20.2)		
>10,000	42(72.4)	16(27.6)		
Home Area			1.058	0.304
City	153(78.1)	43(21.9)		
Rural Area	196(82)	43(18)		
The Only Child			1.600	0.206
Yes	90(76.3)	28(23.7)		
No	259(81.7)	58(18.3)		
Physical Appearance			21.676**	<0.001
Satisfied	153(90.0)	17(10.0)		
Neutral	177(76.0)	56(24.0)		
Dissatisfied	19(59.4)	13(40.6)		
Family History of Social Phobia			3.536	0.060
Yes	13(61.9)	8(38.1)		
No	336(81.2)	78(18.8)		
Whether to Hold a Class Position			2.449	0.118
Yes	75(86.2)	12(13.8)		
No	274(78.7)	74(21.3)		
Personality			15.567**	<0.001
Introversion	186(73.8)	66(26.2)		
Extroversion	163(89.1)	20(10.9)		
Academic Performance Ranking			21.74**	<0.001
Excellent	50(86.2)	8(13.8)		
Good	174(86.6)	27(13.4)		
Normal	122(72.6)	46(27.4)		

Weak	3(37.5)	5(62.5)		
Perceived Stress			26.047**	<0.001
Very Low Perceived Stress	52(98.1)	1(1.9)		
Low to Moderate Perceived Stress	14(100)	0(0)		
Medium to High Perceived Stress	119(85)	21(15)		
Heavy Perceived Stress	164(71.9)	64(28.1)		
Self-Efficacy			23.548**	<0.001
Very Low Self-Efficacy	15(65.2)	8(34.8)		
Low to Moderate Self-Efficacy	10(50)	10(50)		
Medium to High Self-Efficacy	98(74.2)	34(25.8)		
High Self-Efficacy	226(86.9)	34(13.1)		

*Note: Data are n (%). *P < 0.05; **P < 0.001.*

Fisher's exact test or continuity-corrected χ^2 test was used where expected cell counts were small, as appropriate. For the multivariable logistic regression, perceived stress was dichotomized as heavy vs not heavy (very low, low-to-moderate, and medium-to-high combined as the reference), and self-efficacy was dichotomized as high vs not high (very low, low-to-moderate, and medium-to-high combined as the reference).

Independent Predictors of Social Anxiety

According to Table 3, the logistic regression analysis was conducted with screening-positive SA as the dependent variable. The findings indicate that SA is significantly associated with personality traits, perceived stress, and self-efficacy ($P < 0.05$). After adjusting for other variables, extroverted students were found to be a protective group against SA, with an OR of 0.543 (95% CI: 0.299~0.986). Increased perceived stress was a risk factor for increased SA, with an OR of 3.042 (95% CI: 1.873~4.941). Students with high self-efficacy were a protective group against SA, with an OR of 0.543 (95% CI: 0.383~0.771).

Table 3: Multivariable Binary Logistic Regression of Screening-positive Social Anxiety Symptoms (n = 435)

Variable	B	SE	Wald χ^2	*P*	*OR Value*	*OR* Value 95% *CI*
Personality: extroversion vs introversion (reference)	-0.611	0.305	4.02	0.045	0.543	0.299-0.986
Perceived stress: heavy vs not heavy (reference)	1.113	0.247	20.225	< 0.001	3.042	1.873-4.941
Self-efficacy: high vs not high (reference)	-0.61	0.179	11.648	0.001	0.543	0.383-0.771

Note: Dependent variable: Screening-positive SA symptoms (1 = yes, 0 = no)

Only variables with $P < 0.05$ in univariable analyses were entered. Reference categories: Reference categories: personality = introversion; perceived stress = not heavy (very low/low-to-moderate/medium-to-high); self-efficacy = not high (very low/low-to-moderate/medium-to-high). B = unstandardized coefficient; SE = standard error; OR = adjusted odds ratio; CI = confidence interval.

DISCUSSION

The current study reports a screening-positive social anxiety prevalence of 19.8% among undergraduate nursing students at a selected university in Shandong Province, China. This finding is consistent with recent research showing that approximately one in five nursing students may be affected by social anxiety. The prevalence of screening-positive SA in this study was comparable to that reported among undergraduate nursing students in recent Chinese studies using similar social anxiety measures (Jia & Yue, 2025).

Personality Traits

Compared with introverted students, extroverted students had 45.7% lower adjusted odds of screening-positive SA symptoms (OR = 0.543, 95% CI: 0.299-0.986). This effect size is consistent with Sharma *et al.* (2024). After controlling for family relationship quality, parenting style, and academic performance, personality

remained an independent predictor. For nursing education, this finding suggests that curricula should accommodate introverted students by providing low-stress social exposure rather than simply encouraging "more participation."

Perceived Stress

Perceived stress demonstrated the largest effect size in the regression model (OR = 3.042, 95% CI: 1.873-4.941). This reveals how nursing students' dual stressor-heavy coursework and high career expectations jointly impact mental health. A notable graded finding: the SA rate was 0% in the low-to-moderate stress group but reached 28.1% in the high-stress group. A machine-learning study of 2,024 nursing students similarly identified sleep condition, alexithymia, and depression as the top three predictors of social anxiety, suggesting that stress-related and affective factors cluster with social anxiety rather than acting in isolation (Wang *et al.*, 2025). Globally, studies have similarly documented that nursing students in high-stress environments related to academic demands, clinical training, or broader socio-political contexts exhibit elevated psychological distress (Toqan *et al*., 2023; Aqtam *et al*., 2025).

Self-efficacy

High self-efficacy reduced SA odds by 45.7% (OR = 0.543, 95% CI: 0.383-0.771). Resilience partially mediated the negative association between social interaction anxiety and self-esteem in clinical nursing students, positioning resilience as a modifiable proximal target alongside self-efficacy (Amin *et al.,* 2026). Jia and Yue (2025) similarly reported that students with low self-efficacy (50.0% SA prevalence) doubt their social abilities, leading to fear and avoidance. This finding aligns with recent work by Wang and Zhao (2026), who demonstrated that regulatory emotional self-efficacy mediates the relationship between shyness and social anxiety. Among 824 Chinese undergraduate nursing students, self-efficacy negatively predicted fear of negative evaluation, and fear of positive evaluation partially mediated this association (mediation effect = 38.22%), clarifying one mechanism through which self-efficacy may reduce social anxiety (Jia & Yue, 2023).

Associated Factors and their Mechanisms

Although family and individual factors did not remain independent predictors in the regression model, their significant bivariate associations warrant mechanistic explanation. Distant family relationships and negative parenting styles correlated with higher SA. This finding is consistent with Chu *et al*. (2023). The attenuation of family relationship quality and parenting style after adjustment for personality, self-efficacy, and perceived stress is consistent with the possibility that these family-level factors overlap substantially with individual-level characteristics. However, because the present study did not conduct a formal mediation analysis, this pattern should not be interpreted as evidence of mediation. Chu *et al*. (2023) reported that alexithymia mediated the association between family function and social anxiety among Chinese nursing students; that finding provides a plausible mechanism, but it was not tested in the present sample. Students dissatisfied with their appearance (40.6% SA prevalence) and those with weak academic performance (62.5% SA prevalence) had significantly higher SA. For nursing students who are frequently evaluated in clinical settings, these concerns are particularly salient.

Integrated Intervention Framework and Practical Implications

Based on the three core independent predictors (personality traits, perceived stress, self-efficacy) and multiple associated factors, we propose a three-tier intervention framework:

Tier 1 (Universal Prevention): Integrate SA screening into entry-level mental health assessments and promote mindfulness-based stress reduction courses. Evidence from Chinese college students suggests that physical activity is associated with lower social anxiety, with social support and psychological capital as chain mediators (Deng & Wang, 2024); another study reported chain mediation through family support and self-efficacy (Yang *et al*., 2026)."

Tier 2 (Selective Intervention): For at-risk groups (introverted students and those with high perceived stress), provide cognitive-behavioral group counseling and stress management skills training. An eight-week mindfulness-based cognitive counseling group produced significant group×time improvements in social anxiety, assertiveness, and self-confidence among nursing students, sustained at six-month follow-up (Ercan *et al.*, 2026). Recent work has proposed multi-component approaches combining psychological counseling,

curriculum adjustment, campus culture initiatives, and family support (Deng & Zhang, 2026; Qu *et al*., 2024); however, intervention trials are needed to determine whether these approaches produce more sustained effects than single-modality CBT.

Tier 3 (Targeted Treatment): For students meeting the SIAS/SPS cut-off criteria for SA, provide professional psychological referral and long-term follow-up. This framework emphasizes family-school collaboration. Because family relationship quality and parenting style show significant associations with SA, families should be engaged through parental mental health education and communication skills training (Qu *et al*., 2024). At the policy level, national mental health education policies in China provide a supportive context; however, province-level guidelines specifically for nursing students are urgently needed. Institutions should allocate sufficient mental health professionals and develop university-level screening guidelines and tiered intervention pathways.

Limitations

The study has several limitations. First, the cross-sectional design cannot establish causality; perceived stress and social anxiety may be bidirectionally associated. Second, recruitment from one selected university may introduce selection bias and limits generalizability to all nursing students in Shandong Province. Third, self-report measures may be affected by social desirability and common method bias. Fourth, SA was defined by SIAS/SPS cut-offs rather than clinical diagnostic interviews, so the prevalence estimate refers to screening-positive cases. Fifth, residual confounding cannot be excluded. The response rate was 84.2%, and non-response bias cannot be excluded.

Future Scope

Future longitudinal, multi-center studies using clinical interviews and validated intervention programs are needed to clarify causality, improve generalizability, and evaluate intervention effectiveness.

CONCLUSION

Among undergraduate nursing students at a selected university in Shandong Province, the prevalence of screening-positive social anxiety symptoms was 19.8%. Personality traits, perceived stress, and self-efficacy emerged as independent predictors of these symptoms. However, these findings should not be generalized to all nursing students across Shandong Province without corroborating evidence from multi-center studies. A multilevel intervention framework encompassing university-level support, family engagement, and supportive health policy is essential to mitigate social anxiety risk and promote the mental well-being of future nursing professionals.

CRediT Authorship Contribution Statement

F. Z.: Conceptualization, Methodology, Formal Analysis and Writing: Original Draft. **L.S.W.:** Supervision, Writing – Review and Editing. **S.A.R.:** Supervision and Validation.

AI Assistance Declaration

The authors declare that AI tools were solely used for language polishing. All authors reviewed and approved the final version of the manuscript.

Conflict of Interest

The authors declare that they have no competing interests.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to all the undergraduate nursing students who participated in this study for their time and cooperation. The authors also acknowledge the participating university and its staff for their support and assistance during the data collection process. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. The authors declare that they have no competing interests.

REFERENCES

Amin, S. M., Allawy, M. E. A., Razek, R. A. A., Sabrah, N. Y. A., Atta, M. H. R., Abdelaliem, S. M. F., Baghdadi, N. A., Ali, E. A., & Khedr, M. A. (2026). The Mediating Role of Resilience in the Association Between Social Interaction Anxiety and Self-Esteem Among Nursing Students in Clinical Settings. *Healthcare, 14*(17), 2719. https://doi.org/10.3390/healthcare14172719

Aqtam, I., Ayed, A., Alfuqaha, O. A., & Shouli, M. (2025). Stress and resilience of nursing students in clinical training during political violence: A Palestinian perspective. *PLoS One, 20*(6), e0325278. https://doi.org/10.1371/journal.pone.0325278

Ayed, M., Ejheisheh, M. A., Ayed, A., & Batran, A. (2025). Understanding the relationship between resilience and psychological well-being among nursing students in Palestine. *BMC Nursing, 24*(1), 889. https://doi.org/10.1186/s12912-025-03566-z

Calderón-Cruz, B., García-Sánchez, U., González-Oya, J. L., & Prieto-Campo, Á. (2025). Factors related to well-being and psychological health in nursing students: A cross-sectional survey. *International Journal of Nursing Studies Advances, 9*, 100421. https://doi.org/10.1016/j.ijnsa.2025.100421

Chu, Y., Zhang, Y., Yang, D., Wang, S., Liang, C., Wang, X., & Dai, H. (2023). Influence of family function on social anxiety among Chinese nursing students: The mediating role of alexithymia. *Nursing Open, 10*(3), 1356–1366. https://doi.org/10.1002/nop2.1385

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A Global Measure of Perceived Stress. *Journal of Health and Social Behavior, 24*(4), 385–396. https://doi.org/10.2307/2136404

Deng, Q., & Zhang, X. (2026). Interpretable analysis of social anxiety status and influencing factors among college students. *Frontiers in Psychiatry, 17*, 1776296. https://doi.org/10.3389/fpsyt.2026.1776296

Deng, Y., & Wang, X. (2024). The impact of physical activity on social anxiety among college students: The chain mediating effect of social support and psychological capital. *Frontiers in Psychology, 15*, 1406452. https://doi.org/10.3389/fpsyg.2024.1406452

Ercan, F., İnce, D. K., & Demir, S. (2026). The effect of mindfulness-based cognitive counseling group on social anxiety, assertiveness, and self-confidence in nursing students: A randomized controlled trial. *Journal of Psychiatric Nursing, 17*(2), 169–181. https://doi.org/10.14744/phd.2026.38066

Eskiyurt, R. (2026). Social anxiety and clinical practice experiences among nursing students: A quantitative and qualitative study. *Taiwanese Journal of Psychiatry, 40*(3), 170. https://doi.org/10.4103/TPSY.TPSY_28_26

Guo, S., Yang, J., Zhang, S., Xue, D., & Liu, M. (2025). Impact of self-identity on social anxiety among college students: A moderated mediation model. *Frontiers in Psychology, 16*, 1622431. https://doi.org/10.3389/fpsyg.2025.1622431

Jia, Y., & Yue, Y. (2023). Fear of positive evaluation mediates the relationship between self-efficacy and fear of negative evaluation in nursing students: A cross-sectional study. *Journal of Professional Nursing, 47*, 88–94. https://doi.org/10.1016/j.profnurs.2023.04.007

Jia, Y., & Yue, Y. (2025). Influencing Factors of Social Anxiety of Undergraduate Nursing Students Based on Random Forest Model: A Cross-Sectional Study. *Nursing Open, 12*(1), e70137. https://doi.org/10.1002/nop2.70137

Li, Y., Sun, B., Wu, X., & Li, Y. (2025). An explainable analysis of depression status and influencing factors among nursing students. *Frontiers in Psychiatry, 16*, 1696139. https://doi.org/10.3389/fpsyt.2025.1696139

Liu, H. L., Zhai, C. C., & Ding, G. Y. (2019). Study on the current situation and influencing factors of social phobia

among clinical university students in a medical university in Shandong. *Journal of Taishan Medical University, 40*(9), 699–702.

Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behaviour Research and Therapy, 36*(4), 455–470. https://doi.org/10.1016/S0005-7967(97)10031-6

Negm, L. M. M. A., Mersal, F. A., Fawzy, M. S., Rajennal, A. T., Alanazi, R. S., & Alanazi, L. O. (2024). Challenges of nursing students during clinical training: A nursing perspective. *AIMS Public Health, 11*(2), 379–398. https://doi.org/10.3934/publichealth.2024019

Qu, D., Wen, X., Cheng, X., Zhu, A., Wu, Z., Che, L., & Chen, R. (2024). School mental health prevention and intervention strategies in China: A scoping review. *The Lancet Regional Health - Western Pacific, 53*, 101243. https://doi.org/10.1016/j.lanwpc.2024.101243

Schwarzer, R., Jerusalem, M., Weinman, J., Wright, S., & Johnston, M. (1995). Generalized Self-Efficacy Scale. *Measures in Health Psychology: A User's Portfolio. Causal and Control Beliefs Windsor*. https://psycnet.apa.org/doi/10.1037/t00393-000

Sharma, S., Devi, M. J., & Khan, A. A. (2024). A Comparative Study to Assess the Level of Stress and Coping Strategies among Introvert and Extrovert Nursing Students in Selected Colleges of Nursing, Delhi and NCR. *Indian Journal of Psychiatric Nursing, 21*(1), 35–43. https://doi.org/10.4103/iopn.iopn_58_23

Sun, F., Wang, A., Xue, J., Su, J., Hu, C., & Lu, Q. (2022). The mediating effect of psychological capital on the relationship between psychological stress and distress among chinese nursing students: A cross-sectional study. *BMC Nursing, 21*(1), 128. https://doi.org/10.1186/s12912-022-00915-0

Toqan, D., Ayed, A., Malak, M. Z., Hammad, B. M., Bashtawy, M., Hayek, M., & Thultheen, I. (2023). Sources of stress and coping behaviors among nursing students throughout their first clinical training. *Sage Open Nursing, 9*, 23779608231207274. https://doi.org/10.1177/23779608231207274

Wang, F., Xu, P., Huang, Y., Liu, L., Kong, L., & Yang, F. (2025). Social anxiety prediction model for nursing students based on machine learning: A cross-sectional survey. *Frontiers in Psychiatry, 16*, 1721618. https://doi.org/10.3389/fpsyt.2025.1721618

Wang, X., & Cheng, Z. (2020). Cross-sectional studies: Strengths, weaknesses, and recommendations. *Chest, 158*(1S), S65–S71. https://doi.org/10.1016/j.chest.2020.03.012

Wang, Y., & Zhao, Y. (2026). The impact of shyness on social anxiety among college students: Mediating role of regulatory emotional self-efficacy and resilience. *PLoS One, 21*(3), e0344809. https://doi.org/10.1371/journal.pone.0344809

Wang, Y.-Z., Afzal, K. I., Yuan, C.-M., Fan, J.-Y., He, J., Li, X.-H., Wang, B.-B., Feng, Y.-Y., Shao, H.-Y., Zhou, D.-H., & Weng, X. (2026). Prevalence, comorbidity and predictors of social anxiety severity among Chinese youth in the post-COVID-19 era. *BJPsych Open, 12*(2), e74. https://doi.org/10.1192/bjo.2026.10980

Yang, B., Yang, X., Fan, Z., Liu, C., & Zheng, Z. (2026). The impact of physical activity on social anxiety among college students: an analysis of the chain mediation effect of family support and self-efficacy. *PeerJ, 14*, e20511. https://doi.org/10.7717/peerj.20511

Ye, D., Qian, M., Liu, X., & Chen, X. (2007). Revision of social interaction anxiety scale and social phobia scale. *Chinese Journal of Clinical Psychology, 15,* 115–117. https://pesquisa.bvsalud.org/portal/resource/pt/wpr-544876