

Exploring the Resilience of Cross-Border Exchange Nurses: A Cross-Sectional Study

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Abstract

Background

Cross-border exchange nurses facing unique cultural differences, language barriers, unfamiliar clinical procedures, and being far from their usual support network. These challenges can be completely different from everyday work stress and place special demands on a nurse's psychological resilience. While previous studies have examined psychological resilience in general nursing populations, few have focused specifically on the resilience levels of cross-border exchange nurses and the factors that influence them, leaving a gap in support for this professional group. This study aims to assess the psychological resilience of cross-border exchange nurses.

Methods

This study used a cross-sectional survey design. A total of 92 questionnaires were distributed, and 75 valid responses were received (response rate: 81.5%). The participants were taking part in a six-month exchange program between Guangxi, China, and Hong Kong. The survey was conducted in the fourth to fifth months of the exchange (April 2026) through an anonymous online platform. The inclusion criteria were as follows: currently participating in the exchange program and signed the informed consent form. Statistical analyses included descriptive statistics, Spearman's rank-order correlation to assess relationships among the study variables, and multiple linear regression analysis to identify independent predictors of psychological resilience.

Results

A total of 75 nurses who participated in cross-border exchange programs were included, 73 (97.3%) of whom were female. The mean age was 33.36 ± 4.24 years, and the majority held a bachelor's degree (90.7%). The mean psychological resilience score was 90.11 ± 12.08 . Spearman's correlation analysis revealed that resilience was significantly positively correlated with age ($r = 0.351$, $p = 0.002$), social support ($r = 0.429$, $p < 0.001$), and adaptation level ($r = 0.381$, $p = 0.001$). Multiple linear regression analysis further revealed that, after controlling for age, both social support ($B = 1.589$, $p = 0.001$) and adaptation level ($B = 5.898$, $p < 0.001$) remained significant independent predictors of resilience, with the final model explaining 41.2% of the variance (adjusted $R^2 = 0.370$).

Conclusions

Nurses who participated in short-term Hong Kong exchange programs presented a relatively high level of psychological resilience. Resilience was positively associated with older age, greater perceived social support, and better self-rated adaptation. These findings contribute to the limited literature on resilience among cross-border exchange nurses.

1. Introduction

Resilience is seen as a personality trait that can enhance the ability to understand and predict problems, as well as cope with stressful events¹. People with high resilience can develop strategies, make smart decisions, and solve problems via their practical and communication skills. They stay positive about themselves and their own matters. Resilience is highly important for handling stress, developing effective coping strategies, and adapting to changing or fast-changing environments²⁻³. Research has shown that resilience helps prevent nurses from experiencing emotional exhaustion and is an important part of their mental and physical health⁴.

Many studies have documented the challenges nurses face in education and work, and these challenges are often linked to resilience⁵. Several qualitative and quantitative studies have explored the resilience of nurses around the world⁶⁻⁸. Nurses from different departments or working in different clinical areas show some differences in resilience⁸. These investigations have identified multiple correlates of resilience, such as age, years of experience, social support, and coping styles⁹⁻¹³. Although these studies provide an important foundation for understanding nurse resilience, most of them focus on nurses who work long-term in regular clinical settings, and research specifically on the resilience of nurses in cross-border communication is still relatively scarce.

With the acceleration of globalization, increasingly more nurses are becoming involved in international exchange programs. During this process, they temporarily leave their familiar work environment and step into new clinical and cultural settings. Working across borders gives nurses valuable opportunities to improve their clinical skills, deepen their professional understanding, and develop cross-cultural communication abilities¹⁴. However, it also presents unique challenges—such as cultural differences, language barriers, unfamiliar clinical procedures, and being away from their usual support networks—which can be very different from everyday work stress and place special demands on a nurse's psychological resilience¹⁵⁻¹⁶. Since the fourth quarter of 2022, the Hong Kong Hospital Authority has launched the 'Greater Bay Area Medical Talent Exchange Program'¹⁷⁻¹⁹. Notably, although Hong Kong and mainland China share similar cultural roots, Hong Kong's healthcare system follows a British model, with marked differences in clinical protocols, medical terminology, nurse–patient communication styles, and working languages (Cantonese and English). Thus, mainland nurses participating in exchange programs in Hong Kong face not only geographic relocation but also a culturally adaptive challenge that is simultaneously familiar and unfamiliar—familiar in cultural heritage but unfamiliar in institutional and linguistic contexts. This unique adaptive environment may place specific demands on nurses' psychological resilience.

However, even though cross-border nursing exchange programs are thriving, related academic research is clearly lagging behind. Most existing studies on nurses' psychological resilience focus on those in regular clinical settings, examining their current resilience, influencing factors, and intervention strategies. Research involving nurses in cross-border exchange situations often focuses on long-term immigrant nurses²⁰ and examines cultural shocks, job adaptations, and resilience protective factors. However,

studies on the resilience of short-term cross-border nurses who participate in exchanges for learning purposes within a fixed timeframe are extremely limited. These nurses face unique mental challenges—they need to adapt to unfamiliar work environments, different clinical procedures, language barriers, and cultural differences within a short period—while lacking the systemic social support networks that long-term immigrant nurses might have. How resilient this group is and which factors play key roles in their adaptation process still lack sufficient empirical research. Understanding this is important and can offer valuable insights into these challenges.

Therefore, the present study was designed to investigate the level of psychological resilience among nurses participating in cross-border exchange programs and to examine its associations with perceived social support and self-rated adaptation, with the aim of providing preliminary empirical evidence for the development of support systems for cross-border nursing exchange programs.

2. Materials and methods

2.1. Study Design and Participants

A cross-sectional survey design was used in this study. The study participants were nurses who participated in a six-month exchange program between Guangxi, China, and Hong Kong. Questionnaires in which more than 10% of the questionnaires lacked a complete structure were excluded from this study. Those whose exchange programs were interrupted or who returned early were also excluded from this study. The sample size was determined by the total number of nurses participating in the cross-border exchange program during the study period. All eligible nurses who provided informed consent were invited to participate. A total of 92 questionnaires were distributed, of which 75 were completed and deemed valid, yielding a response rate of 81.5%. No a priori sample size calculation was performed, as this was an exploratory cross-sectional study; nevertheless, the achieved sample size provides sufficient statistical power for the correlation and regression analyses conducted.

2.2. Participants and measures

All nurses enrolled in the Guangxi–Hong Kong nursing exchange program were eligible for participation. The inclusion criteria were as follows: (1) currently engaged in the exchange program and (2) provided informed consent. The survey was distributed in the fourth to fifth months of the exchange period (April 2026) via an anonymous online platform (Wenjuanxing). All 75 questionnaires returned were complete and valid.

Sociodemographic questionnaire (self-developed): Collected data on age, sex, marital status, educational attainment, years of clinical experience, professional title, managerial role, monthly income, clinical specialty, exchange type, voluntary enrollment status, prior interprovincial and overseas work/study experience, self-rated Cantonese proficiency (1–5 scale), and self-rated adaptation to the Hong Kong work environment (1–5 scale).

Connor-Davidson Resilience Scale (CD-RISC)²¹: The validated Chinese version revised by Yu and Zhang (2007) was used²². The scale comprises 25 items rated on a 5-point Likert scale (0–4), yielding a total score of 0–100, with higher scores indicating greater resilience. The scale encompasses three dimensions: tenacity, strength, and optimism. In this study, the scale demonstrated high internal consistency, with a Cronbach's alpha coefficient of 0.937.

Oslo Social Support Scale (OSSS-3): The Chinese version validated by Zhang et al. (2024) was administered²³. This 3-item scale uses a score of 1–5 per item, producing a total score of 3–15, with higher scores reflecting greater social support. The Cronbach's alpha in this study was 0.833.

2.3. Procedures

This study was approved by the Science and Technology Ethics Committee of the People's Hospital of Guangxi Zhuang Autonomous Region (Approval No. LW[2026]021). Data were collected from mainland nurses who participated in a short-term exchange program at a hospital in Hong Kong between April and May 2026. Data were collected online through a questionnaire platform. The questionnaire link was distributed via a QR code within the working group. Each person was limited to completing one questionnaire; the questionnaire was anonymous and voluntary. This study aims to improve the convenience of nurses participating in questionnaire surveys while reducing time and space limitations.

2.4 Statistical analysis

Statistical analyses were performed via SPSS version 26.0 (IBM Corp., Armonk, NY). Continuous variables are presented as the means +/- standard deviations (M +/- SDs), and categorical variables are presented as frequencies and percentages. Associations between sociodemographic characteristics and CD-RISC scores were evaluated via independent-samples t tests for dichotomous variables, one-way ANOVA for polytomous variables, and Pearson correlation coefficients for continuous variables. Variables with $P < 0.10$ in univariate analysis were entered into a multiple linear regression model via the Enter method; variance inflation factors (VIFs) were calculated to assess multicollinearity (threshold $VIF < 5$). Mediation analysis was conducted via the PROCESS macro for SPSS (Model 4; Hayes, 2013), with 5,000 bootstrap samples, with the 95% confidence interval (CI) excluding zero denoting significant mediation. An indirect effect was considered statistically significant if the 95% bootstrap confidence interval did not contain zero. A two-tailed significance threshold of $\alpha = 0.05$ was adopted throughout.

2.5 Ethical considerations

In accordance with ethical considerations, this study was performed in accordance with the Declaration of Helsinki after approval was granted by the Ethics Committee of the People's Hospital of Guangxi Zhuang Autonomous Region. Researchers introduced the research purpose and procedures to all participants prior to data collection. All participants took part voluntarily with anonymous responses, and written informed consent was obtained via a checkbox on the questionnaire cover page after detailed notification. The participants were explicitly informed that all the collected data would be used exclusively for this scientific research, that their personal information would be kept strictly confidential, and that they would retain the right to withdraw from the investigation at any time.

3. Results

3.1 Sociodemographic characteristics of the participants

A total of 92 subjects were recruited for this research investigation, among which 75 usable questionnaires were retrieved, corresponding to an effective recovery rate of 81.52%. A total of 75 participants were included in the final analysis. The mean age was 33.36 ± 4.24 years. The majority were female (73, 97.3%), voluntarily participated (71, 94.7%), and reported moderate to high adaptation levels (61, 81.3%). The detailed demographic characteristics are presented in Table 1.

Table 1

Sociodemographic characteristics of nurses and comparisons of different variables related to resilience

Variable	Group/Statistic	Mean+/-SD	Test statistic	p value
Sex (t test)	Male (n = 2)	84(82,86)	-	-
	Female (n = 73)	90.11 ± 12.08		
Voluntary enrollment (t test)	Yes (n = 71)	90.41 ± 12.00	-	-
	No (n = 4)	81.75 ± 8.73		
Marital status (t test)	Married (n = 46)	90.07 ± 11.81	t=-0.107	0.915
	Unmarried (n = 29)	89.76 ± 12.41		
Interprovincial experience (t test)	Yes (n = 49)	90.31 ± 11.83	t = 0.355	0.724
	No (n = 26)	89.27 ± 12.42		
Overseas experience (t test)	Yes (n = 3)	103(113,103,93)	-	-
	No (n = 72)	103.00 ± 10.00		
Managerial role (t test)	Yes (n = 8)	93.25 ± 6.63	t = 0.824	0.412
	No (n = 67)	89.55 ± 12.42		
Education (ANOVA)	Bachelor's (n = 68)	89.65+/-12.43	t=-0.673	0.503
	Master's+ (n = 7)	92.86+/-5.37		
Professional title (ANOVA)	Nurse (n = 13)	87.23+/-17.33	H = 3.420	0.181
	Senior nurse (n = 53)	90.28+/-10.94		
	Deputy chief+ (n = 9)	91.89+/-8.89		
Monthly income (ANOVA)	< 5,000 CNY (n = 2)	108(96,120)	-	-
	5,000–8,000 CNY (n = 50)	87.74+/-11.50		

Note: Data are presented as the means ± SDs for continuous variables or n (%) for categorical variables. For group comparisons, Spearman's r is reported for continuous variables (age, social support), whereas H (Kruskal–Wallis) or t (independent-samples t-test) is reported for categorical variables with adequate subgroup sizes (all subgroup n ≥ 5). For categorical variables containing any subgroup with n < 5, statistical tests were not performed; these subgroups are presented descriptively with raw scores in parentheses, and “–” denotes not applicable in the statistical columns. All p-values are two-tailed.

Variable	Group/Statistic	Mean+/-SD	Test statistic	p value
	8,001–12,000 CNY (n = 22)	93.50+/-11.20		
	> 12,000 CNY (n = 1)	86.00		
Age (Pearson r)	Continuous	--	r = 0.351	0.002
Years of service (Pearson r)	< 5 years	78(71,85)	-	-
	5–10 years	87.87 ± 12.34		
		93.03 ± 10.92		
Cantonese proficiency (Pearson r)	Minimal comprehension(n = 4)	83.75(77,82,83,93)	-	-
	Moderate comprehension(n = 16)	85.06 ± 14.31		
	Basic conversational ability(n = 26)	90.46 ± 9.40±		
	effective communication(n = 29)	93.03 ± 12.48		
Adaptation level (Pearson r)	Poor adaptation(n = 7)	75.43 ± 9.82	r = 0.381	0.001
	Moderate adaptation(n = 32)	88.91 ± 9.77		
	Good adaptation(n = 29)	91.52 ± 9.07		
	Excellent adaptation(n = 7)	102.71 ± 18.42		
Social support (Pearson r)	Continuous	--	r = 0.429	<0.001
<i>Note: Data are presented as the means ± SDs for continuous variables or n (%) for categorical variables. For group comparisons, Spearman's r is reported for continuous variables (age, social support), whereas H (Kruskal–Wallis) or t (independent-samples t-test) is reported for categorical variables with adequate subgroup sizes (all subgroup n ≥ 5). For categorical variables containing any subgroup with n < 5, statistical tests were not performed; these subgroups are presented descriptively with raw scores in parentheses, and “–” denotes not applicable in the statistical columns. All p-values are two-tailed.</i>				

3.2 Correlational Analysis of Key Variables with Psychological Resilience

Spearman's rank-order correlation analysis was performed to examine the bivariate relationships among the study variables (Table 2). Psychological resilience was significantly correlated with age (r = 0.351, p =

0.002), social support ($r = 0.429$, $p < 0.001$), and overall adaptation level ($r = 0.381$, $p = 0.001$). No severe multicollinearity was observed among the independent variables (all $r_s < 0.70$).

Table 2
Spearman's rank-order correlation matrix for all the study variables

Variable	Age	Social support	Adaptation level	Resilience
Age	1			
Social support	0.135	1		
Adaptation level	0.204	0.235*	1	
Resilience	0.351**	0.429***	0.381**	1
Note. Spearman's rank-order correlation coefficients are reported. All p values are two-tailed.				

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

3.3 Multiple Linear Regression Analysis

Hierarchical multiple regression was performed to examine the independent predictors of psychological resilience. Age was entered into Model 1 as a control variable. Social support and the dummy-coded adaptation levels (with 'poor adaptation' as the reference group) were entered into Model 2.

Model 1, with age alone, was significant ($F(1, 73) = 8.309$, $p = 0.005$), accounting for 10.2% of the variance in resilience ($R^2 = 0.102$, adjusted $R^2 = 0.090$). The addition of social support and adaptation levels in Model 2 significantly improved the model, explaining an additional 31.0% of the variance ($\Delta R^2 = 0.310$, $F(4, 69) = 9.108$, $p < 0.001$). The final full model was highly significant ($F(5, 69) = 9.687$, $p < 0.001$), accounting for 41.2% of the variance ($R^2 = 0.412$, adjusted $R^2 = 0.370$).

In the final model, all five predictors emerged as statistically significant. Specifically, age ($B = 0.901$, $p = 0.019$) and social support ($B = 1.589$, $p = 0.001$) were positive continuous predictors. Compared with the poor adaptation group, the moderate adaptation group scored 12.346 points higher ($p = 0.003$), the good adaptation group scored 11.916 points higher ($p = 0.005$), and the excellent adaptation group scored 23.417 points higher ($p < 0.001$) in terms of psychological resilience. The full regression results are shown in Table 3.

Table 3
Hierarchical Multiple Linear Regression Analysis Predicting Psychological Resilience

Model	Predictors	B	β	t	p	R ²	ΔR^2	F Change	p (Change)
Model 1	(Constant)	59.885				0.102	0.102	8.309	0.005
	Age	0.901	0.320	2.883	0.005				
Model 2	(Constant)	39.680				0.412	0.31	9.108	< 0.001
	Age	0.901	0.227	3.960	0.019				
	Social Support	1.589	0.329	3.419	0.001				
	Adaptation_3	12.346	0.514	3.101	0.003				
	Adaptation_4	11.916	0.488	2.891	0.005				
	Adaptation_5	23.417	0.573	4.534	< 0.001				
<i>Note: Model 1 includes age as the only predictor; Model 2 adds social support and dummy-coded adaptation levels (reference group = poor adaptation). B = unstandardized coefficient; β = standardized coefficient. ΔR^2 = change in R².</i>									

4. Discussion

In this study, the average resilience score of the participants was 90.11 ± 12.08 , which is considered quite high. This result is consistent with recent domestic studies targeting specific departments (e.g., operating room nurses at 90.40 ± 9.27^{24} and nurses sent to aid in COVID-19 efforts at 89.60 ± 11.69^{25}) but is greater than that of several international studies (e.g., 49.49 in Jordan²⁶ and 74.4 in Saudi Arabia¹⁰). These differences might come from variations in regional culture, medical environments, survey timing, and sample characteristics, suggesting that we should be cautious when citing norm data from different studies.

Consistent with prior research^{27–29} the present study revealed a significant positive correlation between age and psychological resilience ($r = 0.351$, $p = 0.002$). Hierarchical regression analysis further confirmed that age was an independent positive predictor of resilience ($B = 0.901$, $p = 0.019$), indicating that resilience tends to increase with age among this sample of nurses. This finding may be explained by the accumulation of clinical experience and coping strategies. Over time, older nurses may draw upon these strategies to better manage work-related stress.

This study revealed that social support was significantly positively correlated with psychological resilience, which is similar to the results obtained in a study conducted with nurses by Li et al.³⁰. Another study reported a strong positive correlation between perceived social support and resilience scores^{31–34}.

This may be because social support provides individuals with emotional, informational, and instrumental resources that help them cope with stress and adversity. Individuals who perceive higher levels of social support may feel more confident and less stressed when facing challenges and ultimately show stronger resilience.

The current study also revealed that the overall adaptation level was significantly positively correlated with, and independently predicted, psychological resilience. Individuals with higher adaptation levels were more likely to have higher levels of resilience. In a sample of 445 new Chinese nurses, adjustment disorders were found to be negatively associated with mental resilience ($r = -0.460, p < 0.001$)³⁵, suggesting that greater adaptation corresponds to greater resilience. The possible reason for these similar results is that individuals with high adaptation levels are more likely to calmly face and solve problems, which helps to enhance their psychological resilience. That is, individuals with better adaptation skills are more likely to use these skills to adjust their appraisals to fit the situation and maintain positive mental health under stress^{36–37}.

Together, some qualitative and theoretical studies support the idea that experiences in cross-cultural communication are positively linked to the development of resilience^{38–39}. Our cross-sectional findings extend this body of evidence by demonstrating that, among nurses in a mainland–Hong Kong cross-border exchange program, resilience was positively correlated with social support and adaptation level and that adaptation partially mediated the social support–resilience relationship. Although causal conclusions about the 'enhancing effect' of the exchange program cannot be drawn owing to the single-timepoint design, the observed pattern is consistent with the broader cross-cultural adaptation literature.

Limitations

Although we have tried our best to improve the design of this study, there are still several limitations. First, the cross-sectional design precludes causal inferences regarding the relationships among social support, adaptation, and resilience. Second, the sample size was relatively small ($N = 75$), which may limit the generalizability of the findings. Third, the majority of participants were female, which may affect the applicability of the results to male populations. Fourth, the use of self-report measures may introduce response bias. Future studies with longitudinal or experimental designs, larger and more diverse samples, and multiple measurement methods are warranted to confirm and extend these findings.

5. Conclusions

Nurses who took part in short-term Hong Kong exchange programs presented a relatively high level of psychological resilience, similar to their peers on the mainland. Age, social support, and adaptability were positively related to the resilience of these cross-border nurses. Our findings help us better understand the resilience of nurses involved in cross-border exchanges. Identifying these factors can help provide more support for nurses with lower resilience early on and offer useful information for future research on targeted interventions and support programs to increase nurses' resilience.

Declarations

Ethics approval and consent to participate: This study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from the Ethics Committee of Guangxi Zhuang Autonomous Region People's Hospital Ethics Committee

(Approval No.:LW [2026] 021). All participants were informed about the purpose and procedures of the study and provided written informed consent prior to participation. Participation was voluntary, and participants were assured of their right to withdraw at any time without consequence. Clinical trial number: not applicable.

Consent for publication: Not applicable. This manuscript does not contain any individual person's data in any form (e.g.,images,videos,or identifying details), and therefore no additional consent for publication was required.

Availability of data and materials: The datasets used during the current study are not publicly available but are available from the corresponding author upon reasonable request.

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Author contributions

LH: Writing—original draft, Data curation, Methodology, Conceptualization. **XZ:** Writing—review&editing, Investigation, Data curation. **ML:** Writing—review&editing, Investigation, Data curation.**ZG:** Writing – review & editing, Software, Resources.

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