

INVESTIGATION OF THE PSYCHOLOGICAL RESILIENCE AND CORE EMERGENCY RESPONSE COMPETENCIES OF STUDENT NURSES IN THE COVID-19 EPIDEMIC

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ABSTRACT

Objective: We aimed to understand the psychological resilience and core emergency response competencies of student nurses during the outbreak of the coronavirus disease 2019 (COVID-19) epidemic and to use our findings as the basis for adjusting the curriculum of nursing colleges and medical institutions for student nurses' training and psychological interventions.

Methods: We adopted a convenience sampling method from February 5 to 10, 2020. A questionnaire link was sent via WeChat was used to conduct an online survey of student nurses at a nursing college.

Results: The average psychological resilience score of the student nurses was (61.66±15.92), which was lower than that of the general population in China. The student nurses' average core emergency response competency score was (117.91±23.54) reflected a medium level of competency. Differences in psychological resilience were present among student nurses at various educational levels ($p<0.05$). Additionally, the core emergency response competency was higher among students who had internship experiences in fever clinics or infectious disease departments ($p<0.05$). There was a positive correlation between the core emergency response competencies and all dimensions of psychological resilience ($p<0.05$).

Conclusion: During the COVID-19 epidemic, we found that student nurses had a low level of psychological resilience and a medium level of core emergency response competencies. Therefore, it is necessary to strengthen training on COVID-19-related knowledge and to provide targeted psychological interventions.

Keywords: COVID-19, student nurses, psychological resilience, core emergency response competencies.

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Introduction

Coronavirus disease 2019 (COVID-19) is mainly transmitted via patients infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), including patients with no symptoms. The disease is mainly transmitted through respiratory droplets and contact. People are generally susceptible to COVID-19. Its common symptoms are fever and cough, and approximately half of the patients have difficulty breathing⁽¹⁾.

The COVID-19 epidemic occurred during the Spring Festival in China. Due to the mass migration at the time, the disease quickly spread to other parts

of China, with Wuhan, Hubei Province, as the epicenter. At the same time, the number of confirmed cases gradually increased worldwide. The National Health Commission has incorporated COVID-19 into class B infectious disease management and has adopted class A infectious disease measures for prevention and control⁽²⁾. On January 30, the World Health Organization (WHO) listed the COVID-19 epidemic as a Public Health Emergency of International Concern (PHEIC). Facing the sudden COVID-19 epidemic, nurses on the front line in the clinic have put forth great effort and made great sacrifices; student nurses, as the reserve army of nursing work, were also impacted. The purpose of this study is to

understand student nurses' core emergency response competencies and psychological resilience in the COVID-19 epidemic to provide a basis for improving student nurses' response abilities during the epidemic. The results are presented below.

Subjects and methods

Study subjects

We used a convenience sampling method to select student nurses in the technical secondary school, junior college, and undergraduate college at one nursing school.

The inclusion and exclusion criteria were as follows:

- Student nurses who planned to graduate in 2020, had more than half-a-year of internship experience during a clinical practice rotation, and volunteered to participate in this study were included.
- Student nurses who had spent less than one month at their internship were excluded.

Research tools

General information questionnaire

The questionnaire was designed by the authors and included information such as gender, age, education level, and the grade of the hospital at which the student nurse completed his or her internship training.

The Connor-Davidson Resilience Scale (CD-RISC):

The CD-RISC was created by the American psychologists Connor and Davidson⁽³⁾. This study used the Chinese version of the CD-RISC translated by Yu et al.⁽⁴⁾, which has three factors: tenacity (13 items), strength (8 items), and optimism (4 items). The scale uses a 5-point Likert scale of 0-4 points corresponding to ratings of "Never", "Rarely", "Sometimes", "Often", and "Always".

The total score ranges from 0 to 100 points, with higher scores indicating better psychological resilience. The Chinese version of the CD-RISC has a Cronbach's α of 0.91, indicating high reliability.

The CD-RISC is currently the most widely used scale for measuring psychological elasticity, and it is suitable for the general population, adolescents, college students, and patients with cancer and chronic diseases⁽⁵⁾.

Survey form for core emergency response competencies in the COVID-19 epidemic

We designed the questionnaire by referring to

The Index System of Medical Workers' Core Emergency Response Competencies During Infectious Disease Emergencies constructed by Yun et al.⁽⁶⁾. The questionnaire was based on research group discussions and expert group review.

It consists of three first-level indicators, including prevention capabilities (3 items), preparation capabilities (6 items, including 4 second-level indicators), rescue capabilities (26 items, including 5 second-level indicators), for a total of 35 items. Each item is scored using a 5-point Likert scale, with ratings ranging from "Unknown" (1 point) to "Very familiar" (5 points).

The total score ranges from 35 to 175 points, with higher scores indicating better emergency response abilities. The scoring rate was calculated using the following formula: scoring rate = average score/total score \times 100%. Scoring rates lower than 60% indicate a low level of competency; scoring rates of between 60% and 80% indicate a moderate level of competency; and scoring rates higher than 80% indicate a high level of competency.

Statistical methods

The statistical software SPSS 22.0 was used to analyze the data. The statistical indicators included the rate, the mean, and the standard deviation. Count data were analyzed by the χ^2 test.

Measurement data were analyzed by the t-test and analysis of variance. The Pearson correlation coefficient was used to determine the correlations between groups. $p < 0.05$ was considered statistically significant.

Quality control

The questionnaire excluded personal information such as names and student numbers and avoided sensitive language. The same IP address could only be used once to answer the questions.

The system monitored the length of time required to complete each questionnaire. If the time was less than 100 seconds, the questionnaire was considered invalid.

Results

General information of the subjects

A total of 584 questionnaires were returned in this survey, of which 551 were valid. The effective response rate was 94.3%. The age of the student nurses ranged from 17 to 28 (20.51 \pm 2.07) years; the sample included 76 males (13.8%) and 475 females

Items		Number of subjects	Percentage (%)
Gender	Male	76	6.2
	Female	475	86.8
Education level	Technical secondary school	204	27.0
	Junior college	94	17.1
	Undergraduate college	253	45.9
Grade of the hospital at which the participant interned	Grade-A tertiary	465	84.4
	Grade-B tertiary	40	7.3
	Grade-A Secondary and below	46	8.3
Intern experience in fever clinics or infectious disease departments	Yes	144	26.1
	No	407	73.9
Willing to join efforts to prevent and control COVID-19	Yes	449	81.5
	No	102	18.5
Impact of the epidemic on employment intention	Yes	101	18.3
	No	450	81.7

Table 1: General information of the subjects. (86.2%). See Table 1 for details.

CD-RISC scores of the student nurses

The average total psychological resilience score of student nurses was 61.66 ± 15.92 .

The average scores for tenacity, strength, and optimism were 31.40 ± 8.95 , 21.27 ± 5.42 , 8.49 ± 2.75 , respectively. Differences in the total psychological resilience scores of the student nurses were significant according to educational levels, willingness to participate in the prevention and control of COVID-19, and impact of the epidemic on employment intention ($p < 0.05$). There were no statistically significant differences according to the variables gender, grade of the hospital at which the participant interned, and internship experience in fever clinics or infectious disease departments ($p > 0.05$). See Ta-

Item		Psychological resilience score ($\bar{x} \pm s$)	t/F value	p value
Gender	Male	62.14 ± 23.20	0.136	0.892
	Female	61.65 ± 12.39		
Education level	Technical secondary school	58.29 ± 12.25	9.972	< 0.001
	Junior college	62.43 ± 20.74		
	Undergraduate college	63.79 ± 15.92		
Grade of hospital for intern training	Grade-A tertiary	61.14 ± 14.72	2.105	0.123
	Grade-B tertiary	62.03 ± 14.18		
	Grade-A secondary and below	60.67 ± 20.20		
Internship experience in fever clinics or infectious disease departments	Yes	60.29 ± 18.48	-7.660	0.444
	No	61.47 ± 14.91		
Willing to participate in the prevention and control of COVID-19	Yes	62.49 ± 15.61	4.174	< 0.001
	No	55.31 ± 15.99		
Impact of the epidemic on employment intention	Yes	54.28 ± 23.19	-3.526	0.001
	No	62.71 ± 13.32		

Table 2: CD-RISC scores of the student nurses.

ble 2 for details.

Core emergency response competency scores of the student nurses during the COVID-19 epidemic

The average total score for the core emergency response competencies of student nurses during the COVID-19 epidemic was 117.91 ± 23.54 , with a scoring rate of 67.4%. Specifically, the average prevention capability score was 11.01 ± 2.30 , with a scoring rate of 73.4%; the average preparation capability score was 17.69 ± 4.96 , with a scoring rate of 58.9%; and the average rescue capability score was 89.20 ± 17.76 , with a scoring rate of 68.6%.

The total core emergency response competency score in the COVID-19 epidemic was not statistically significantly different according to gender, education level, and the grade of the internship hospital ($p > 0.05$). The differences according to willingness to participate in the prevention and control of COVID-19 and impact on employment intention were statistically significant ($p < 0.05$). See Table 3

Item		Core emergency response competencies ($\bar{x} \pm s$)	t/F value	P value
Gender	Male	112.86 ± 36.24	-1.374	0.173
	Female	118.71 ± 20.75		
Education level	Technical secondary school	116.84 ± 22.26	0.339	0.712
	Junior college	118.29 ± 28.28		
	Undergraduate college	118.62 ± 22.66		
Grade of hospital for intern training	Grade-A tertiary	117.10 ± 22.07	2.105	0.123
	Grade-B tertiary	120.00 ± 22.38		
	Grade-A secondary and below	124.24 ± 35.52		
Intern experience in fever clinics or infectious disease departments	Yes	121.07 ± 25.20	3.103	0.003
	No	116.79 ± 22.85		
Willingness to participate in the prevention and control of COVID-19	Yes	119.92 ± 22.52	4.290	< 0.001
	No	109.02 ± 25.86		
Impact of the epidemic on employment intention	Yes	111.73 ± 31.15	-2.320	0.022
	No	119.29 ± 21.26		

Table 3: Core emergency response competency scores of student nurses in the COVID-19 epidemic.

for details.

Correlation between core emergency response competencies and psychological resilience in student nurses

Based on the Pearson correlation analysis, we found that the psychological resilience scores in all dimensions were positively correlated with the core emergency response competencies in the COVID-19

Item		Tenacity	Strength	Optimism	Psychological resilience
Core emergency response competencies in the COVID-19 epidemic	r	0.637	0.615	0.477	0.650
	p	< 0.001	< 0.001	< 0.001	< 0.001

Table 4: Correlation between psychological resilience and the core emergency response competencies of student nurses in the COVID-19 epidemic (n = 551). epidemic (p<0.01). The results are shown in Table 4.

Discussion

Analysis of the status quo of student nurses' psychological resilience

Psychological resilience refers to an individual's adaptation process when facing adversity, trauma, tragedy, threat, or other significant stress; that is, the capability to rebound in the face of obstacles⁽⁷⁾. Individuals with higher levels of psychological resilience have good social adaptability and can face life stresses, traumas, and other adverse life events more positively. The results of this study show that the psychological resilience score of student nurses was 61.66±15.92. The score was lower than that of ordinary adults in China⁽⁸⁾, indicating that the student nurses' psychological resilience in the COVID-19 epidemic is relatively weak and needs to be improved. In this study, the psychological resilience level of females was lower than that of males, which is consistent with the findings of Wu et al.⁽⁹⁾ and may be because women's psychological resilience is more vulnerable to traumatic events⁽¹⁰⁾.

Psychological resilience varied according to education levels as follows, in descending order: undergraduate college >junior college >technical secondary school. This result is consistent with that of previous studies⁽¹¹⁻¹²⁾. The higher the educational level of student nurses, the more professional nursing knowledge and skills they possess.

Therefore, they can better apply the knowledge and techniques they have learned to their clinic experiences, giving them a definite competitive advantage over students with lower educational attainments, which in turn enhances their confidence and psychological resilience.

Some scholars have found that individuals with good psychological resilience can reduce the harm and incidence of stress reactions, while individuals with poor psychological resilience are more likely to suffer from stress and burnout in daily nursing work and may even leave the nursing industry⁽¹³⁾. This study shows that student nurses who were willing

to participate in the prevention and control of COVID-19 and whose employment intentions were not affected by the epidemic had a higher level of psychological resilience. The results verify that individuals with higher levels of psychological resilience are more likely to respond positively to stressful events. Therefore, psychological resilience training should be provided to student nurses to improve their capability to cope with stressful events, thus reducing the loss of outstanding nursing talent.

Analysis of the core emergency response competencies of student nurses in the COVID-19 epidemic

In recent years, public health emergencies have been increasing worldwide. It is critical to improving nursing staff's abilities to respond to public health events to ensure the safety and quality of nursing in emergency situations. This study shows that the average core emergency response competency score of student nurses in the COVID-19 epidemic was 117.91±23.54, with a scoring rate of 67.4%. The score is higher than the results of a survey of medical staff in Jiangxi Province performed by Liu et al.⁽¹⁴⁾. This difference may have occurred because our survey only involved the core emergency response competencies in the COVID-19 epidemic, while the survey by Liu et al. covered a wide range of issues that required a broader range of knowledge, thus leading to relatively lower scores. In general, however, the average core emergency response competency score of the student nurses in the COVID-19 epidemic was not high; the scoring rate for preparation capability was 58.9%. First, student nurses have relatively few opportunities to practice in infectious disease events and to receive continuing education and training related to infectious diseases. Second, student nurses learn little about infectious disease at school, where information about various systems, laws, and regulations is only briefly introduced⁽¹⁵⁾.

Moreover, COVID-19 is a recently emerging infectious disease, so there is a lack of training in related core emergency response competencies for student nurses. This study also found that there was no significant difference in core emergency response competencies in the COVID-19 epidemic among student nurses according to gender, educational level, and grade of the hospital at which internship training was performed. Meanwhile, the level of core emergency response competencies in the COVID-19 epidemic differed significantly between participants who had internship experience at fever clinics or in-

fectious disease departments and those who had not. The results suggest that such abilities were cultivated in the context of continuous learning and through the accumulation of relevant experience. That is, practice may be a critical factor in improving core emergency response competencies in the COVID-19 epidemic. Therefore, internship bases should actively develop and encourage student nurses to participate in emergency drills and training for infectious or emerging infectious diseases.

Additionally, student nurses who were willing to participate in the prevention and control of COVID-19 and whose employment intentions were not affected by the epidemic had higher core emergency response competencies. This result might be because student nurses with higher emergency response competency levels had more confidence in clinical work and greater courage in the face of various challenges in clinical work.

Correlation between the core emergency response competencies and psychological resilience of student nurses in the COVID-19 epidemic

An analysis of the correlation between the psychological resilience and core emergency response competencies of student nurses in the COVID-19 epidemic showed that the scores for all dimensions of psychological resilience were positively correlated with core emergency response competencies in the COVID-19 epidemic ($p < 0.01$). The higher the psychological resilience of student nurses, the higher their core emergency response competencies in the COVID-19 epidemic. The results suggest that when training student nurses in core emergency response competencies, mental health education should not be ignored. Studies⁽¹⁶⁻¹⁹⁾ show that psychological resilience develops dynamically, and intervention methods such as positive psychology-oriented group counseling and solution-focused psychological counseling can effectively improve the psychological resilience of student nurses. Individuals with high levels of psychological resilience can quickly and effectively shed the adverse effects of stress, frustration, and trauma events and deal with various clinical problems better and more quickly⁽²⁰⁾.

Conclusions

In summary, the psychological resilience level of student nurses was lower than that of the general population, and their core emergency response competencies in the COVID-19 epidemic were

moderate. To reduce the impact of public health emergencies such as the COVID-19 epidemic on student nurses, nursing colleges should optimize the knowledge structure and setting of infectious disease courses; medical institutions should provide positive psychological interventions for students during the epidemic and should promptly provide information about the prevention and control of emerging infectious diseases.

Institutions should also conduct regular emergency drills on public health emergencies to improve students' psychological resilience and core emergency response competencies under such conditions.

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