

# THE EFFECT OF ACUTE STRESS RESPONSE ON PROFESSIONAL IDENTITY AND SELF-EFFICACY OF NURSING STUDENTS IN CHINA DURING COVID-19 OUTBREAK : A CROSS-SECTIONAL STUDY

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## Abstract

**Background:** During the rapidly evolving situation of COVID-19, the external environment and job stress may influence the professional identity and self-efficacy of nursing students. An assessment of professional identity, self-efficacy, and acute stress response of nursing students during the coronavirus outbreak, as well as the effect of acute stress response on them is necessary and badly needed.

**Objective:** To evaluate the nursing students' professional identity, self-efficacy, and acute stress response during the COVID-19 outbreak, and to investigate the effect of acute stress response on nursing students' professional identity and self-efficacy.

**Design, settings, and participants:** Assessment of professional identity, self-efficacy and acute stress response were designed for this cross-sectional study. A total of 2024 nursing students from Shanxi Medical University completed the questionnaire used in this study.

**Methods:** The online questionnaire, including personal characteristics, professional identity questionnaire of nursing students (PIQNS), generalized self-efficacy scale (GSES) and Stanford acute stress response scale questionnaire (SASRQ), was utilized for the measurement.

**Results:** The total score of and sub-scales' score of professional identity of nursing students significantly increased after the COVID-19 outbreak ( $p < 0.001$ ). Additionally, self-efficacy had a positive effect on professional identity ( $p < 0.001$ ) while acute stress response had a negative effect on professional identity and self-efficacy, respectively ( $p < 0.001$ ).

**Conclusion:** The results of this study provide insights into the effect of acute stress response on professional identity and self-efficacy of nursing students during COVID-19 outbreak in China. Nursing education must be oriented to help strengthen the professional identity of nursing students from this emergence.

**Keywords:** professional identity, self-efficacy, acute stress response, Covid-19 outbreak

## Introduction

In the past few months, Coronavirus infection was breakout in Wuhan, China. Millions of health

care professionals were dealing directly with patients who are facing challenging medical conditions all around the country. They are subject to experience acute or chronic stress and have to meet high requirement in their working place with physical and psychological challenges. There is an increasing demand for qualified nurses to assist in the medical institutions for treatment and care of patients with COVID-19 infection.

Nurse shortage is annually worsen in the last decades. It was reported that nurse' intention to leave the profession varied from 4% to 54% world

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widely [1], and in China, around 40% of nurses were intending to leave in Shanghai [2]. The main reasons were occupational stress, effort-reward imbalance, high job demands, and job dissatisfaction which could cause physical, mental, and emotional health issues [3-5]. Previous research study found that newly graduated nurses were more likely to leave the profession than other nurses mainly due to the stress [6].

As many nursing students are not engaged in a natural disaster or emergencies, they students may experience stress and fears because nurses have higher risks of exposure to patients with coronavirus disease. Studies related to the acute stress response were very limited so far. In general, Stanford acute stress response scale questionnaire (SASRQ) was regarded as an important tool to encapsulate the acute stress reactions and identify individuals at high risk of developing severe psychiatric problems [7]. It is crucial to understand how nursing students' professional identity in this situation and to explore the factors that influence their professional identity.

Self-efficacy has been commonly utilised in nurse education, and could lead to well-being, endurance and academic success, and may affect the output of individuals in a particular circumstance. Low self-efficacy is correlated with depressive emotions, such as distress, depression, impotence or poor self-motivation [8, 9]. As influenced by social environments, nursing students can have detrimental implications for their self-efficacy and for their professional identification.

Thus, in this study, we scored the nursing students' professional identity before and after the traumatic event, then we further estimated self-efficacy and acute stress response of them under the current conditions. Furthermore, we studied the relationship of professional identity, self-efficacy, and acute stress response.

## Material and Methods

### Participants in the discussion

A total of 2024 nursing students participated in this cross-sectoral research at Shanxi Medical University in China. A comprehensive online questionnaire, including the demographic history, was demanded to be completed in early March 2020. This analysis was explorative and therefore no structured sample size was defined. Ethical consent has been received from the Shanxi Medical University Academic Ethics Commission.

### Instruments and equipment

Data were obtained from three questionnaires in Chinese: The Professional Identification Questionnaire for Nursing Students (PIQNS), the Generalized Self-Efficacy Scale (GSES) and the Stanford Acute Stress Reply Questionnaire (SASRQ). PIQNS [10] was structured to assess students' professional identification before and after the Coronavirus epidemic (range score: 17-85). This questionnaire is a five-factor sub-scale measure of 17 items, including professional self-image (6 items), profit stability and attrition vulnerability (4 items), peer contrast and self-reflection (3 items), job option freedom (2 items) and social modelling (2 items). Participants scored on the questionnaires using the 5-point Likert Scale from 1 (complete non-compliance) to 5 (complete conformity). The scores for each subscale were obtained by summing up the products. Higher scores reflect a higher degree of professional identification. In this analysis, the alpha coefficients of Cronbach were 0.95 and 0.93, 0.85, 0.78, 0.04 and 0.82, respectively, for each subscale.

GSES was used to assess the strength of an individual's general confidence in the efficacy of coping with tough circumstances and challenges. This scale contains 10 elements varying from 1 to 4, which are connected to the different specific traits that respondents classified their own situations. Higher scores suggest greater confidence in self-efficacy. In this analysis, the alpha coefficients for Cronbach were 0.94.

The SASRQ [7, 11] was used to as an important tool to encapsulate the acute stress reactions and identify individuals at high risk of developing severe psychiatric problems. It includes 30 self-report measures concerned with dissociation, re-experiencing, avoidance, anxiety and hyper-arousal, and impairment in functioning. It can be scored on a Likert-type scale from 0 (not experienced) to 5 (very often experienced). The high score represents more acute stress disorder. In this study, the Cronbach's alpha coefficients was 0.98, and for each sub-scale was 0.95, 0.92, 0.95, 0.90 and 0.80, respectively.

### Statistical Analysis

The data was evaluated using IBM SPSS version 21.0 for Windows. Descriptive statistics using figure, mean and standard deviations (SD) analysed the features of all participants. The Pearson correlation coefficient was used to check the variations between variables. Both figures were 2-sided and the p-value < 0.05 was found statistically important.

## Result

### Demographic characteristics of nursing students

The mean age of nursing students was  $20.99 \pm 2.42$  years. Men constituted 9.8% of the study population. 30.6% of the students declared that they had clinical intern before. 1033 (51%) students were came from rural areas while 442 (21.9%) from cities of China. 92.8% of the participants were undergraduate students, including year 1 (37.7%), year 2 (19.9%), year 3 (26.0%), and year 4 (9.2%). Additionally, 1836 (90.7%) believed that more and more peoples would respect health care professionals, and around 90% of participates would like to work in health care institutes.

For the PIQNS (Table 1 and supplementary Table 1), the total score and sub-scale score of PIQNS after the event were significantly increased ( $p < 0.001$ ) when compared to that before the event. The mean level of 'social modeling' was the highest (before:  $3.77 \pm 0.89$ , after:  $4.04 \pm 0.83$ ,  $p < 0.001$ ) while that of 'Retention benefit and risk of turnover' was the lowest (before:  $3.00 \pm 0.61$ , after:  $3.66 \pm 0.76$ ,  $p < 0.001$ ).

The GSES and SASRQ scores were demonstrated in Table 2 and supplementary Table 1. For the GSES, the mean level is  $2.60 \pm 0.59$ . For the SASRQ, the highest mean level is 'Anxiety and Hyper-arousal' ( $2.28 \pm 1.01$ ) and the lowest level is 'Re-experience of event' ( $2.14 \pm 1.00$ ).

### Correlations between variables, GSES, SASRQ and PIQNS for nursing students

Table 3 Displays the approximate coefficients for the bivariate association between the specific characteristics of the individuals, GSES, SASRQ and PIQNS.

There is a statistically important positive association between GSES and the overall score and subscale PIQNS scores both before and after the incident ( $p < 0.01$ ), suggesting that a higher degree of professional identification was correlated with a high level of self-efficacy among nursing students. In addition to the sub-profile of career option independence, the overall and sub-profile scores of SASRQ were tested substantially in the negative relationship with PIQNS ( $p < 0.01$ ), indicating that the professional orientation of nursing students was affected by the social climate during the outbreak of COVID-19. It seems to be notable that the 'dissociative' score was shown to be more highly adversely correlated with PIQNS than with other subscales.

The results also showed a statistically significant negative correlation between sex and retention benefit and turnover risk (before:  $r = -0.094$ ,  $p$

$< 0.01$ , after:  $r = -0.059$ ,  $p < 0.01$ ), career choice independence (before:  $r = -0.054$ ,  $p < 0.01$ , after:  $r = -0.069$ ,  $p < 0.01$ ), duration of study and career choice independence (before:  $r = -0.053$ ,  $p < 0.05$ , after:  $r = -0.045$ ,  $p < 0.05$ ).

### Moderating effects

Multiple linear regression analysis was conducted to examine the relationship between nursing students' demographic information, GSES, SASRQ and PIQNS (Table 4). Of the independent variables, place of residence, GSES total score, and SASRQ total score were significantly related to the PIQNS ( $p < 0.01$ ), suggesting a moderating effect of these variables on PIQNS. The multiple linear regression model explained 28.3% (adjust  $R^2$  scores: 28.1%) of the PIQNS variance.

### Discussion

This research mainly examined the impact of acute stress response on the professional reputation and self-efficacy of nursing students during the outbreak of COVID-19 in China. We evaluated the student's social identification before and after the public, as well as their self-efficacy and acute stress reaction.

Professional identity directly related to the nursing students career path after graduation [12]. The score of 'after the event' of each sub-scale is significantly higher than that of 'before the event' in our study, illustrating that the nursing students have a positive professional identity and would like to select as their career even after this traumatic event. The score of self-image and social modelling is  $3.92 \pm 0.77$  and  $4.04 \pm 0.83$ , respectively, illustrating that the personal component and interpersonal dimension are important factors effecting nursing students in their career, which is similar to previous study [10]. Compared to that of before the event, the score of retention benefit and risk of turnover was increased from  $3.00 \pm 0.61$  to  $3.66 \pm 0.76$ , suggesting the attitude of nursing students may change from 'neutral' to 'positive'. However, the Cronbach's alpha value for the career choice independence was 0.04, indicating that this reliability of this scale was not reliable, which is not consistent with previous study reported [13].

Our analysis found that over half of the participants had a strong sense of self-efficacy. A higher sense of self-efficacy has a positive effect on the personal reputation and a negative influence on the acute stress reaction. Anneken et al. [9] noticed that self-efficiency and general well-being in nurse students was important to contemporary nurse education in a limited sample. A further research

undertaken by Iwona et. Al. [14] indicated that the meaning of self-efficacy has had a substantial effect on the degree of tension and the manner with which a nursing student may deal with stressful circumstances. Similarly, the research conducted by Zhao et.al [15] noted the value of improving self-efficacy to alleviate tension among Chinese nursing students.

Acute stress response may result in negative impact on participants' life during the acute phase and in the long-term. If their psychological problems were not solved by professionals, they may develop into severe problems. The SASRQ provide a reliable and valid measurement to recognize the symptoms related to acute stress and it could be used as a general predictor of clinical outcomes [11, 16]. In our study, the sub-scale scores of anxiety and hyper-arousal, dissociation were higher than total score of SASRQ, and showed significant correlation with PIQNS. Recognizing acute stress symptoms in nursing students is a critical step in the path to developing interventions to promote student retention and resilience when they are engaged in urgent situations. However, the studies related to the effect of acute stress response on nursing students were very limited.

This study also has some limitations that need to be considered. Firstly, this study was carried out at one site of university from a single discipline and specific culture context and it should be regarded as a pilot study [17] and the conclusion should be drawn after further studied. Secondly, professional identity questionnaire we designed includes two parts: before and after the event in one questionnaire. Thus, the bias could be existed. Secondly, the correlations between professional identity and self-efficacy, between professional identity and acute stress response, and between self-efficacy and acute stress response, were analyzed, respectively. However, the possibility of a bidirectional interrelation between these two constructs may exist. This study only focused on one direction of the influence, and their actual relationships are more likely complex. More follow-up studies should be further continued.

### Conclusion

Nursing students who took part in this cross-sectional study indicated higher levels of professional identity and self-efficacy. In addition, it indicated that acute stress response of COVID-19 outbreak could have a negative impact on professional identity and self-efficacy.

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**Table 1. Total and sub-dimension scores of the PIQNS for nursing students before and after COVID-19 outbreak (n=2024)**

	Score (before)	Score (after)	Correlation (r)	P value	Range
PIQNS					
Total	59.95±10.72	64.62±11.34	0.896**	<0.001	17-85
Sub-scale					
Professional self-image	22.37±4.70	23.49±4.61	0.877**	<0.001	6-30
Retention benefit and risk of turnover	12.00±2.42	14.64±3.06	0.835**	<0.001	4-20
Social comparison and self-reflection	11.21±2.12	11.57±2.11	0.868**	<0.001	3-15
Career choice independence	6.81±1.47	6.84±1.45	0.858**	0.138	2-10
Social modelling	7.54±1.77	8.07±1.65	0.823**	<0.001	2-10

\*\* :  $P < 0.001$

Table 2. Total and subscale on the GSES and ASRQ during COVID-19 breakout (N=2024).

	Score	Range
GSES		
Total	25.97±5.95	10-40
SASRQ		
Total	66.48±29.82	0-150
Sub-scale		
Dissociation	22.43±10.24	0-50
Re-experience of event	12.88±6.01	0-30
Avoidance	13.10±6.49	0-30
Anxiety and Hyper-arousal	13.67±6.08	0-30
Impairment in functioning	4.39±2.13	0-10

Supplementary

Table 3. The mean score of PIQNS, GSES, and SASRQ.

	Score (before)	Score (after)	Correlation (r)	P value
PIQNS				
Total	3.53±0.63	3.80±0.67	0.896**	<0.001
Sub-scale				
Professional self-image	3.72±0.78	3.92±0.77	0.877**	<0.001
Retention benefit and risk of turnover	3.00±0.61	3.66±0.76	0.835**	<0.001
Social comparison and self-reflection	3.74±0.71	3.85±0.70	0.868**	<0.001
Career choice independence	3.41±0.73	3.42±0.73	0.858**	0.138
Social modelling	3.77±0.89	4.04±0.83	0.823**	<0.001
GSES				
Total		2.60±0.59		
SASRQ				
Total		2.22±0.99		
Sub-scale				
Dissociation		2.24±1.02		
Re-experience of event		2.14±1.00		
Avoidance		2.18±1.08		
Anxiety and Hyper-arousal		2.28±1.01		
Impairment in functioning		2.20±1.07		

Supplementary

Table 4. Pearson's correlation between the variables and GSES, SASRQ scores.

	GSES total score	SASRQ total score	Dissociative	Re-experiencing	Avoidance	Anxiety Hyper-arousal	Impairment in functioning
Sex	-.137**	-.007	-.007	-.014	-.010	.002	-.001
Age	.031	.042	.027	.048*	.053*	.034	.069**
Place of residence	.064**	-.047*	-.049*	-.045*	-.046*	-.029	-.067**
Undergraduate (Years)	.063**	.046*	.025	.058**	.058**	.036	.080**
Internship in clinical	-.059**	-.007	.005	-.025	-.005	-.005	-.027
GSES total score	1	-.097**	-.117**	-.066**	-.085**	-.094**	-.086**

\*  $p < 0.05$ ; \*\*  $p < 0.01$ .

GSES: generalized self-efficacy scale

SASRQ: Stanford acute stress reaction questionnaire

PIQNS: professional identity questionnaire for nursing students



Table 5. Pearson's correlation between the variables and the PIONS scores (n=2024).

	PIQNS		Professional Self-image		Retention benefit and risk of turnover		Social comparison and self-reflection		Career choice independence		Social modeling	
	before	after	before	after	before	after	before	after	before	after	before	after
Sex	-.057*	-.044	-.047*	-.030	-.094**	-.059**	-.015	-.026	-.054*	-.069**	-.026	-.012
Age	.011	.001	-.006	-.020	.022	.025	.010	-.002	-.031	-.024	.066**	.038
Place of residence	-.005	-.030	-.022	-.045*	-.016	-.041	.028	.023	-.010	-.023	.023	-.013
Undergraduate (Years)	.009	.000	-.021	-.031	.034	.033	.023	.022	-.053*	-.045*	.080**	.037
Internship in clinical GSES	-.035	-.017	-.021	.006	-.029	-.040	-.040	-.032	.022	.024	-.090**	-.040
Total SASRQ	.557**	.519**	.487**	.450**	.514**	.521**	.525**	.490**	.347**	.350**	.458**	.409**
Total Dissociative	-.133**	-.137**	-.165**	-.170**	-.076**	-.114**	-.115**	-.109**	.022	.030	-.144**	-.142**
Re-experience of event	-.145**	-.143**	-.175**	-.176**	-.088**	-.121**	-.126**	-.113**	.026	.031	-.159**	-.151**
Avoidance Anxiety Hyper-arousal	-.106**	-.111**	-.143**	-.150**	-.041	-.080**	-.094**	-.089**	.037	.046*	-.121**	-.125**
Impairment in functioning	-.125**	-.134**	-.153**	-.163**	-.075**	-.114**	-.104**	-.107**	.011	.026	-.128**	-.138**
	-.132**	-.135**	-.157**	-.160**	-.082**	-.118**	-.113**	-.110**	.008	.010	-.138**	-.130**
	-.115**	-.122**	-.145**	-.155**	-.061**	-.101**	-.091**	-.092**	.017	.027	-.130**	-.125**

\*  $p < 0.05$ ; \*\*  $p < 0.01$ .

GSES: generalized self-efficacy scale

SASRQ: Stanford acute stress reaction questionnaire

PIQNS: professional identity questionnaire for nursing students

Table 6. Multiple linear regression model for the prediction of the PIQNS scores.

	Unstandardized coefficient		Standardized coefficient	t	P-value	F	P-value
	B	S.D.	$\beta$				
Constant	40.045	3.375		11.865	.000	113.93	<0.001
Sex	1.133	.729	.030	1.554	.120		
Age	.079	.126	.017	.627	.531		
Place of residence	-.823	.235	-.066	-3.505	.000		
Studying years	-.391	.255	-.049	-1.534	.125		
Internship in clinical	-.264	.637	-.011	-.414	.679		
GSES total score	.993	.037	.521	27.093	.000		
SASRQ total score	-.033	.007	-.088	-4.609	.000		