Research article

Knowledge, attitude and practice of registered nurses toward ICU patients' transfer anxiety in China: A cross-sectional study

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ABSTRACT

Introduction: Transfer anxiety has effect many critically ill patients in ICU around the world. Nurses must take care of the psychological adjustments that patients and families face when ICU patients transferred to general ward. During this period, basic knowledge, positive attitude, and correct practice are necessary for nurses to address the issue of transfer anxiety and seek to reduce it whenever possible. However, there were few investigations have been performed the knowledge, attitudes, and practice of registered nurses toward ICU patients' transfer anxiety.
Aim: The purpose of the paper is to explore the level and influencing factors of knowledge, attitude and practice of registered nurses toward ICU patients' transfer anxiety in China.
Methods: From February 1 to March 17, 2023, a cross-sectional study was adopted in China. An electronic questionnaire was used to collect data. Registered nurses' knowledge, attitudes and practice toward ICU patients' transfer anxiety were assessed using The Knowledge, Attitude and Practice Questionnaire for Chinese Registered nurses in ICU regarding the prevention of transfer anxiety. In the end, in this study involved 381 registered nurses from Lanzhou University Second Hospitals in China. SPSS 26.0 for mac, independent T-test, one-way ANOVA test, Scheffe's test, Pearson correlation coefficient and multiple linear regression tests were used for data analysis.
Results: The scores of total KAP, knowledge, attitude, and practice are 135.21 ± 24.504, 45.58 ± 13.903, 56.94 ± 10.690 and 32.87 ± 6.393 separately. Study results show that there was a statistically significant correlation among the three variables. According to the results of independent *t*-test or one-way ANOVA test, there is a correlation between gender($P = 0.001$), highest educational attainment ($P = 0.005$) and knowledge; type of department($P = 0.003$) and attitude; gender ($P = 0.003$), marital status ($P = 0.002$), clinical work experience ($P = 0.002$), type of department ($P = 0.005$) and practice. According to the results of linear regression analysis in this study, the variables of gender ($P = 0.006$), highest educational attainment ($P = 0.032$), scores of attitudes ($P = 0.006$), and scores of practice ($P = 0.000$) were associated with the scores of knowledge; the variables of scores of knowledge ($P = 0.004$), and scores of practice ($P = 0.000$)

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were associated with the scores of attitudes; the variables of scores of knowledge (P = 0.000), and scores of attitudes (P = 0.000) were associated with the scores of practice.

Conclusion: The findings of the study emphasize that comprehensive measures of knowledge, attitude and practice should be taken to improve nurses' knowledge, attitudes, and practices regarding transfer anxiety in intensive care unit patients in order to reduce its adverse effects on ICU patients.

1. Introduction

Intensive Care Unit (ICU) is used to treat all kinds of critically ill patients [1]. Previous studies have shown that patients and their families perceive admission to the ICU as a distressing and frightening experience, with fear, anxiety, psychological distress, and social disorganization [2,3]. At the meantime, a growing body of evidence suggests that discharge from a skilled nursing facility can be equally traumatic [4–7]. This phenomenon has been described as transfer anxiety and was accepted by the North American Diagnostic Association in 1992 [8]. It has been defined as 'a state in which a person develops physical and/or psychological disturbances as a result of transferring from one environment to another' [9].

Transfer anxiety has effect many critically ill patients in ICU around the world [10], according to statistics, up to 75,000 patients in the UK may be affected by transfer anxiety each year [11] and approximately 95 % of patients experience anxiety, fear and depression during transfer from the ICU each year in China [12]. The results of a minor exploratory study (N = 54) to examine the level of ICU transfer anxiety among open heart surgery patients that fifty-two patients (54.7 %) had a high level of transfer anxiety [13].

Some studies have shown that nurses must take care of the psychological adjustments that patients face when ICU patients transferred to general ward [14,15]. During this period, basic knowledge, positive attitude, and correct practice are necessary for nurses to address the issue of transfer anxiety and seek to reduce it whenever possible [16,17]. Most of the foreign studies on this area are qualitative, focusing on the experience of nurses in the process of transferring out of ICU patients. Bunkenborg et al. applied an explorative, qualitative design using focused ethnography to explore nursing practice and perception of engaging in communicative interaction when handing over multi-morbid patients from the ICU to general medical or surgical wards. They founded that a lack of shared goals regarding handing over patients from a high monitoring unit to general wards causes communicative and collaborative difficulties, loss of information and potential risks to patients [18]. Kauppi et al. collected data from 16 nurses from three different hospitals in Sweden with focus groups and in-depth interviews. Through these interviews they found that the structure of the organization and its leadership appear to have a significant impact on the nurses' ability to offer patients the care they need [19]. Another study was to explore and better understand the experiences of Hong Kong general ward nurses who care for post-intensive care patients by Yau and Christensen [20]. The findings of this study demonstrate that these ward nurses found themselves in a difficult situation with trying to understand of the needs of the post-intensive care patient. A lack of support, a lack of education and an increased workload made this situation hard. All of these qualitative studies founded that it is a great challenge for ICU nurses and ward nurses to take care patients for transition ICU to general ward. A few quantitative investigations have been performed on ICU patients' transfer anxiety knowledge, attitudes, and practice among nurses. The findings of Ludin et al. [21] suggest that nurses have relatively low levels of knowledge and attitudes about the transfer experiences of patients in the ICU. A qualitative descriptive study reported that nurses on general wards viewed the transfer of patients from the intensive care unit as a major responsibility and a great challenge because of lack regarding knowledge [22]. Another exploratory descriptive study finding that both ICU nurses and general ward nurses are have a negative attitude about ICU patients' transition [23]. Previous studies also indicated that nurses lack of the knowledge of transfer anxiety may induce stress or distress in some critically ill patients and their family members [24]. Obviously, it is necessary to know the current level and influencing factors of knowledge, attitude and practice of ICU nurses and ward nurses on ICU patients' transfer anxiety. However, there are fewer investigation studies on nurses' knowledge, attitude and practice regarding ICU patients' transfer anxiety in China. Therefore, the purpose of this paper is to explore the level and influencing factors of knowledge, attitude and practice of registered nurses toward ICU patients' transfer anxiety in China.

2. Methods and materials

2.1. Study Design and sample size estimation

A cross-sectional study with a random sampling approach was used in this study. Based on the simple random sampling formula, the absolute allowable error was δ 0.05, assuming the probability of type I error α = 0.05, $Z_{0.05} = 1.96$, and the P value of .5470; the required sample size of 381 was calculated eventually.

$$n = \frac{t_\alpha^2 P(1-P)}{\delta^2}$$

2.2. Participants

Our target population were from Lanzhou University Second Hospital, Lanzhou, Gansu. The inclusion criteria were as follows:1) the registered nurses working full time in Lanzhou University Second Hospital 2) working time more than 1 year 3) voluntary participation

in the study. The exclusion criteria were as follows: 1) studying and intern nurses 2) nurses in operating rooms, emergency rooms, anesthesia and resuscitation rooms, and hemodialysis centers.

2.3. Data collection

Data collection started from February 1, 2023 to March 17, 2023. An electronic questionnaire was used to collect data. In this study, we first discussed the purpose of the survey and the principle of anonymity with the head nurse of the unit. Second, with the nurses' consent, the head nurse of the unit sent an electronic questionnaire with an informed consent to all eligible nurses and asked them to fill it out via their mobile phones.

2.4. Instruments

"The Knowledge, Attitude and Practice Questionnaire for Registered nurses on ICU Patients' Transfer Anxiety" [25] was used to explore the level and influencing factors of knowledge, attitude, and practice with ICU patients' transfer anxiety among registered nurses in China. The overall content validity of the questionnaire was 0.97, the questionnaire KMO value was 0.873, and the x^2 value of Bartlett's spherical test was 7794.683 (P < .05). Cronbach's α coefficients of the three dimensions of knowledge, attitude, conduct and the whole questionnaire were 0.856, 0.860, 0.839 and 0.873, respectively. The questionnaire was composed of four parts, including demographic information and three scales. It assesses registered nurses' knowledge, attitudes, and practices regarding ICU patients' transfer anxiety. The total scale score was 37–185, with higher scores indicating higher levels of knowledge, attitudes, and practices of registered nurses regarding ICU patients' transfer anxiety.

Section 1 discusses the demographic information including gender, age, marital status, work hospital, type of department in work hospital, highest educational attainment, work experiences, and position.

Section 2 discusses registered nurses' knowledge about ICU patients' transfer anxiety: the scale consists of 15 multiple-choice questions with 5 selectable options related to ICU patients' transfer anxiety. The 15 items reflect four themes: definition, risk factors, nursing intervention measures, and the side effects of transfer anxiety in critically ill patients. Scoring is done on a 5-point Likert scale from 1 "unknown" to 5 "clear" for a total of 15–75 points.

Section 3 discusses registered nurse's attitude to ICU patients' transfer anxiety: this scale of 14 items that measure attitudes towards ICU patients' transfer anxiety. The 14 items reflect four themes: coping attitude for ICU patients' transfer anxiety, attitudes toward participation in an educational program for ICU patients with transfer anxiety, and attitude in taking nursing intervention measures about ICU patients' transfer anxiety. Scoring is done on a 5-point Likert scale from 1 "Strongly Disagree" to 5 "Strongly Agree". Higher scores indicate more active attitudes.

Section 4 discusses registered nurses' practice towards ICU patients' transfer anxiety: this scale includes 8 items. The 8 items reflect three themes: the preparation before ICU patients is transferred to the common ward, the communication during the transfer process and the coping after the transfer. Responses are on a 5-point Likert scale (1 = never done, 5 = always done). The higher the score, the more correct the exercise.
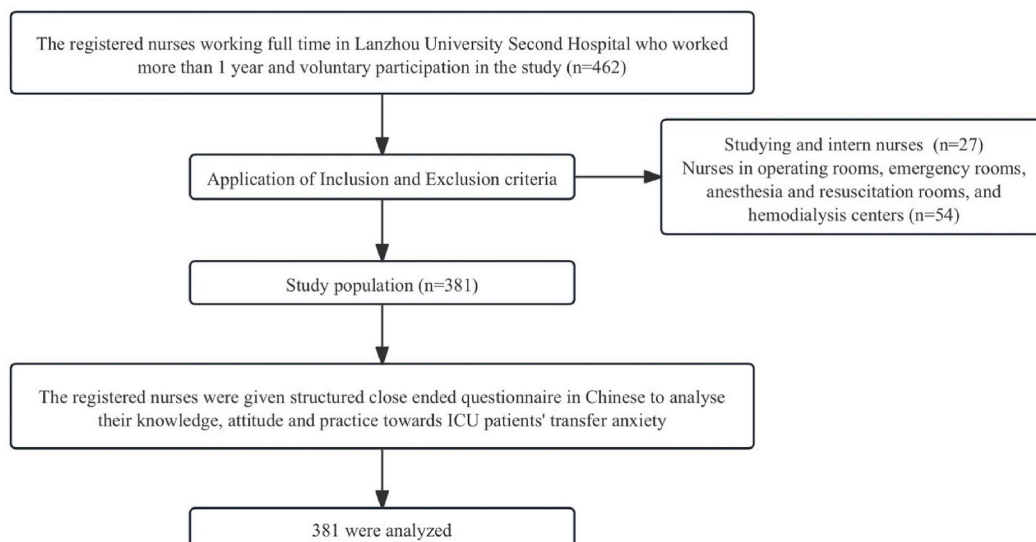

Fig. 1. Population consort flow.

2.5. Ethics

The study was approved by Institutional Review Board (IRB) at Lanzhou University Second Hospital and was registered under the code 2023A-332. Participants in this study were voluntary and received informed consent.

2.6. Statistical analysis

IBM SPSS Statistics 26.0 for Mac was used to analyze all data. Means and standard deviation were used to describe the continuous variables, reported as mean $\pm$ SD, while frequency and percentage were used to summarize categorical variables. Total score rate or score rate of each dimension = total score rate and score rate of each dimension = average score/theoretical maximum $\times$ 100 %.

Differences based on gender and type of department were analyzed by independent T-test. One-way ANOVA was used to examine differences between ICU patients' transfer anxiety scales and other demographic information. Scheffe's test was adopted as post-test of one-way ANOVA. After the results of one-way ANOVA, multiple linear regression analysis was adopted to analyze data. Based on the total scores obtained, the relationship between knowledge, attitude, and practice was used Pearson correlation coefficient. $P \leq .05$ was considered significant for all statistical analyses.

3. Result

3.1. Background facts

A total of 381 nurses from ICU and general wards agreed to participate in this study and completed the questionnaire (Fig. 1). Most of the registered nurses in this study were between 31–40 years old. Most of the participants were female (88.5 %), whereas the male only take possession of 11.5 %. The unmarried account for the largest proportion of marital status (73.5 %). The largest percentage of nurses (93.2 %) had a bachelor's degree as their highest level of education, and the smallest percentage (2.9 %) had a master's degree or higher. Moreover, 43.3 % of the registered nurses in this study had between 5 and 10 years of clinical experience, 40.2 % worked more than 11 years. In the terms of technical title of the participants, the largest was senior nurse (56.7 %), while only 3.9 % had the technical title of deputy chief nurse or above. Most of the participants were from ICU (74.5 %), while the general ward nurses only account for 25.5 %. Details are given in Table 1.

The total score of 381 registered nurses was 135.21 $\pm$ 24.504 with a score of 73.09 %. While the knowledge, attitude and practice scores for ICU patients'transfer anxiety were 45.58 $\pm$ 13.903, 56.94 $\pm$ 10.690 and 32.87 $\pm$ 6.393 respectively, the score rates were 60.8 %, 81.2 % and 82.2 % respectively. Table 2 presents participants' responses to the three lowest scoring items on each aspect of the

Table 1
Demographic characteristics correlation with knowledge, attitude, and practice of ICU patients' transfer anxiety (N = 381).

Variable	Frequency (%)	Knowledge		Attitudes		Practice	
		Mean $\pm$ SD	Test results	Mean $\pm$ SD	Test results	Mean $\pm$ SD	Test results
Age							
18 to 25	34(8.9)	42.68 $\pm$ 13.077	$F = 0.833$	58.97 $\pm$ 11.419	$F = 0.748$	31.65 $\pm$ 7.862	$F = 1.538$
31 to 40	202(53.0)	46.36 $\pm$ 15.071	$P = .477**$	56.07 $\pm$ 9.230	$P = .524**$	32.29 $\pm$ 5.772	$P = .204**$
26 to 30	125(32.8)	44.94 $\pm$ 12.357		57.04 $\pm$ 11.492		33.51 $\pm$ 6.447	
41 to 50	20(5.2)	46.65 $\pm$ 11.992		57.95 $\pm$ 9.611		32.10 $\pm$ 6.553	
Gender							
Male	44(11.5)	39.05 $\pm$ 13.301	$t = -3.361$	54.93 $\pm$ 11.157	$t = -1.329$	30.89 $\pm$ 7.150	$t = -2.198$
Female	337(88.5)	46.44 $\pm$ 13.771	$P = 0.001*$	57.21 $\pm$ 10.617	$P = .184*$	33.13 $\pm$ 6.253	$P = 0.029*$
Marital status							
Unmarried	280(73.5)	45.46 $\pm$ 14.248	$F = 0.494$	57.46 $\pm$ 10.840	$F = 1.227$	33.25 $\pm$ 6.284	$F = 3.950$
Married	95(24.9)	45.63 $\pm$ 12.842	$P = .611**$	55.57 $\pm$ 10.243	$P = 0.294**$	31.48 $\pm$ 6.580	$P = 0.020**$
Divorce	6(1.6)	51.17 $\pm$ 14.972		54.83 $\pm$ 10.008		36.83 $\pm$ 4.997	
Highest educational attainment							
Junior college	15(3.9)	49.67 $\pm$ 13.947	$F = 3.013$	57.93 $\pm$ 9.438	$F = 0.386$	33.13 $\pm$ 6.402	$F = 0.642$
Bachelor's degree	355(93.2)	45.69 $\pm$ 13.736	$P = 0.050**$	56.98 $\pm$ 10.741	$P = .680**$	32.92 $\pm$ 6.842	$P = .527**$
Master's degree or above	11(2.9)	36.55 $\pm$ 16.670		54.36 $\pm$ 11.192		32.87 $\pm$ 6.393	
Clinical work experience							
< 5 years	63(16.5)	43.10 $\pm$ 12.381	$F = 1.633$	55.84 $\pm$ 11.145	$F = 1.699$	33.19 $\pm$ 6.225	$F = 4.012$
5–10 years	165(43.3)	45.39 $\pm$ 13.858	$P = .197**$	58.09 $\pm$ 9.561	$P = .184**$	33.37 $\pm$ 6.317	$P = 0.019**$
Over 11years	153(40.2)	46.82 $\pm$ 14.469		56.16 $\pm$ 11.570		32.87 $\pm$ 6.393	
Technical title							
Nurse	59(15.5 %)	44.02 $\pm$ 13.353	$F = 0.379$	56.46 $\pm$ 11.316	$F = 0.375$	32.89 $\pm$ 6.309	$F = 1.231$
Senior nurse	216(56.7 %)	45.70 $\pm$ 13.548	$P = .769**$	57.23 $\pm$ 9.976	$P = .771**$	33.70 $\pm$ 6.087	$P = 0.298**$
Supervisor nurse	91(23.9 %)	46.43 $\pm$ 15.195		57.00 $\pm$ 11.563		31.87 $\pm$ 7.615	
Associate chief nurse or above	15(3.9 %)	44.87 $\pm$ 13.747		54.40 $\pm$ 13.195		32.87 $\pm$ 6.393	
Type of department							
Intensive care units	284(74.5 %)	45.89 $\pm$ 13.612		56.26 $\pm$ 10.661		32.49 $\pm$ 6.414	
General wards	97(25.5 %)	44.67 $\pm$ 14.757		58.96 $\pm$ 10.573		33.97 $\pm$ 6.232	

Knowledge, Attitude, and Practice Assessment Scale for ICU patients'transfer anxiety.

3.2. Knowledge status

According to the results of independent *t*-test shown in Table 1, there is an important correlation between knowledge and gender. Knowledge about the ICU patients' transfer anxiety in female was significantly higher ($P = 0.001$). Furthermore, according to one-way ANOVA test's results, there was a statistically significant difference between knowledge and highest educational attainment ($P = 0.050$). Pearson correlation test showed that knowledge and attitude have a clear positive correlation ($r = 0.337$, $P < 0.001$). As the knowledge score increased, the attitude score also increased. At the same time, there is a clear positive relationship between knowledge and practice ($r = 0.406$, $P < 0.001$), which means the practice scores were also increased with the increase of the knowledge score (Table 3). As Table 4 shows, the variables of gender, highest educational attainment, scores of attitudes, and scores of practice were associated with the scores of knowledge in this study. According to the linear regression analysis, with one unit increase in the attitude score of registered nurses, nurses' knowledge was increased by 0.200 units, and the practice score of registered nurses increased by one unit, nurses' knowledge was increased by 0.651 units.

3.3. Attitudes status

Based on the results of independent *t*-test (Table 1), there was an important relationship between the attitudes and type of department ($P = 0.031$). Pearson correlation test showed that there was an obvious and positive relationship between attitude and practice ($r = 0.570$, $P < 0.001$), which reported that increased attitude score would increase practice score (Table 3). As shown in Table 5, the variables of type of department, scores of knowledge, and scores of practice were associated with the scores of attitudes in this study. According to the linear regression analysis, with one unit increase in the knowledge score of registered nurses, nurses' attitudes scores were increased by 0.102 units. When the practice score of registered nurses increased by one unit, nurses' attitudes was increased by 0.853 units.

3.4. Practice status

Based on the results of independent *T*-test (Table 1), there was an important relationship between the practice and gender. Practice about the ICU patients' transfer anxiety in female was significantly higher ($P = 0.029$). According to the results of one-way ANOVA test, there was a statistically significant difference between practice and marital status ($P = 0.020$). There was also a significant difference in terms of practice and clinical work experience ($P = 0.019$). Scheffe's test results showed that item with over 11 years was obviously higher ($P = 0.027$). Moreover, based on the results of independent *T*-test, there was a statistically significant difference between practice and type of department ($P = 0.049$). The results of relationship between knowledge, attitude, and practice related to ICU patients' transfer anxiety among registered nurses have shown in Table 3. As shown in Table 6, the variables of marital status, scores of knowledge, and scores of attitudes were associated with the scores of practice in this study. According to the linear regression analysis, with one unit increase in the knowledge score of registered nurses, nurses' practice scores were increased by 0.109 units. When the attitudes score of registered nurses increased by one unit, nurses' practice was increased by 0.288 units.

Table 2
The three items with the lowest scores in each dimension of the knowledge, attitude, and practice assessment scale of registered nurses towards ICU patients' transfer anxiety.

Dimension	Items	Scores
Knowledge	K2. Do you understand the development status of transfer anxiety in ICU patients at home and abroad?	2.55 ± 1.101
	K3. Do you know the intervention measures to deal with transfer anxiety of ICU patients?	2.69 ± 1.093
	K4. Do you know that coping with transfer anxiety of ICU patients is an important part of continuous care?	2.80 ± 1.137
Attitudes	A2. Do you think transfer anxiety intervention for ICU patients is important for their transitional care?	4.01 ± 0.918
	A5. Do you think that the development of transitional care plan can reduce the length of hospital stay of ICU patients and improve the quality of life of patients?	4.04 ± 0.885
	A3. Do you think registered nurses should actively deal with the transfer anxiety of patients in ICU when they are transferred to general wards?	4.04 ± 0.905
Practice	P4. Will you develop targeted health education programs for ICU patients with transfer anxiety during the transfer process?	3.90 ± 1.027
	P6. In the process of ICU patient transfer, you will make a good transfer/transfer care plan for ICU patients in advance?	4.00 ± 0.947
	P1. In the ICU patient transfer process, you will take the initiative to understand the patient's concerns and psychological needs?	4.09 ± 0.859

Table 3
Correlation of knowledge, attitude, and practice related to ICU patients' transfer anxiety among registered nurses.

	Scores of knowledge	Scores of attitude	Scores of practice
Scores of knowledge			
Pearson's correlation	1	0.337**	0.406**
Sig.	N/A	0.000	0.000
Scores of attitude			
Pearson's correlation	0.337**	1	0.570**
Sig.	0.000	N/A	0.000
Scores of practice			
Pearson's correlation	0.406**	0.570**	1
Sig.	0.000	0.000	N/A

Note: **$P < 0.01$.

Table 4
The results of linear regression analysis to investigate the effect of demographic characteristics on registered nurses' knowledge about ICU patients' transfer anxiety (N = 381).

Independent variables	B coefficient	Standard coefficient	β-value	Statistics	P-value
Gender	5.550	2.009	0.128	2.763	0.006
Highest educational attainment	−5.282	2.447	−0.099	−2.158	0.032
Scores of attitudes	0.200	0.073	0.154	2.746	0.006
Scores of practice	0.651	0.122	0.299	5.330	0.000

Table 5
The results of linear regression analysis to investigate the effect of demographic characteristics on registered nurses' attitudes about ICU patients' transfer anxiety (N = 381).

Independent variables	B coefficient	Standard coefficient	β-value	Statistics	P-value
Type of department	1.567	1.032	0.064	1.518	0.130
Scores of knowledge	0.102	0.035	0.133	2.893	0.004
Scores of practice	0.853	0.077	0.510	11.076	0.000

Table 6
The results of linear regression analysis to investigate the effect of demographic characteristics on registered nurses' practice about ICU patients' transfer anxiety (N = 381).

Independent variables	B coefficient	Standard coefficient	β-value	Statistics	P-value
Gender	0.152	0.846	0.008	0.180	0.858
Marital status	0.970	0.640	0.070	1.516	0.130
Type of department	0.609	0.607	0.042	1.003	0.317
Clinical work experience	0.589	0.420	0.066	1.404	0.161
Scores of knowledge	0.109	0.020	0.236	5.398	0.000
Scores of attitudes	0.288	0.026	0.482	11.103	0.000

4. Discussion

According to the results of this study, registered nurses' knowledge towards ICU patients' transfer anxiety in female was higher than scores of the male, which might be because female make up a much larger proportion than male in participants. Also, in this study, there was a relationship between the highest level of education and the knowledge score. In other words, nurses with higher education were more likely to be fully aware of ICU patients' transfer anxiety than nurses with lower education/certification. Also, the higher the attitude and practice scores, the more adequate the nurses' knowledge. In other words, positive attitudes and practices also contribute to nurses' knowledge. However, nurses' clinical work experience and knowledge score are not related in this paper. The findings contradict previous studies. The results of the study by Ludin et al. showed that nurses with more than 10 years of experience working in the ICU had a greater understanding and practice of ICU patients'transfer anxiety [21]. The reason for this opposite result may be due to the fact that the concept of ICU patients' transfer anxiety was introduced to China late (about 2015) [26], which means nurses with low clinical work experience or high clinical work experience have the same level for knowledge. Thus, it is necessary to improve the knowledge regard ICU patients' transfer anxiety in male, at the same time, registered nurses should learn more knowledge about ICU patients' transfer via data base, such as PubMed, Web of Science, China National Knowledge Infrastructure.

The results of the study showed that the type of department of registered nurses have no associated with transfer anxiety attitudes of patients in the intensive care unit. This results was similar with a descriptive study conducted by Ludin et al. [21], which study

showed that there is also no relationship between training program and nurses' attitude regarding ICU patients' transfer anxiety. Therefore, it is debatable whether there is a need to provide targeted attitudes educational programs for nurses in different department.

The results of this study indicate that nurses' practice had a significant association with knowledge regarding ICU patient's transfer anxiety and attitudes regarding ICU patients' transfer anxiety. Similarly, Xie Yanfang et al. [27] reported that adequate knowledge and positive attitude towards ICU patients' transfer anxiety can lead better practice towards ICU patients' transfer anxiety.

Although this paper has many advantages in research design and other aspects, there are still some shortcomings. First, the score of the questionnaire used is not graded and there is no exact evaluation standard for the level. Scores can be graded in the future. Second, the present study lacks investigation in different grades' hospital, which result in the influence of different grades' hospital on the results was not analyzed. Third, there is less study investigate the knowledge, attitude, and practice towards ICU patients' transfer anxiety with registered nurses. So, more study can be implemented in the future.

5. Conclusions

In this study, the registered nurses had medium level of knowledge toward ICU patients' transfer anxiety. However, most of them are interested in ICU patients' transfer anxiety. Thus, it is necessary to improve the knowledge regard ICU patients' transfer anxiety in male. In the future, a cross-sectional study can be carried out specifically among male nurses to understand the extent of male nurses' understanding of the ICU patients' transfer anxiety and its influencing factors, so as to effectively improve the understanding of the ICU patients' transfer anxiety in male nurse. In addition, due to the mutual influence of knowledge, attitude and practice, the above three aspects should be involved in the future research to improve the intervention program of nurses to ICU patients' transfer anxiety. To enable nurses to provide comprehensive care for ICU transfer patients.

Data availability statement

The authors do not have permission to share data.

CRediT authorship contribution statement

Feiran Cheng: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization, Resources. **Hui Yan:** Resources, Project administration, Data curation, Conceptualization. **Juanping Zhong:** Writing – review & editing. **Hong Yang:** Writing – review & editing, Software, Methodology. **Ruiling Nan:** Writing – review & editing, Resources, Methodology, Data curation. **Xinglei Wang:** Writing – review & editing, Funding acquisition, Data curation. **Zhengyong Wei:** Data curation. **Xinman Dou:** Funding acquisition.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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