



Observational Study

# Relationship between clinical belonging, professional identity, and nursing information ability among nursing interns: Model construction

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## Abstract

### BACKGROUND

Clinical belonging refers to the feeling that clinical medical staff feel recognized and accepted by others or groups. The level of clinical belonging of nursing interns affects students' learning motivation and confidence, which in turn affects their clinical practice behavior.

### AIM

To explore the effects of professional identity and nursing information ability on clinical belonging among nursing interns and establish a relationship model for these factors.

### METHODS

The researchers used the convenience sampling method to select 682 nursing interns from China. The survey was conducted using a general information questionnaire, clinical sense of belonging scale, nursing information ability self-assessment scale, and a nursing student professional identity questionnaire. The mediating effect of nursing information ability between their professional identity and clinical sense of belonging was analyzed using SPSS 21.0 and the path analysis in structural equation modeling.

### RESULTS

The total scores of clinical belonging, professional identity, and nursing information ability of nursing interns were  $(104.29 \pm 13.11)$  points,  $(57.89 \pm 7.16)$  points, and  $(70.29 \pm 6.20)$  points, respectively. Nursing information ability had a direct effect on the clinical sense of belonging (effect value = 0.46,  $P < 0.05$ ). Occupational identity had a direct effect (effect value = 0.52,  $P < 0.05$ ) and an indirect effect (effect value = 0.21,  $P < 0.05$ ) on clinical belonging.

## CONCLUSION

Nursing administrators in nursing colleges and hospitals should take effective measures to improve the professional identity and nursing information ability of nursing interns, as well as the clinical sense of belonging among nursing interns.

**Key Words:** Belongingness; Nursing; Education; Undergraduate; Information literacy; Models

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**Core Tip:** Nursing administrators in nursing colleges and hospitals should take effective measures to improve the professional identity and nursing information ability of nursing interns, as well as the clinical sense of belonging among nursing interns.

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## INTRODUCTION

Clinical belonging refers to the feeling that clinical medical staff feel recognized and accepted by others or groups[1]. The level of clinical belonging in nursing interns affects students' learning motivation and confidence, which in turn affects their clinical practice behavior[2]. Professional identity refers to individuals' identification with their professional roles, affirmation of their own professional ability, and positive evaluation of their professional value[3]. Previous studies have shown that occupational identity has a positive effect on clinical belonging, but the mechanism remains unclear[4]. Nursing information competence refers to comprehensive abilities in terms of knowledge, skills, and attitudes shown in various nursing information activities[5]. Studies have shown that good nursing information ability is conducive to the enhancement of nurses' professional sense of accomplishment and affects their clinical sense of belonging[6]. In this study, we aimed to explore the relationship among nursing interns' clinical sense of belonging, professional identity, and nursing information ability to provide a basis for improving nursing interns' clinical sense of belonging.

## MATERIALS AND METHODS

### Research participants

From October 2023 to March 2024, 682 nursing interns were selected as research participants in China. Inclusion criteria were:  $\geq 4$  clinical departments in rotation and duration of clinical practice  $\geq 5$  months. Exclusion criteria were nurses who terminated their internship early for various reasons. This study has been reviewed by the Ethics Committee of Foshan Traditional Chinese Medicine Hospital.

### Data and methods

A general data questionnaire was designed by the researcher, to collect information on age, sex, educational background. Before the investigation, the research purpose was explained to the participants, consent was obtained, and informed consent forms were signed.

**Clinical sense of belonging:** We used a clinical belongingness scale to evaluate the level of clinical belonging in nursing interns which was developed by Levett-Jones *et al*[7]. The Chinese version was revised by Tian *et al*[8] and has good reliability and validity, Cronbach's  $\alpha$  coefficient was 0.920, and the retest reliability was 0.872. The scale contains 34 items in three dimensions, including self-esteem, communication, and effectiveness. A 5-point Likert scale was adopted, with the total score ranging from 34 to 170 points. The higher the score, the higher the level of clinical belonging.

**Nursing information ability self-rating scale:** This scale was used to assess the nursing information competence level of nurses. The Chinese version was translated and revised by Yu *et al*[9]. The scale includes five dimensions (28 items): Basic computer knowledge and skills, clinical information role, application ability of computer skills, nursing information attitude, and wireless device skills. A five-level scale was used, and higher total scores indicated stronger nursing information ability. The scale's Cronbach's  $\alpha$  coefficient was 0.931 and the retest reliability was 0.881.

**Nursing students' professional identity questionnaire:** This tool was used to evaluate the professional identity level of nursing interns[10]. The questionnaire includes 17 items in five dimensions: occupational self-concept, retention benefit and turnover risk, social comparison and self-reflection, autonomy of career choice, and social persuasion. The total score ranges from 17 to 85 points. The higher the score, the higher the sense of professional identity. Cronbach's  $\alpha$  coefficient of

this questionnaire in this study was 0.858 with a half reliability of 0.850.

**Methods of data collection:** A cross-sectional study design was adopted. After obtaining the consent of the nursing department in each hospital, questionnaires were distributed through WeChat and Wenxing to collect data. All questionnaires were completed independently and anonymously by nursing interns. Unified guidelines were adopted to introduce research objectives and methods in detail. Each WeChat was set to answer the questionnaire only once, and the questionnaire could be submitted only after all items had been completed. At the end of the survey, the data were checked by two people, and questionnaires that did not meet the quality requirements were eliminated. A total of 690 questionnaires were collected in this study, of which 682 were valid, with an effective rate of 98.84%.

### **Ethical consideration**

This study has been reviewed by the Ethics Committee of Foshan Traditional Chinese Medicine Hospital. Before conducting the study, the researcher explained the main purpose of the study to the participants who provided written informed consent.

### **Statistical analysis**

Epidata 3.1 was used for data entry and IBM SPSS 21.0 and Amos 17.0 were used for statistical analysis. The general data are described by adoption rate and percentage. Mean and standard deviation were used to describe the relationship between clinical belonging, occupational identity, and nursing information ability. Pearson correlation analysis was used to explore the correlation between nursing information ability, professional identity, and clinical sense of belonging. The mediating effect of nursing information ability on occupational identity and clinical belonging was analyzed using the path of structural equation model. The test level was 0.05.

## **RESULTS**

### **General information**

A total of 682 nursing interns, aged ( $20.00 \pm 1.23$ ) years, were enrolled, including 78 male (11.43%) and 604 female (88.57%) nurses. There were 204 junior college students (29.91%), 413 undergraduates (60.56%), and 65 postgraduate students or above (9.53%); 34 students (4.99%) had experience as class leaders.

### **Nursing interns' clinical sense of belonging, professional identity, and nursing information ability**

Tables 1 and 2 show the scores for clinical sense of belonging, professional identity, and nursing information ability among nursing interns ( $n = 682$ ).

### **Correlation between nursing interns' clinical sense of belonging, professional identity, and nursing information ability**

Pearson correlation analysis showed that the total score for nursing information ability was positively correlated with the total score for clinical sense of belonging. The total score for professional identity was positively correlated with the total score for clinical belonging, as shown in Table 3.

### **Relationship model between clinical belonging, professional identity, and nursing information ability among nursing interns**

A hypothesis model was established with clinical belonging as the dependent variable, nursing information ability as the independent variable, and professional identity as the mediating variable. The structural equation model was applied to test the hypothesis. The data parameters were required to conform to a multivariate normal distribution. Considering that most of the data in this study had a non-normal distribution, the bootstrap method was used to correct the hypothesis. According to statistics, the relationship and path among variables are shown in Figure 1. In this study, the fit index was 0.984, the adjusted fit index was 0.977, the relative fit index was 0.906, the value-added fit index was 0.990, the comparative fit index was 0.990, the mean square and square root of residuals was 0.012, and the asymptotic residual mean square and square root was 0.014. All fitting indices were within the acceptable range, indicating that the model fit well; see Table 4 and Figure 1 for details.

## **DISCUSSION**

### **Current situation regarding clinical belonging, professional identity, and nursing information ability among nursing interns**

**Results of the analysis:** The results of this study showed that the total score for clinical sense of belonging among nursing students during their internship was  $104.29 \pm 13.11$  points, and the entries were all  $3.06 \pm 0.38$  points, which was slightly lower than the results of an investigation among undergraduate nursing students by Tian *et al*[11]. Our study showed that nursing interns had the lowest average score on the communication dimension, which was consistent with research results from China[12]. The participants in this study were hospital interns in Guangdong Province, most of whom were

**Table 1 Scores for clinical sense of belonging, professional identity, and nursing information ability among nursing interns (*n* = 682)**

Dimension	Number of entries	Dimension score	Entry average score
<b>Total clinical belonging score</b>	34	104.20 ± 13.11	3.06 ± 0.38
Self-esteem	15	47.04 ± 7.44	3.13 ± 0.49
Communication	11	31.73 ± 4.65	2.88 ± 0.42
Efficacy	8	25.52 ± 4.58	3.19 ± 0.57
<b>Total score for professional identity</b>	17	57.89 ± 7.16	3.40 ± 0.42
Occupational self-concept	6	20.71 ± 3.54	3.452 ± 0.59
Social persuasion	2	8.33 ± 1.20	4.16 ± 0.59
Autonomy in career choice	2	6.23 ± 1.87	3.11 ± 0.93
Benefits of retention and turnover risk	4	13.43 ± 2.75	3.36 ± 0.68
Social comparison and self-reflection	3	9.18 ± 2.30	3.06 ± 0.77
<b>Total score for nursing information ability</b>	28	70.29 ± 6.20	2.93 ± 0.26
Basic computer knowledge and skills	11	35.40 ± 4.34	3.21 ± 0.39
Clinical information roles	5	11.13 ± 2.50	2.23 ± 0.50
Applied computer skills	4	11.90 ± 2.51	2.97 ± 0.62
Wireless device skills	4	11.86 ± 2.52	2.96 ± 0.63
Nursing information attitudes	4	12.07 ± 2.65	3.02 ± 0.66

**Table 2 Comparison of scores for clinical belonging, professional identity, and nursing information ability of nursing interns with different demographic characteristics**

Item	Sex		Age (yr)		Education			Class leader experience	
	Male	Female	< 20	20-30	Junior college	Undergraduate	Graduate and above	Yes	No
Total clinical belonging score	103.02 ± 10.21	105.04 ± 11.39	103.17 ± 11.42	104.06 ± 12.10	101.16 ± 12.25	103.62 ± 12.06	105.38 ± 11.30	103.20 ± 12.04 <sup>a</sup>	89.79 ± 9.60 <sup>a</sup>
Total score for professional identity	55.02 ± 7.08	60.02 ± 4.72	57.90 ± 5.18	59.13 ± 4.86	58.70 ± 2.16	57.68 ± 3.15	58.89 ± 4.25	59.30 ± 5.14	57.22 ± 4.08
Nursing information ability	80.25 ± 9.32 <sup>a</sup>	74.30 ± 8.14 <sup>a</sup>	76.28 ± 5.26	77.05 ± 4.12	71.36 ± 6.15 <sup>a</sup>	75.07 ± 5.16 <sup>a</sup>	80.12 ± 4.17 <sup>a</sup>	77.95 ± 5.33	78.02 ± 4.38

<sup>a</sup>*P* < 0.01.

from Hubei, Hunan, Jiangxi, and other places. There were certain language differences among them, which may have caused communication barriers. In addition, clinical work is demanding; clinical instructors should ensure the safety of clinical work based on education as their communication time with interns may be insufficient. In addition, as can be seen from Table 2, interns with different degrees have different levels of clinical belonging, which suggests that nursing management should strengthen teaching management, such as holding regular intern seminars, to understand the problems of interns at different levels to solve and assist them in these issues. Clinical educators should spend more time communicating with interns and taking the initiative to lead interns to integrate into the department and enhance their clinical sense of belonging[13].

**Analysis regarding the status quo of professional identity among nursing students during internship:** The results of this study showed that the total score for professional identity among 682 nursing interns was 57.89 ± 7.16, which was a medium-high level, consistent with the results of Xing *et al*[14]. This is related to the emphasis among nursing educators on cultivating professional attitudes, as well as society's recognition of the role of nursing staff in the field of health. Attitudes among the public regarding nurses are constantly improving[15], which increases nursing students' sense of professional identity. The highest score in all dimensions of professional identity among nursing students during the internship was for social persuasion (4.16 ± 0.59), which indirectly proves the role of public opinion and example gui-

Table 3 Correlation between clinical sense of belonging, professional identity, and nursing information ability among nursing interns			
	Total clinical belonging score	Total professional identity score	Total score for nursing information competence
Total clinical belonging score	1.000	-	-
Total professional identity score	0.585 <sup>a</sup>	1.000	-
Nursing information ability score	0.457 <sup>a</sup>	0.382 <sup>a</sup>	1.000

<sup>a</sup>*P* < 0.01.

Table 4 Effects of professional identity and nursing information ability on clinical belonging in nursing interns				
Independent variable	Dependent variable	Direct effects	Indirect effects	Total effect
Professional identity	Clinical sense of belonging	0.52	0.21	0.73
Nursing information capability	Clinical sense of belonging	0.46	-	0.46

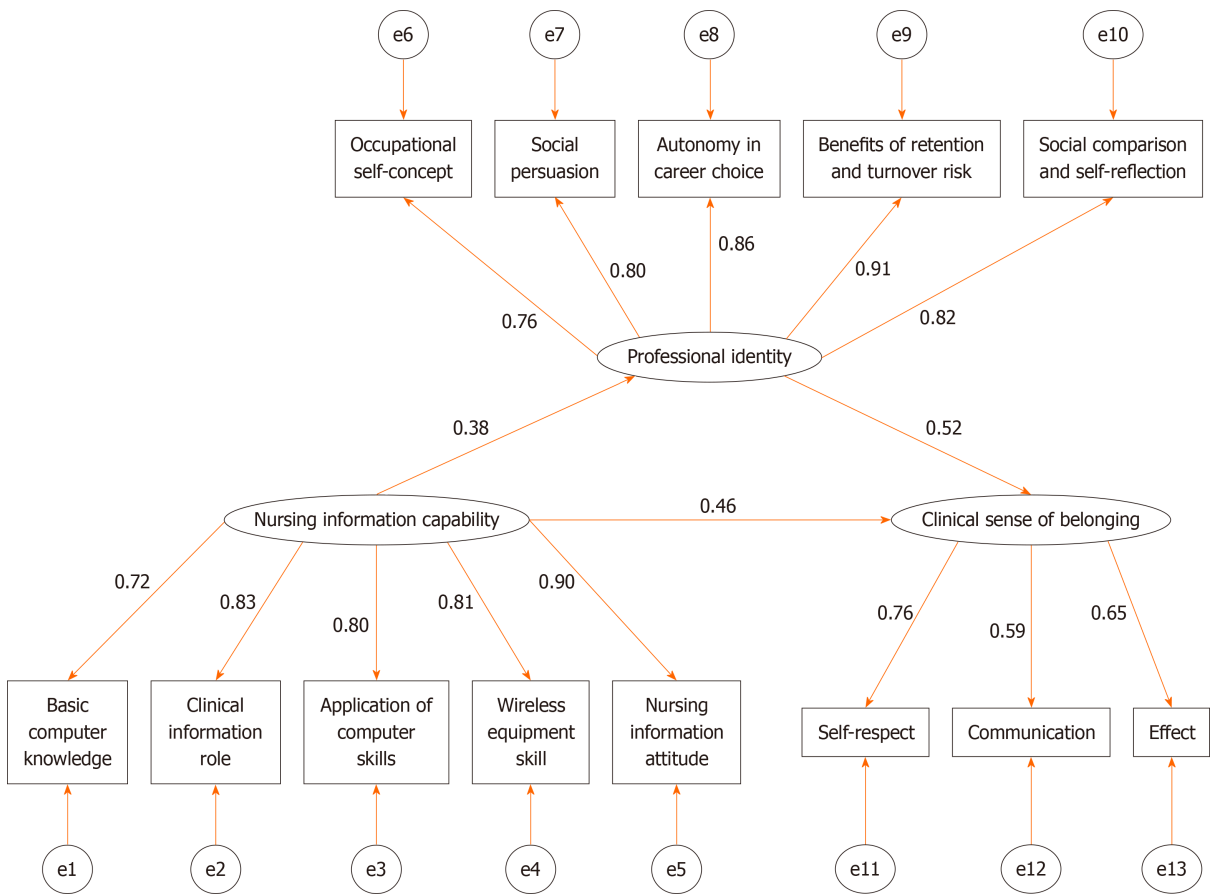


Figure 1 Structural equation model of clinical belonging, professional identity, and nursing information ability among nursing interns.

dance in improving professional identity among nursing students. The dimension of the benefit of retention and resignation risk had the lowest score; the item “nursing work can enable me to display my personal ability and expertise” in this dimension had a lower score, which was consistent with the results of the domestic survey. Table 2 shows that the professional identity of male interns and non-class leaders was low, which indicates that the nursing work at the present stage cannot meet the needs of the development platform for nurses, especially male nurses. It is suggested that nursing managers reasonably employ nurses according to their personal abilities and specialties, to mobilize their work enthusiasm.

**Analysis regarding the status quo of nursing information ability among interns:** The results of this study showed that the total score for nursing information ability among nursing interns was  $70.29 \pm 6.20$  points, and the average score was  $2.93 \pm 0.26$  points; this was lower than the average level and slightly higher than the survey results of Li *et al.* This may be because the research participants in this study included master's students (9.53%) whose nursing information ability is higher than that of undergraduate students[16]. As shown in Table 2, the nursing information ability of male students was higher than that of female students, which may be related to the fact that male students are more interested in computers and other Internet-related content and are willing to learn related content, leading to a better ability to apply computer skills. The scores for basic computer knowledge and skills were highest, similar to those of new nurses in an investigation by Liu *et al.*[17] and higher than those of nursing students in a study by Hu *et al.*[18] This may be because nursing interns in this study were all juniors or above; the higher the grade, the more computer theory courses and clinical practice have been completed, leading to improvement in computer knowledge and skills. The score for the clinical information role was the lowest, indicating that nursing students' ability to acquire and process clinical nursing information after entering the clinic was insufficient. It is suggested that nursing schools cooperate with hospitals to increase the time contact with clinical practice before actual practice so that nursing students can have a full understanding of clinical work procedures and working systems to improve their nursing information ability.

### **Model construction of nursing interns' clinical sense of belonging, professional identity, and nursing information ability**

**Correlation analysis results:** The results of this study showed that nursing information ability was positively correlated with clinical sense of belonging, that is, stronger nursing information ability leads to a stronger clinical sense of belonging. This is because, in clinical practice, stronger nursing information ability among nursing interns means they will be more likely to receive appreciation from clinical educators. Research shows that a teacher's praise can promote clinical sense of belonging in nursing interns[19]. As shown in Table 3, professional identity among nursing interns is positively correlated with clinical sense of belonging. Studies show that the level of professional identity determines the performance of nursing interns in clinical work. The higher the level of professional identity, the higher their enthusiasm and professional quality in clinical practice, and the better they can integrate into the role of clinical nurses, which affects their clinical sense of belonging[4]. Nong *et al.*[20] showed that with stronger competency among clinical educators, the professional identity of nursing interns was improved. Therefore, hospital managers should attach greater importance to the cultivation of teaching ability among nursing educators and guide them to use encouraging teaching methods to improve professional identity among nursing students, enhance their clinical sense of belonging, and thus stabilize the nursing team.

**Mediating effect of nursing information ability on professional identity and clinical sense of belonging:** The results of this study showed that the professional identity of nursing interns could directly affect their clinical sense of belonging (effect value = 0.51) and could also influence clinical sense of belonging through the partial mediating effect of nursing information ability (effect value = 0.20). These results showed that nursing information ability was a protective factor and an important way for professional identity to affect clinical sense of belonging, that is, clinical sense of belonging could enhance nursing interns' professional identity by improving their nursing information ability. This may be because clinical practice is an important factor affecting the improvement of nursing information ability; with better clinical practice, nursing information ability is improved[21]. Professional identity also has a positive regulating effect on clinical practice behavior[22]; therefore, professional identity can improve nursing information ability to further enhance nursing students' clinical sense of belonging.

### **Limitations**

The research in this study mainly focused on hospitals in Guangdong, China, and cities outside Guangdong Province were not included, which has certain geographical limitations. At the same time, the research subjects were mainly tertiary hospitals and secondary hospitals and community hospitals were not included, which limits the universality of the research results. Therefore, this study will collaborate with multiple provinces and cities to conduct research on multi-center and multi-level hospitals, in order to provide a better theoretical basis regarding interventions for nursing interns.

## **CONCLUSION**

In this study, we assessed the current situation of clinical belonging, professional identity, and nursing information ability among nursing interns and constructed a relationship model for these three factors, which confirmed the direct effect of professional identity and nursing information ability on clinical belonging and the indirect effect of professional identity on clinical belonging through nursing information ability. Our findings suggested that nursing colleges should set up courses related to professional identity and nursing information ability and increase the clinical practice time of nursing students before internship to improve the basis of nursing interns' professional identity and nursing information ability. In addition, it is suggested that hospitals establish a good management system for nursing teachers, ensure adequate communication between nursing teachers and nursing interns, and strive to create a good atmosphere for interns and promote their integration into clinical nursing work to improve their sense of clinical belonging.

## FOOTNOTES

**Co-corresponding authors:** Gai Zhang and Shao-Juan Huang.

**Author contributions:** Zhang G, Huang SJ, and Li SF conceptualized and designed the research; Zhang G and Li SF screened the research topics and acquired clinical data; Zhang G performed data analysis; Zhang G, Li SF wrote the paper. All the authors have read and approved the final manuscript. Both Zhang G and Huang SJ have played important and essential roles in the experimental design, data interpretation and manuscript preparation as the co-corresponding authors. Zhang G applied for and obtained the funds for this research project. Huang SJ conceptualized, designed, and supervised the whole process of the project. She searched the literature, revised and submitted the early version of the manuscript and was responsible for data re-analysis and re-interpretation, figure plotting, comprehensive literature search, preparation and submission of the current version of the manuscript.

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