



Research article

Transition shock, future time perspective, professional self-concept, and professional identity among nursing interns: A cross-sectional study

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ABSTRACT

Background: Transition shock is prevalent among nursing interns. Future time perspective helps nursing interns learn and work more effectively and improve their problem-solving skills. Professional self-concept and professional identity play an important central and driving role in nursing interns' career choices and career development. However, the mechanism by which future time perspective, professional self-concept and professional identity are linked to transition shock among nursing interns remains unknown.

Objectives: We assess the degree of transition shock experienced by nursing interns and investigate the connections among transition shock, future-focused viewpoint, professional identity, and professional self-concept.

Design: A descriptive, cross-sectional design was conducted.

Setting: Eight hospitals in Hunan Province, China were included in the study.

Participants: Nursing interns at the studied hospital participated in the study.

Methods: A total of 1090 nursing interns [929 female, 161 male] were recruited from eight hospitals. Data on transition shock, future time perspective, professional self-concept and professional identity among nursing interns were collected using questionnaires from 30 May to June 15, 2022.

Results: On a 4-point rating scale, the participants' felt transition shock had a mean overall score of 2.39 (SD = 0.52). The dimension with the highest score was overwhelming workload (mean = 2.74, SD = 0.58), while the dimension with the lowest score was incongruity between work and personal life (mean = 2.16, SD = 0.70). Professional identity was statistically significantly correlated with transition shock ($r = -0.198$, $p < 0.01$). The preferred level of nursing ($\beta = 0.354$, $p < 0.001$), professional self-concept ($\beta = 0.226$, $p < 0.001$), professional identity ($\beta = -0.2576$, $p < 0.001$) and future time perspective ($\beta = 0.119$, $p < 0.001$) were predictors of transition shock.

Conclusions: The development of nursing interns' sense of professional identity and future time perspective should be enhanced during both the education phase and clinical placement to help nursing interns overcome the experience of transition shock.

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1. Introduction

The process of nursing student training in China arranges for nursing students to undergo a clinical internship for more than 8 months before graduation to adapt to the atmosphere of clinical work in advance and accumulate clinical experience. A nursing intern has a "dual role" during his or her clinical internship as a student and nurse. As nursing interns move from theoretical learning to practical nursing practice, clinical nursing practice is a crucial component of their transition. As a result, they encounter a variety of patients, conduct practical clinical nursing operations in strange settings, and experience pressure [41,42]. "Transition shock" is the term for this procedure. The experience of moving from the familiar role of student to the rather foreign role of practicing professional nurse has been termed as "transition shock." [1,2]. Relevant studies [43,44] have shown that when nursing interns fail to deal with transition shock in the clinical placement phase, they may leave the nursing profession at the end of their clinical placement. The "National Nursing Development Plan (2016–2020)" document emphasizes problems such as the shortage and loss of nursing personnel on the growth of China's nursing sector during the "Twelfth Five-Year Plan" period [44]. The future of the nursing profession is represented by nursing students, and the development of nursing careers must be supported by a reserve team of strong professional quality with firm professional belief, recognition of the value of nursing work and a love of the nursing profession to form stable nursing teams [45].

Future time perspective is defined as "a personality trait in which individuals perceive, experience, and tend to act in future time" and is based on a five-dimensional model of mental structure-future imagery, awareness of purpose, future effectiveness, goal orientation, and behavioural commitment [3]. Future time perspective focuses on an individual's own attributes and has an important role to play in the level of transition shock. A healthy future time perspective helps increase the motivation of nursing interns to learn and work and improve their problem-solving skills [4]. Those who often look to the future have higher levels of career adjustment than those who are comfortable with the status quo or are nostalgic of the past [4,5], and nurses experience less transition shock the more adjusted they are in their careers. That is, nursing interns with higher levels of future time perspective experience lower levels of transition shock [5,46].

Professional self-concept refers to identifying one's current role and recognizing the role experience fully enough to express an ideological commitment to one's profession [6]. The Hong Kong Polytechnic University's Professor Arthur claims that nurses' professional self-concept (PSNs') is distinct, both closely related to and distinct from general self-concept, and represents a professionally relevant and enduring set of perceived professional self-attitudes that one develops as one transitions from being a lay student to becoming a professional nurse [7,8].

Professional identity refers to nursing students acknowledging themselves as nursing students and their future status as nurses, recognizing the value of the nursing profession, fully accepting the nature of the profession, and having correct perceptions and evaluations of the profession, which can directly affect an individual's future career planning [40,47]. Related studies have shown a negative relationship between professional identity and transition shock [4,39].

The professional identity of nursing interns is positively connected with their professional self-concept, according to Zhang et al. [9]. The stronger one's professional identity, the more positive one's professional self-concept is. Nursing interns with a more positive professional self-concept have better self-skills and communication skills, are better at maintaining strong nurse-patient relationships [48]; , and experience increased job satisfaction and their own professional values, while nursing interns with a negative professional self-concept feel uncertain about and fearful of their future development due to their lack of confidence in their professional abilities, thus resulting in a weaker sense of professional identity.

In summary, there are related studies showing that professional identity, professional self-concept and future time perspective have direct or indirect effects on transition shock, but there are no reports on the relationship between the three and transition shock. As the future of the nursing profession, nursing interns are being studied to better understand the relationship between future time perspective, professional self-concept, professional identity, and transition shock in nursing interns. This research will help develop strategies for assisting nursing interns in overcoming transition shock and bolstering the clinical nursing workforce.

2. Methods

2.1. Aim

We investigate the connections between nursing interns' transition shock and their professional identities, professional self-concept, and future temporal perspective.

2.2. Study design

A descriptive, cross-sectional design was used.

2.3. Setting

As one of the capital cities in central China, Changsha, Hunan Province is middle ranking in economic development among provincial capitals in the country. This study was made in 8 hospitals in Hunan Province. Additionally, all eight of these hospitals are Grade III first-class facilities that combine medical care with education, research, and preventive medicine. While providing high-

quality medical services, they can also train high-level medical talents and carry out high-level scientific research.

2.4. Sample

A total of 1090 nursing interns from 8 hospitals in Hunan Province, China were recruited by convenience sampling method.

Nursing interns meeting the following criteria were included: 1) full-time nursing interns at the hospital who are in their junior, senior, and undergraduate years and 2) providing informed consent. Nursing interns with obvious physical abnormalities or serious mental or physical illness, interns experiencing an interruption or suspension of their internship for any reason, and nonclinical nursing workers (e.g., para-active, institutional, and logistical interns) were excluded.

The questionnaire used in this study includes four scales (85 items in total), and the sample size should generally be 5–10 times the number of items. Considering 20% invalid questionnaires, the sample size is determined to be 1020. Five of the 1095 surveys that were issued were returned for incomplete completion. With a 99.5% effective recovery rate, 1090 valid surveys were retrieved.

2.5. The study questionnaire

(1) Transition shock

Kim and associates created a scale to quantify transition shock [10] and later refined by Yuxuan Huang et al. [11]. The scale measures six dimensions, including “conflict between theory and practice”, “an overwhelming workload”, “loss of social support”, “diminishing relationships with coworkers”, “confusion of professional nursing values”, and “incongruity between work and personal life”. With higher scores denoting more acute transition shock, the scale’s 18 items are rated on a four-point Likert scale. Cronbach’s alpha for the Transition Shock Scale (Chinese Version) among undergraduate nursing students was determined to be 0.912 [11]. The Cronbach’s alpha coefficient of this scale was 0.929 in this study.

(2) Future time perspective

Nursing interns’ future time perspective was assessed using the general future time perspective questionnaire [12]. The five components of future time perspective that university students are measured for on this 20-item assessment are behavioral commitment, future efficacy, far-reaching goal orientation, future purpose consciousness, and future image-related. Better scores correspond to better levels of perspective on the future. A four-point Likert scale was used to score each item, with 1 representing strongly disagree and 4 representing strongly agree. A factor analytic research by QZ Song [12] yielded a test-retest reliability coefficient of 0.79 and a Cronbach’s alpha of 0.90. In this study, the Cronbach’s alpha coefficient for the scale was 0.913.

(3) Professional self-concept

Arthur was the one who created the Professional Self-Concept of Nurses Instrument (PSCNI) at the beginning [7]. Li et al. [13] translated it into Chinese, and Yang et al. [14] confirmed it once again. There are thirty items in total that measure the five aspects of a professional self-concept: five items measure communication, four measure leadership, seven measure skill, five measure flexibility, and nine measure satisfaction. Each item was scored using a four-point Likert scale, where 1 denotes strongly disagree and 4 denotes strongly agree. Inverse scores were assigned to negative elements, and the final score may vary from 30 to 120. A high degree of self-concept is indicated by higher scores on the professional self-concept questionnaire. The internal consistency reliability measured by Cronbach’s alpha for the PSCNI of Chinese version was 0.84 [14]. The Cronbach’s alpha coefficient of this scale was 0.923 in this study.

(4) Professional identity

The Professional Identity Questionnaire for Nursing Students (PIQNS) was utilized to measure the professional identity of Chinese nursing students. It was created by Yufang Hao [15], a nursing researcher from China, and has been widely used in China. With a Cronbach’s α of 0.827 [16], the scale consists of five dimensions: occupational self-concept, job retention benefits and resignation risks, social support and self-reflection, career choice autonomy, and social persuasion. Likert ratings range from 1 (not true at all) to 5 (true almost all the time) on the 17-item assessment scale. Item 12 is inverted. Higher sum total scores are indicative of a more robust professional brand. For this scale in this study, the Cronbach’s alpha coefficient was 0.957.

2.6. Data collection

This study employed a convenience sampling technique, using Questionnaire Star to find nursing interns working at eight hospitals in Hunan Province between May 30 and June 15, 2022. The questionnaire included demographic information (gender, hospital, etc.), the Transition Shock Scale for Undergraduate Nursing Students (Chinese Version), the Future Time Perspective Scale, the PSCNI, and the PIQNS. The investigator himself is responsible for the distribution and collection of questionnaires, and contacts with the heads of nursing interns in each hospital. After obtaining the informed consent of students, the questionnaires are distributed by Sojump APP (Changsha Xingxin Information Technology Co, a web-based survey tool), and the unified guidance and explanation of the research

objectives and filling requirements are used.

2.7. Statistical analysis

Version 25 of IBM SPSS Statistics for Windows (Armonk, NY: IBM Corp.) was used for data analysis. In order to assess the homoscedasticity and normalcy of the study variables—which included transition shock, future time perspective, professional self-concept, and professional identity—descriptive statistics were used. Utilizing t tests and analysis of variance, transition shock variations by demographic attributes were ascertained. Additionally, Pearson's correlation analysis was done to determine how transition shock, future time perspective, professional identity, and professional self-concept relate to one another. Lastly, the impacts of future time perspective, professional identity, and professional self-concept on transition shock among nursing interns were investigated using stepwise multiple regression analyses.

Ethical approval

The Second Xiangya Hospital Ethics Committee at Central South University gave its approval to this study (LYG2022073). Every participant gave their permission and offered to take part in the study. At any point, attendees were free to leave the event. Every technique employed in this investigation was completed in compliance with all applicable laws and rules.

3. Results :

3.1. Participant characteristics

1090 valid questionnaires were received in total from the poll. Table 1 presents the participants' demographic details. There were 929 participants, or 85.2% of the total, who were female. In addition, most of the participants had an associate's degree (n = 802, 73.6%), while 282 (18.9) had an undergraduate degree and only 6 (0.6%) had master's degree or above. Most of the participants expressed their desire to work for a hospital in the future (n = 532, 48.8%), and as most of the participants had an associate's degree (n = 802, 73.6%), many (n = 346, 31.7%) wished to upgrade their qualifications; only a small number of nursing interns (n = 22, 2.0%) were considering changing professions.

3.2. Transition shock, future time perspective, professional self-concept, and professional identity

On a 4-point rating scale, the participants' felt transition shock had a mean overall score of 2.39 (SD = 0.52). The conflict between theory and practice dimension (mean = 2.66, SD = 0.57) was ranked second, with the overwhelming workload dimension reporting the highest score (mean = 2.74, SD = 0.58). The dimension with the lowest score was the incongruity between work and personal life (mean = 2.16, SD = 0.70) (Table 2)(Table 2).

For nursing interns, the mean overall score (on a 4-point scale) was 2.89 (SD = 0.40) for their future time perspective. Following the

Table 1
Relationships between demographic variables and transition shock (N = 1090).

Variables			Transition shock				
	n	%	Mean	SD	F/t	p	
Sex	Male	161	14.8	2.29	0.58	5.57	0.018
	Female	929	85.2	2.41	0.50		
Family residence	Urban areas	382	35.0	2.38	0.52	0.001	0.981
	Rural areas	708	65.0	2.39	0.51		
Only child	Yes	206	18.9	2.43	0.53	0.846	0.358
	No	884	81.1	2.38	0.51		
Education level	Associate degree	802	73.6	2.34	0.52	11.42	0.00
	Bachelor	282	25.9	2.50	0.50		
	Master	4	0.4	3.32	0.78		
	Doctor	2	0.2	2.83	0.24		
Employment intentions	Hospital	532	48.8	2.35	0.50	10.68	0.00
	Nursing Schools	19	1.7	2.30	0.65		
	Upgrading qualifications	346	31.7	2.32	0.49		
	Postgraduate study	71	6.5	2.62	0.45		
	Change of profession	22	2.0	2.86	0.72		
	Undecided	100	9.2	2.56	0.54		
Preferred level of nursing	Liked very much	135	12.4	2.04	0.59	49.92	0.00
	Liked	500	45.9	2.30	0.43		
	Fair	425	39.0	2.56	0.48		
	Disliked	20	1.8	3.21	0.41		
	Disliked very much	10	0.9	2.39	0.52		

Notes : SD = standard deviation.

future efficacy dimension (mean = 3.04, SD = 0.52) in terms of score, the far-reaching goal orientation dimension recorded the highest score (mean = 3.06, SD = 0.50). Mean = 2.41, SD = 0.66 was the lowest score for the behavioral commitment dimension (Table 2.).

Table 2 indicates that, on a 4-point rating, the mean overall score for professional self-concept was 2.78 (SD = 0.35). Flexibility scored lowest (mean = 2.68, SD = 0.44), and communication scored best (mean = 2.90, SD = 0.51).

Based on a 5-point rating system, the average professional identity score was 3.65 (SD = 0.64). The highest score was recorded on the occupational self-concept subscale (mean = 3.77, SD = 0.70), which was followed by the career choice autonomy dimension (mean = 3.70, SD = 0.72). The dimensions with the lowest scores were self-reflection and social support (mean = 3.46, SD = 0.65) (Table 2.).

3.3. Connections between nursing interns' transition shock, future-focused viewpoint, professional self-concept, and professional identity

Professional identity was statistically substantially connected with transition shock, as Table 3 illustrates ($r = -0.198, p < 0.01$). Of all of the subdomains of professional identity, occupational self-concept ($r = -0.251, p < 0.01$), job retention benefits and resignation risks ($r = -0.159, p < 0.01$), and social persuasion ($r = -0.198, p < 0.01$) had a statistically significant negative correlation with transition shock. The relationships between future time perspective and transition shock ($r = 0.057, p > 0.05$) and between professional self-concept and transition shock ($r = 0.054, p > 0.05$) lacked statistical significance. However, of the subdomains of future time perspective, future purpose consciousness ($r = -0.118, p < 0.01$), far-reaching goal orientation ($r = -0.141, p < 0.01$), future efficacy ($r = -0.166, p < 0.01$), and behavioural commitment ($r = -0.531, p < 0.01$) had a statistically significant negative correlation with transition shock. Of all of the subdomains of professional self-concept, leadership ($r = -0.134, p < 0.01$), skill ($r = 0.292, p < 0.01$), satisfaction ($r = 0.179, p < 0.01$), and communication ($r = -0.122, p < 0.01$) demonstrated a statistically significant inverse relationship with transition shock.

The findings of our stepwise multiple regression study, which looked at the factors influencing transition shock, are shown in Table 4. For transition shock, the preferred level of nursing ($\beta = 0.354, p < 0.001$), professional self-concept ($\beta = 0.226, p < 0.001$), professional identity ($\beta = -0.2576, p < 0.001$) and future time perspective ($\beta = 0.119, p < 0.001$) were statistically significant.

4. Discussion

Transition Shock is the first direct, sharp and striking problem in the early stage of nurses' career. Duchscher breaks down the transition shock experienced by the graduate into four categories: intellectual, emotional, physical, and societal[1]. Liang found that the difficulties or stress faced by nursing interns upon entering clinical settings stem from fears of making mistakes and uncertainty about decision-making in nursing practice; overwork and shift work; a burdensome and unfamiliar work culture; and self-assessment regarding whether to pursue a nursing career[17]. In this study, the transition shock score for the nursing interns was measured as 2.39 ± 0.52 , which concurs with Kim et al.'s findings [18]. This suggests that nursing interns already encounter transition shock issues prior to graduation and experience feelings of disorientation, confusion, doubt and uncertainty in the clinical placement phase [19,20].

Table 2

Transition shock, future time perspective, professional self-concept, and professional identity among nursing interns.

Variables	Dimension	Minimum	Maximum	Mean	SD
Transition shock	Conflict between theory and practice	1.00	4.00	2.66	0.57
	Overwhelming workload	1.00	4.00	2.74	0.58
	Loss of social support	1.00	4.00	2.24	0.73
	Diminishing relationship with co-workers	1.00	4.00	2.21	0.67
	Confusion in professional nursing values	1.00	4.00	2.27	0.66
	Incongruity in work and personal life	1.00	4.00	2.16	0.70
	Overall	1.00	4.00	2.39	0.52
Future time perspective	Future image	1.00	4.00	2.91	0.52
	Future purpose consciousness	1.00	4.00	3.03	0.51
	Far-reach goal orientation	1.00	4.00	3.06	0.50
	Future efficacy	1.00	4.00	3.04	0.52
	Behavioral commitment	1.00	4.00	2.41	0.66
	Overall	1.00	4.00	2.89	0.40
	Professional self-concept	Leadership	1.00	4.00	2.90
Flexibility		1.00	4.00	2.68	0.44
Skill		1.00	4.00	2.64	0.39
Satisfaction		1.00	4.00	2.79	0.41
Communication		1.00	4.00	2.92	0.42
Overall		1.00	4.00	2.78	0.35
Professional identity		Occupational self-concept	1.00	5.00	3.77
	Job retention benefits and resignation risks	1.00	5.00	3.59	0.70
	Social comparison and self-reflection	1.00	5.00	3.46	0.65
	Career choice autonomy	1.00	5.00	3.70	0.72
	Social persuasion	1.00	5.00	3.66	0.80
	Overall	1.00	5.00	3.65	0.64

Notes: SD = standard deviation.

Table 3

Correlations between future time perspective, professional self-concept, professional identity and transition shock.

Variables	Domain	Transition shock
Future time perspective	Future image	-0.039
	Future purpose consciousness	-0.118**
	Far-reach goal orientation	-0.141**
	Future efficacy	-0.166**
	Behavioral commitment	-0.531**
	Overall	0.057
Professional self-concept	Leadership	-0.134**
	Flexibility	0.056
	Skill	0.292**
	Satisfaction	0.179**
	Communication	-0.122**
	Overall	0.054
Professional identity	Occupational self-concept	-0.251**
	Job retention benefits and resignation risks	-0.159**
	Social support and self-reflection	0.012
	Career choice autonomy	-0.179
	Social persuasion	-0.268**
	Overall	-0.198**

Notes : **p < 0.01.

Table 4

Factors predicting transition shock (n = 1090).

Variables	R ²	B	SE	β	t	p
Constant		21.622	2.552		8.473	0.000
Preferred level of nursing	0.155	4.388	0.377	0.354	11.624	0.000
Professional self-concept	0.176	0.199	0.037	0.226	5.327	0.000
Professional identity	0.202	-0.218	0.035	-0.257	-6.299	0.000
Future time perspective	0.209	0.140	0.044	0.119	3.204	0.001

Notes: Stepwise multiple regression analysis was performed to examine the predictors of transition shock among nursing interns. For transition shock, preferred level of nursing ($\beta = 0.354$, $p < 0.01$), professional self-concept ($\beta = 0.226$, $p < 0.01$), Professional identity ($\beta = -0.257$, $p < 0.01$) and future time perspective ($\beta = 0.119$, $p < 0.01$) were statistically significant. SE = standard error.

The effects of education level, employment intentions and the preferred level of nursing on the transition shock of nursing interns were statistically significant ($p < 0.05$). In terms of employment intentions, the investigation's findings demonstrate that the level of transition shock was greater for nursing interns whose employment intentions were to enter graduate school (2.63 ± 0.45) or change professions (2.86 ± 0.72) than for nursing interns with other employment intentions. A survey [21] shows that dissatisfaction with the current state of nursing work is the main reason for nursing students to attend graduate school. Nursing students who choose to continue their study career are still immersed in their role as students and are afraid to take on the pressures and responsibilities of clinical work, resulting in high levels of transition shock. Survey results show [22,23] that nursing interns are affected by transition shock in terms of physical, knowledge and skill, psychological, sociocultural and developmental factors. This suggests to us that during the clinical placement process, supervising teachers should consider, where appropriate, the issue of matching the practical abilities of nursing interns with their workload and arrange appropriate work; there is also a need to reform the hospital teaching model and adopt more diverse teaching methods (e.g., using situational simulation [24], problem/context-based learning [25], etc.) to improve nursing interns' clinical practice skills and confidence in their clinical work, thereby reducing transition shock among such interns and preventing the loss of nursing talent.

Transition shock was statistically substantially connected with professional identity, as Table 3 illustrates. Sun's study found that transition shock is the primary element affecting the behavior of seeking feedback of junior nurses, while the degree of enjoyment of nursing among junior nurses was also found to be the main factor influencing feedback-seeking behaviour, showing that there is also a link between transition shock and enjoyment of nursing [26]. Nursing students who enjoy the nursing profession and voluntarily choose to enter the profession tend to have more ambitious career goals, more professional self-confidence and a stronger professional identity, stronger independent learning ability, an ability to deal with difficulties and problems encountered in clinical settings with a more positive attitude, higher levels of professional self-concept and lower degrees of transition shock [49]. This suggests that nursing students should focus on developing a sense of professional identity and pride in their profession, both in their schooling and in their clinical placement education. When nursing interns understand and identify enough with their profession and work, they are motivated to overcome transition shock in their studies and work.

As demonstrated by our study's findings, nursing interns' transition shock increases with their level of literacy, which is consistent with the findings of Zhang et al. [27]. However, in this study, the degree of transition shock of doctoral degree nursing interns was not higher than that of graduate degree students, which may be related to the small sample size of doctoral degree students collected in this study. A mismatch between expectations and the reality of professional practice leads to a lack of confidence in nursing interns in terms

of working independently and handling multiple tasks simultaneously on a consistent basis [28,29]. The reasons for this are that highly educated nursing interns are often expected to perform well in clinical work among colleagues and leaders, invariably subjecting them to more psychological pressure than their peers (Duchscher & Windey, 2018; [42]). The fact that highly educated nursing interns are engaged in the same basic clinical nursing work as undergraduate and college-educated nurses will also be questioned by their peers. As nursing managers, training programmes can be developed to suit those intern' needs and help them successfully overcome transition shock.

Future time perspective helps individuals better face the future and provides them with the intrinsic motivation to set goals, make plans and put them into action, which in turn has an impact on their development [50]. That is, nursing interns with higher levels of future time perspective experience less transition shock [5]. In this study, the correlation between future time perspective and transition shock lacked statistical significance ($p > 0.05$), but the correlations between future purpose consciousness, far-reaching goal orientation, future efficacy, and behavioural commitment were statistically significant ($p < 0.01$) and negatively correlated with transition shock.

In this study, nursing interns' professional self-concept showed the highest scores for communication (2.92 ± 0.42) and leadership (2.90 ± 0.51) and the lowest scores for skills (2.64 ± 0.39) and flexibility (2.68 ± 0.44). The internship period is a critical time for nursing students to develop professional competence and professional attitudes. Good communication is not only important for nursing students to establish good interpersonal relationships and carry out normal nursing work in hospital settings but also reduces negative experiences among patients during their hospital stay. Conversely, inadequate communication might detract from nursing interns' sense of professionalism and the standard of nursing care [30,31]. A related study [32] suggests that having leadership skills is important to nursing practice and that improving leadership training for nurses can facilitate the development of their professional self-concept, thereby reducing the number of nurses leaving the profession [33]. Some nursing students, after being exposed to nursing work, believe that nurses have heavy workloads, low social status, and low earnings and experience tensions with other nurses and patients, which compromises their professional beliefs [48]. Nursing education in China has not historically paid careful attention to the "strengthening of leadership awareness and the development of leadership skills" of young nurses [34]. If we can learn from foreign concepts [32,35], emphasize the development of nurses' care and communication skills while focusing on strengthening their leadership awareness, develop nurses' leadership training, provide practical opportunities for young nurses and nurses at all levels to assume leadership roles, and provide encouragement and recognition, this will help nursing interns reduce their levels of transition shock.

The professional identity of nursing interns was found to be at an intermediate level (3.65 ± 0.64), with the highest score being reported for occupational self-concept (3.77 ± 0.70), indicating that only by constructing a strong occupational self-concept can nursing interns effectively improve their professional identity. The low scores on "job retention benefits and resignation risks" (3.59 ± 0.70) may be due to nursing interns with different qualifications being assigned to the same job, which does not meet the different learning needs of nursing interns with different qualifications; "social comparison and self-reflection" scores are low (3.46 ± 0.65), and professional identity is formed by comparing the social evaluation of one's own profession to those of other professions. Nursing interns often tend to compare themselves to the doctors with whom they work closely, focusing too much on the strengths of physicians and the weaknesses of the nursing profession: by paying less attention to drawbacks of being a physician (e.g., demanding employment conditions, greater career risks than those of nursing, etc.), thus reducing their sense of professional identity [34].

The professional self-concept is a predictor of transition shock (Table 4, $\beta = 0.226$, $p < 0.001$) in this study. Li highlighted the moderating role that master's degree nurses' professional self-concept plays in their job happiness and intents to leave the field [36]. It is advised that hospitals and nursing managers start from professional self-concept, pay attention to the work experiences of nursing interns, give full play to their work strengths and potential, and promote the realization of their professional values, increasing their willingness to remain in the profession, enriching the nursing workforce and promoting the sustainable development of the nursing profession.

The results of this investigation indicate that hospitals and schools should not restrict the development of nursing interns' other competencies while improving their professional skills and focus on the psychological state of nursing interns. On the one hand, schools and hospitals should promote the cultivation of nursing interns' professional interests and improve their professional awareness and professional identity [37]. At the same time, schools and hospitals can increase awareness among teachers and clinical supervisors of the psychological state of nursing interns through psychological guidance training. Educators can also provide relevant courses or encourage nursing interns to watch videos related to positive psychology [38] to clarify the development prospects of the nursing profession, inspire the potential strengths of nursing interns, encourage them to face adversities positively, improve their psychological resilience, and enhance their sense of professional experience. It ultimately enhances patients' perceptions of their professional selves, strengthening nursing interns' sense of self, and lessens transition shock.

4.1. Limitations

There are several restrictions on this study. First, because our survey was cross-sectional, it was not possible to determine the causal relationships between the variables. As a result, a longitudinal study should be planned to investigate the connections between nursing interns' transition shock, future time perspective, professional self-concept, and professional identity. Second, the study's convenience sampling strategy might have limited how far the findings might be applied. Third, to guarantee the accuracy of the data supplied and the nursing interns' genuine self-evaluation, an online survey and anonymous submission were employed. Unfortunately, it was not possible to verify the validity of the questionnaire results, which might have had an impact on the study's findings.

5. Conclusion

This study found nursing interns' professional identity to be directly related to the level of transition shock experienced by nursing interns. It is particularly important to develop the professional self-concept of nursing interns with regard to their professional identity. A correlation between future time perspective and transition shocks was not found in this study. However, future purpose consciousness, far-reaching goal orientation, future efficacy, and behavioural commitment were found to be related to the level of transition shock among nursing interns. This result emphasizes the significance and importance of learning and clinical leadership to developing future purpose consciousness, far-reaching goal orientation, future efficacy, and behavioural commitment in nursing students. During the school year, teachers should organize more lectures delivered by successful nursing clinicians to cultivate the professional identity of nursing students. During clinical practice, teachers should set a good example for nursing interns, and hospitals should organize more communication with students to improve the professional identity of nursing interns and reduce the transition shock of such interns.

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Data availability statement

All data generated or analyzed during this study are included in this published article and its supplementary information files.

CRediT authorship contribution statement

Ziwei Ding: Writing – review & editing, Writing – original draft, Software, Methodology, Data curation, Conceptualization. **Huiting Weng:** Writing – review & editing, Writing – original draft, Methodology, Data curation, Conceptualization. **Li Yang:** Software, Investigation. **Bo Zhang:** Software, Investigation, Formal analysis. **Yuanyuan Luo:** Software, Formal analysis. **Qin Wang:** Writing – review & editing, Project administration, Methodology, Conceptualization.

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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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2024.e26207>.

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