

Level and influencing factors of transition shock among new nurses in China: A multicenter cross-sectional study

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Abstract

Background and Aims: New nurses are an important part of nursing teams. The failure of new nurses to successfully transition seriously affects personal career development and nursing work quality, and important influencing factors deserve the attention of nursing managers. At present, multicenter, large-sample investigations of transition shock among new nurses are lacking in China. This study aims to investigate the current level and influencing factors of transition shock among new nurses in China.

Methods: We conducted a multicenter, cross-sectional study with 3414 new nurses from 16 provinces in 7 regions in China from October 22, 2021, to November 8, 2021. We used the snowball sampling method and an online questionnaire produced by the researchers to collect data; the questionnaire included questions on demographic information, a transition shock scale for new nurses and open-ended questions. Data were analyzed using SPSS version 24.

Results: The effective response rate of this study was 97.89%, with 3342 effective participants from 189 hospitals in China, most of whom were female (94.88%). The study showed that the transition shock of new nurses in China was at a moderate level, with pre-job anxiety, unsatisfactory welfare treatment, resignation intention, adverse events, poor sleep quality, 1 or fewer exercise sessions per week, inability to balance work and life, and gluttony negatively affecting the transition shock of new nurses in China. Psychological shock was the strongest among the four dimensions of transition shock.

Conclusions: The transition shock of new nurses, especially their psychological shock, deserves more attention from international society. Nursing managers should continue to take supportive measures to intervene in the factors influencing transition shock, with the aim of reducing the level of transition for new nurses, promoting their personal thriving, improving the quality of nursing work and increasing the retention rate of nurses.

KEYWORDS

China, influencing factor, new nurses, nurse retention, psychological shock, survey, transition shock

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1 | INTRODUCTION

Nurses play a vital role in promoting health equity and medical care,¹ and as defenders of patients working in many different types of health-care settings, nurses have the ability to work with other health professionals to promote health equity for all citizens.² One of the major challenges affecting the achievement of health equity is the global shortage of nurses paired with the increasing demand for nurses in all countries.³ It is estimated that 40% of active nurses will retire from clinical positions by 2023. To fill these vacancies in the nursing field, approximately 12.9 million new nurses will be needed in the clinical environment to maintain the development of nursing care and promote high-quality health care.⁴ The attrition rate of new nurses worldwide is reported to be between 24.5% and 70%.⁵ In China, the number of new nurses needed is expected to increase due to the increasing willingness of nurses to leave.⁶ Zhang et al found that the shortage of nurses, the outflow of young nurses and the uneven distribution of nursing staff in the country are fundamental challenges to the reform of nursing care. Cultivating and retaining more qualified new nurses deserves attention.¹

Due to sudden changes in roles, new nurses generally experience transition shock. Transition shock has attracted much attention because of its impact on the quality of clinical nursing and the turnover rate of new nurses. Duchscher et al conducted a 10-year clinical study, synthesized four qualitative studies, and described how new nurses cope with shock related to physical, psychological, knowledge and skills, and social development during clinical practice. The authors then proposed the concept of transition shock, which refers to the feeling and experience of confusion, puzzlement, doubt, and uncertainty caused by the influence of roles, relationships, knowledge, and responsibilities when an individual transitions from a known role to an unfamiliar role. Transition shock hinders new nurses' fit with the high-pressure, highly challenging professional practice environment.⁷ Chinese scholar Wang et al also indicated that after new nurses enter clinical practice, they have adverse psychological reactions, such as experiencing nervous psychological emotions, persistent anxiety, and intermittent confusion, in response to various realistic shock. Persistent psychological disorders even affect their life and work, resulting in decreased sleep quality, decreased self-efficacy and increased nursing errors, which seriously hinder their transition into their new roles.⁶ Transition shock is common among new nurses and is considered a difficult problem by nursing managers. Labrague et al surveyed 176 new nurses in the central Philippines about transition shock and suggested that organizations need to ensure that new nurses achieve work-life balance and are well prepared for work, which may reduce the incidence of errors during care and adverse events.⁸ For new nurses, stressors during the transition period may include a lack of clinical skills, a fear of making mistakes, increased responsibilities, and insufficient guidance. Tastan et al investigated the factors influencing the transition period of 234 new nurses in Turkey. They found that almost half of the interviewees experienced disappointment in the first year of their professional career, 54.7% intended to leave their

job, and 58.73% indicated that their job expectations were met through the guidance of senior nurses; the latter finding indicated that the new nurses had difficulties in the role transition period, but the assistance of experienced nurses helped during this period. To improve the job quality and satisfaction of new nurses, support programs should be implemented.⁹ Implementing support programs during the transition period is worthy of consideration. Kim et al found that the factors influencing transition shock included self-efficacy, job satisfaction, job stress and structural power. Fear, excessive workload, excessive role expectations and emotional difficulties caused by bullying were all identified as obstacles. Promoting factors included new nurses' self-confidence, interaction with colleagues, a positive and supportive work environment, and a stage transition plan. Strengthening organizational factors (structural empowerment, stage transition planning) and enhancing individual factors (self-efficacy, confidence, interaction) are crucial for the successful transition of new nurses to professional roles.⁵

Scholars in China have found that the transition shock of new nurses is at a moderate to high level, and the influencing factors explored in each study have been different.^{10,11} However, there is currently a lack of multicenter, large-sample survey research on this topic in China. Therefore, our research questions and purpose are to investigate the current level of transition shock of new nurses in China, analyze the influencing factors and provide a reference for nursing managers in a multicenter context.

2 | METHODS

2.1 | Research design and study population

A multicenter, cross-sectional study design was used. Participants were registered nurses who had worked in China for 5 years or less. The inclusion criteria were as follows: registered nurses who volunteered to participate in the study, who had worked as nurses for less than or equal to 5 years, and who were 18 years or older. The exclusion criteria were as follows: nurses who were unable to use mobile phones to complete the survey or who were not in their hospital during the investigation period (those who left for further education or vacation).

2.2 | Operational definitions

At present, there is no unified definition of "new nurses," but nurses who have worked for 1 year, 1–3 years, or 5 years or less have been mentioned. New nurses are also called novice nurses or junior nurses. Due to their short tenure, insufficient work experience, and insufficient knowledge and operational skills, they have not adapted to the role of clinical nurses and are prone to transition shock. Nurses who have been working in China for 5 years or less are the focus of the attention of nursing managers, and they must receive a variety of training at the department level and hospital level to ensure the

quality of their clinical nursing work and patient safety. One study compared the turnover rates of nurses with 5 years of service and those with 1 year of service and found that the former group had a higher turnover rate,⁴ that they were an important reserve of talent, and that it was worth the manager's efforts to retain them in clinical practice. Therefore, this study defines new nurses as nurses with a tenure of 5 years or less limits the working life of new nurses to within 5 years. Transition shock refers to the feeling and experience of confusion, puzzlement, doubt, and uncertainty caused by the influence of roles, relationships, knowledge, and responsibilities when an individual changes from a known role to an unfamiliar one.⁷ The dependent variable of this study was the level of new nurses' transition shock, and the independent variables included 32 socio-demographic items, such as gender, age, and educational background (see Table 1 for details).

2.3 | Study setting and period

This multicenter, cross-sectional study was conducted from October 22, 2021, to November 8, 2021, in 16 provinces in China (Gansu, Guangdong, Guangxi, Guizhou, Hebei, Liaoning, Inner Mongolia, Shandong, Shaanxi, Sichuan, Tibet, Xinjiang, Yunnan, Zhejiang, Chongqing, and Hubei), covering 7 regions: Northwest China, South China, Southwest China, North China, Northeast China, East China, and Central China. China has a total of 34 provincial-level administrative regions (including 23 provinces, 5 autonomous regions, 4 municipalities, and 2 special administrative regions), which can be divided into the seven regions examined in this study.

2.4 | Sample size and sampling method

The sample size was mostly based on the requirements for statistical variable analysis; the sample size was calculated as at least 5–10 times the number of variables.^{12,13} Our literature review indicated that there are approximately 32 sociodemographic variables that may affect the transition shock of new nurses; see Table 1 for details. In addition, the transition shock scale for new nurses used in this study includes 4 dimensions, so the predicted sample size was 180 to 360 individuals based on 36 variables, considering a 10% invalid sample size, the final sample size is 198 to 396. This study was conducted in multiple centers, so a snowball sampling method was used.

2.5 | Data collection procedures and measurements

The online structured questionnaire developed by our research team was adopted for data collection, and the scope of the dissemination of the questionnaire was expanded using the WeChat social platform and the snowball sampling method. After reading the background and purpose of the study online and signing the online informed consent

form, participants accessed the answer screen; if participants did not sign the informed consent form, they did not access the questionnaire and ended their participation.

The questionnaire consisted of three parts. First, the questionnaire included a general information questionnaire, including demographic data, such as gender, age, marital status, work department, and education level. The second component of the questionnaire was a transition shock scale for new nurses. Chinese scholars Xue et al used Duchscher's theory of transition shock as a conceptual framework, and after expert evaluation, pretesting, and large sample testing, they developed a formal scale with 27 items in four dimensions: the physical aspect, psychological aspect, knowledge and skills aspect, and social development aspect.¹⁴ This transition shock scale for new nurses uses a Likert 5-level scoring method, with one indicating complete noncompliance and five indicating complete compliance, with a total score of 135 points. The higher the score is, the greater the level of transition shock of new nurses. The language of the scale is Chinese. The author authorized the use of the scale by our research group. The Cronbach's α of this scale was 0.918. We retested the reliability and validity of the scale, and the results showed that the Cronbach's α was 0.959, the KMO value was 0.964, and Bartlett's χ^2 was 64,023.036. This scale has good reliability and validity. Finally, the third component of the questionnaire was a series of open-ended questions: (1) What were your concerns during the period of transition shock? (2) What are your suggestions for training new nurses? (3) Please describe the driving and hindering factors during your transition period.

2.6 | Data quality assurance

To ensure the data quality, each WeChat user was limited to filling in the questionnaire once, and questionnaires that were completed too quickly (a completion time less than 1 min) were deleted. The questionnaire could be submitted only after all the items had been answered. Finally, questionnaires with missing items and sets of similar invalid questionnaires were deleted.

2.7 | Statistical methods

Data were analyzed using SPSS version 24. For the quantitative variables, the mean and standard deviation were determined. For the categorical variables, the quantity and percentage were calculated, an independent sample *t* test was used to make comparisons between two groups, comparisons between groups were made using analysis of the variance, and post hoc pairwise comparisons were conducted using the *SNK-q* test. The step-up method was used to screen variables. Variables with $p < 0.05$ in the single-factor analyses were included in the multivariable regression model. Finally, the factors affecting the transition shock of new nurses were analyzed based on the multivariable regression model. A bilateral $p < 0.05$ was considered statistically significant.

TABLE 1 Demographic characteristics and scores of transition shock (N = 3342).

Variable	n (%)	Label	Transition shock					Total score
			Physiological	Psychological	Knowledge and skills	Social development		
Gender	171 (5.12)	Male	20.08 ± 5.87	23.17 ± 7.9	14.81 ± 4.59	22.65 ± 8.09	80.7 ± 23.56	
	3171 (94.88)	Female	21.99 ± 5.4	25.22 ± 7.81	15.02 ± 4.59	22.51 ± 7.65	84.74 ± 22.44	
		t (p Value)	4.492 (<0.001)***	3.335 (0.001)**	0.594 (0.553)	0.228 (0.819)	2.284 (0.022)*	
Age	1832 (54.82)	≤25	21.48 ± 5.48	24.78 ± 7.67	15.09 ± 4.57	22.12 ± 7.7	83.46 ± 22.51	
	1510 (45.18)	>25	22.39 ± 5.35	25.52 ± 7.99	14.91 ± 4.61	23.01 ± 7.62	85.83 ± 22.47	
		t (p Value)	4.805 (<0.001)***	2.733 (0.006)**	1.09 (0.276)	3.343 (0.001)**	3.025 (0.003)**	
Is the only child in the family	955 (28.58)	Yes	21.89 ± 5.42	24.64 ± 7.89	14.7 ± 4.62	22.23 ± 7.83	83.46 ± 22.66	
	2387 (71.42)	No	21.89 ± 5.45	25.3 ± 7.79	15.13 ± 4.57	22.64 ± 7.61	84.96 ± 22.45	
		t (p Value)	<0.001 (>0.99)	2.192 (0.028)*	2.468 (0.014)*	1.398 (0.162)	1.741 (0.082)	
Same hometown as city of work	2534 (75.82)	Yes	21.84 ± 5.54	25.02 ± 7.91	14.91 ± 4.61	22.4 ± 7.75	84.17 ± 22.87	
	808 (24.18)	No	22.06 ± 5.11	25.41 ± 7.55	15.32 ± 4.5	22.88 ± 7.44	85.67 ± 21.33	
		t (p Value)	1.069 (0.285)	1.247 (0.213)	2.203 (0.028)*	1.522 (0.128)	1.709 (0.088)	
Marital status	1052 (31.48)	Married	22.37 ± 5.43	25.65 ± 8.18	15.08 ± 4.75	22.95 ± 7.99	86.04 ± 23.3	
	2290 (68.52)	Unmarried	21.67 ± 5.43	24.86 ± 7.65	14.98 ± 4.51	22.32 ± 7.52	83.84 ± 22.12	
		t (p Value)	3.419 (0.001)**	2.628 (0.009)**	0.57 (0.569)	2.139 (0.033)*	2.576 (0.01)*	
Having children	659 (62.64)	Yes	22.27 ± 5.49	25.88 ± 8.33	15.1 ± 4.89	22.94 ± 8.06	86.18 ± 23.87	
	393 (37.36)	No	22.53 ± 5.33	25.27 ± 7.91	15.04 ± 4.53	22.96 ± 7.87	85.8 ± 22.34	
		t (p Value)	0.757 (0.449)	1.168 (0.243)	0.183 (0.855)	0.039 (0.969)	0.257 (0.797)	
Education background	1699 (50.84)	Junior college degree	21.74 ± 5.45 ^c	25.06 ± 7.71	15.05 ± 4.59	22.29 ± 7.74	84.15 ± 22.54	
	1602 (47.94)	Bachelor degree	22.09 ± 5.42 ^c	25.2 ± 7.96	14.97 ± 4.6	22.75 ± 7.63	85.02 ± 22.54	
	41 (1.23)	Graduate degree	20.32 ± 5.57 ^{a,b}	23.39 ± 7.31	14.93 ± 4.15	22.71 ± 6.61	81.34 ± 20.75	
	F (p Value)	3.421 (0.033)*	1.137 (0.321)	0.112 (0.894)	1.492 (0.225)	1.038 (0.354)		
Hospital level	1665 (49.82)	Tertiary	21.81 ± 5.47	24.61 ± 7.75 ^c	14.85 ± 4.65	22.16 ± 7.69 ^c	83.42 ± 22.5 ^c	
	1578 (47.22)	second level	21.92 ± 5.44	25.54 ± 7.9	15.14 ± 4.57	22.77 ± 7.69 ^c	85.37 ± 22.64 ^c	
	99 (2.96)	other	22.77 ± 4.89	26.81 ± 7.47 ^a	15.63 ± 3.54	24.6 ± 6.73 ^{a,b}	89.8 ± 19.55 ^{a,b}	
	F (p Value)	1.491 (0.225)	8.163 (<0.001)***	2.643 (0.071)	6.356 (0.002)**	5.859 (0.003)**		

TABLE 1 (Continued)

Variable	n (%)	Label	Transition shock					Total score
			Physiological	Psychological	Knowledge and skills	Social development		
Geographical location of the hospital	1660 (49.67)	Urban	21.42 ± 5.49	24.16 ± 7.66	14.59 ± 4.55	21.72 ± 7.57	81.88 ± 22.22	
	1682 (50.33)	Rural	22.36 ± 5.35	26.05 ± 7.88	15.43 ± 4.59	23.31 ± 7.69	87.14 ± 22.51	
		t (p Value)	5.031 (<0.001) ^{***}	7.043 (<0.001) ^{***}	5.304 (<0.001) ^{***}	6.004 (<0.001) ^{***}	6.799 (<0.001) ^{***}	
Prejob training	3063 (91.65)	Yes	21.79 ± 5.44	24.9 ± 7.8	14.87 ± 4.57	22.22 ± 7.62	83.78 ± 22.41	
	279 (8.35)	No	22.99 ± 5.28	27.43 ± 7.72	16.57 ± 4.54	25.78 ± 7.52	92.77 ± 22.05	
		t (p Value)	3.54 (<0.001) ^{***}	5.182 (<0.001) ^{***}	5.964 (<0.001) ^{***}	7.479 (<0.001) ^{***}	6.423 (<0.001) ^{***}	
Prejob anxiety	2326 (69.6)	Yes	22.99 ± 4.84	27.05 ± 7.2	16.02 ± 4.32	24.21 ± 7.19	90.27 ± 20.29	
	1016 (30.4)	No	19.37 ± 5.89	20.68 ± 7.4	12.7 ± 4.33	18.65 ± 7.33	71.39 ± 21.85	
		t (p Value)	17.21 (<0.001) ^{***}	23.337 (<0.001) ^{***}	20.431 (<0.001) ^{***}	20.451 (<0.001) ^{***}	23.466 (<0.001) ^{***}	
Continuing education	3121 (93.39)	Yes	21.82 ± 5.43	24.99 ± 7.79	14.94 ± 4.56	22.29 ± 7.61	84.04 ± 22.38	
	221 (6.61)	No	22.94 ± 5.51	26.8 ± 8.2	16.05 ± 4.83	25.7 ± 7.86	91.48 ± 23.35	
		t (p Value)	2.96 (0.003) ^{**}	3.318 (0.001) ^{**}	3.493 (<0.001) ^{***}	6.409 (<0.001) ^{***}	4.763 (<0.001) ^{***}	
Work department	1158 (34.65)	Internal department	22.42 ± 5.19 ^{g,h}	25.55 ± 7.76	15.11 ± 4.56	22.85 ± 7.69	85.93 ± 22.2 ^h	
	850 (25.43)	Surgical department	22.08 ± 5.41 ^h	25.31 ± 7.84	15.27 ± 4.61	22.7 ± 7.66	85.36 ± 22.41 ^h	
	222 (6.64)	Obstetrics and Gynecology Department	22.54 ± 5.47 ^{g,h}	25.33 ± 8.07	14.53 ± 4.72 ^f	22.77 ± 7.99	85.17 ± 23.5 ^h	
Pediatrics	136 (4.07)		22.7 ± 5.65 ^{g,h}	26.23 ± 7.82 ^h	15.4 ± 4.76	23.53 ± 8.07 ^h	87.86 ± 22.88 ^h	
	171 (5.12)	Emergency Department	21.77 ± 5.68 ^h	24.87 ± 8.06	14.57 ± 4.49 ^f	22.14 ± 7.29	83.35 ± 22.21	
	133 (3.98)	ICU	22.32 ± 5.19 ^{g,h}	25.61 ± 7.38	15.98 ± 4.28 ^{c,e,h}	23.4 ± 7.44 ^h	87.3 ± 21.19 ^h	
Operation room	161 (4.82)		20.94 ± 5.3 ^{a,c,d,f}	24.06 ± 7.61	14.94 ± 4.5	22.28 ± 7.49	82.23 ± 22.24	
	511 (15.29)	Others	20.11 ± 5.61 ^{a,b,c,d,e,f}	23.68 ± 7.78 ^d	14.38 ± 4.56 ^f	21.06 ± 7.51 ^{d,f}	79.23 ± 22.63 ^{a,b,c,d,f}	
		F (p Value)	11.463 (<0.001) ^{***}	4.001 (<0.001) ^{***}	3.445 (0.001) ^{**}	3.736 (<0.001) ^{***}	5.959 (<0.001) ^{***}	
Perceived human resource adequacy	2469 (73.88)	Yes	21.06 ± 5.56	23.96 ± 7.77	14.42 ± 4.58	20.91 ± 7.38	80.35 ± 22.32	
	873 (26.12)	No	24.25 ± 4.27	28.36 ± 7.04	16.68 ± 4.2	27.08 ± 6.57	96.36 ± 18.51	
		t (p Value)	17.451 (<0.001) ^{***}	15.442 (<0.001) ^{***}	13.353 (<0.001) ^{***}	23.064 (<0.001) ^{***}	20.78 (<0.001) ^{***}	

(Continues)

TABLE 1 (Continued)

Variable	n (%)	Label	Transition shock					Total score
			Physiological	Psychological	Knowledge and skills	Social development		
Working years								
Less than 1 year	559 (16.73)	[a]	20.18 ± 5.48 ^{b,c,d}	23.92 ± 7.37 ^{b,c,d}	15.55 ± 4.55 ^{b,c}	21.14 ± 7.46 ^{b,c,d}	80.79 ± 22.19 ^{b,c,d}	
1–3 years	1442 (43.15)	[b]	21.81 ± 5.47 ^{a,c,d}	24.92 ± 7.75 ^{a,d}	14.97 ± 4.61 ^a	22.36 ± 7.75 ^{a,d}	84.05 ± 22.61 ^{a,d}	
3–5 years	892 (26.69)	[c]	22.5 ± 5.24 ^{a,b,d}	25.3 ± 8.05 ^{a,d}	14.57 ± 4.51 ^{a,d}	22.88 ± 7.67 ^{a,d}	85.25 ± 22.35 ^{a,d}	
5 years	449 (13.44)	[d]	23.09 ± 5.15 ^{a,b,c}	26.82 ± 7.88 ^{a,b,c}	15.33 ± 4.64 ^c	24.04 ± 7.39 ^{a,b,c}	89.27 ± 22.11 ^{a,b,c}	
F (p Value)			30.408 (<0.001) ^{***}	12.033 (<0.001) ^{***}	6.094 (<0.001) ^{***}	12.862 (<0.001) ^{***}	12.426 (<0.001) ^{***}	
Employment type								
Authorized strength	211 (6.31)		21.74 ± 5.77	24.79 ± 7.89	15.5 ± 4.7	23.18 ± 7.3	85.21 ± 23.09	
Contract system	3131 (93.69)		21.9 ± 5.42	25.13 ± 7.82	14.98 ± 4.58	22.47 ± 7.7	84.48 ± 22.48	
t (p Value)			0.406 (0.685)	0.621 (0.535)	1.612 (0.107)	1.285 (0.199)	0.452 (0.651)	
Technical title								
primary	3249 (97.22)		21.88 ± 5.44	25.08 ± 7.82	15 ± 4.58	22.48 ± 7.68	84.45 ± 22.5	
Intermediate and above	93 (2.78)		22.22 ± 5.56	26.2 ± 8.08	15.22 ± 4.77	23.76 ± 7.39	87.4 ± 23.04	
t (p Value)			0.582 (0.56)	1.367 (0.172)	0.437 (0.662)	1.587 (0.113)	1.246 (0.213)	
Having a working post								
Yes	3178 (95.09)		21.92 ± 5.42	25.15 ± 7.82	15.02 ± 4.59	22.58 ± 7.67	84.68 ± 22.48	
No	164 (4.91)		21.3 ± 5.76	24.31 ± 7.91	14.73 ± 4.49	21.32 ± 7.74	81.66 ± 23.01	
t (p Value)			1.43 (0.153)	1.342 (0.18)	0.796 (0.426)	2.047 (0.041) [*]	1.672 (0.095)	
Night shift frequency								
Not on night shift	539 (16.13)	[a]	20.11 ± 5.81 ^{b,c,d}	23.99 ± 8 ^c	15.1 ± 4.88	21.53 ± 7.62 ^c	80.72 ± 23.52 ^c	
1 time per week	1190 (35.61)	[b]	21.47 ± 5.45 ^{a,c}	24.42 ± 7.73 ^c	14.64 ± 4.5 ^c	21.63 ± 7.7 ^c	82.15 ± 22.52 ^c	
2 times per week and above	1216 (36.39)	[c]	23.23 ± 4.96 ^{a,b,d}	26.38 ± 7.77 ^{a,b,d}	15.37 ± 4.58 ^b	24.03 ± 7.55 ^{a,b,d}	89.01 ± 21.67 ^{a,b,d}	
Other frequencies	397 (11.88)	[d]	21.46 ± 5.36 ^{a,c}	24.82 ± 7.53 ^c	14.92 ± 4.39	21.91 ± 7.34 ^c	83.11 ± 21.49 ^c	
F (p Value)			49.104 (<0.001) ^{***}	17.91 (<0.001) ^{***}	5.199 (0.001) ^{**}	25.482 (<0.001) ^{***}	26.71 (<0.001) ^{***}	
Monthly income (CNY)								
<3000	509 (15.23)	[a]	20.89 ± 5.78 ^{b,c,d}	25.11 ± 8.15	15.74 ± 4.78 ^{b,c,d}	22.62 ± 8.14	84.36 ± 24.14	
3000–5000	1487 (44.49)	[b]	22.01 ± 5.43 ^a	25.3 ± 7.83	15.02 ± 4.57 ^{a,d}	22.63 ± 7.88	84.96 ± 22.63	
5000–10000	1217 (36.42)	[c]	22.18 ± 5.27 ^a	25.06 ± 7.74	14.82 ± 4.53 ^{a,d}	22.47 ± 7.29	84.53 ± 21.91	
≥10000	129 (3.86)	[d]	21.7 ± 5.3 ^a	23.47 ± 7.18	13.85 ± 4.09 ^{a,b,c}	21.22 ± 6.92	80.23 ± 19.91	
F (p Value)			7.264 (<0.001) ^{***}	2.197 (0.086)	7.828 (<0.001) ^{***}	1.396 (0.242)	1.759 (0.153)	
Welfare treatment								
Dissatisfied	635 (19.00)	[a]	24.34 ± 4.79 ^{b,c}	28.67 ± 7.87 ^{b,c}	16.75 ± 4.7 ^{b,c}	27.61 ± 7.15 ^{b,c}	97.37 ± 21.19 ^{b,c}	
Neutral	1703 (50.96)	[b]	22.26 ± 4.96 ^{a,c}	25.72 ± 7.24 ^{b,c}	15.32 ± 4.32 ^{a,c}	23.19 ± 6.88 ^{a,c}	86.49 ± 20.19 ^{a,c}	
Be satisfied	1004 (30.04)	[c]	19.72 ± 5.8 ^{a,b}	21.83 ± 7.52 ^{a,b}	13.38 ± 4.45 ^{a,b}	18.16 ± 6.88 ^{a,b}	73.08 ± 21.71 ^{a,b}	
F (p Value)			162.654 (<0.001) ^{***}	175.754 (<0.001) ^{***}	120.958 (<0.001) ^{***}	378.39 (<0.001) ^{***}	279.32 (<0.001) ^{***}	

TABLE 1 (Continued)

Variable	n (%)	Label	Transition shock					Total score
			Physiological	Psychological	Knowledge and skills	Social development		
Rest satisfaction	446 (13.35)	[a]	25.32 ± 4.19 ^{b,c}	29.75 ± 7.42 ^{b,c}	17.18 ± 4.6 ^{b,c}	28.86 ± 6.88 ^{b,c}	101.1 ± 19.78 ^{b,c}	
	1426 (42.67)	[b]	22.91 ± 4.75 ^{a,c}	26.68 ± 7.26 ^{a,c}	15.85 ± 4.27 ^{a,c}	24.42 ± 6.73 ^{a,c}	89.86 ± 19.74 ^{a,c}	
	1470 (43.99)	[c]	19.87 ± 5.61 ^{a,b}	22.18 ± 7.35 ^{ab}	13.54 ± 4.41 ^{ab}	18.75 ± 6.76 ^{ab}	74.33 ± 21.01 ^{ab}	
F (p Value)			246.695 (<0.001)***	240.239 (<0.001)***	163.741 (<0.001)***	480.808 (<0.001)***	382.588 (<0.001)***	
Atmosphere satisfaction	153 (4.58)	[a]	24.95 ± 4.46 ^{b,c}	30.95 ± 7.57 ^{b,c}	17.54 ± 4.98 ^{b,c}	30.54 ± 7.34 ^{b,c}	103.97 ± 20.86 ^{b,c}	
	961 (28.76)	[b]	23.45 ± 4.79 ^{a,c}	27.82 ± 7.29 ^{a,c}	16.28 ± 4.47 ^{a,c}	26.25 ± 6.76 ^{a,c}	93.8 ± 20.18 ^{a,c}	
	2228 (66.67)	[c]	21.01 ± 5.54 ^{a,b}	23.54 ± 7.56 ^{ab}	14.29 ± 4.43 ^{ab}	20.36 ± 7.06 ^{ab}	79.2 ± 21.54 ^{ab}	
F (p Value)			98.576 (<0.001)***	158.334 (<0.001)***	92.05 (<0.001)***	344.917 (<0.001)***	228.376 (<0.001)***	
Resignation intention	1498 (44.84)		24.01 ± 4.51	28.29 ± 7.21	16.46 ± 4.33	27.03 ± 6.45	95.79 ± 19.12	
	1843 (55.16)		20.17 ± 5.53	22.52 ± 7.35	13.83 ± 4.45	18.85 ± 6.56	75.38 ± 20.87	
	t (p Value)		22.08 (<0.001)***	22.766 (<0.001)***	17.237 (<0.001)***	36.087 (<0.001)***	29.451 (<0.001)***	
Adverse event	854 (25.55)		23.52 ± 4.79	27.62 ± 7.19	16.3 ± 4.33	25.41 ± 7	92.85 ± 20.05	
	2488 (74.45)		21.33 ± 5.54	24.25 ± 7.85	14.57 ± 4.59	21.53 ± 7.64	81.67 ± 22.61	
	t (p Value)		11.046 (<0.001)***	11.527 (<0.001)***	9.956 (<0.001)***	13.67 (<0.001)***	13.594 (<0.001)***	
Sleep quality	1126 (33.69)	[a]	24.65 ± 4.21 ^{b,c}	28.87 ± 7.25 ^{b,c}	16.41 ± 4.61 ^{b,c}	25.77 ± 7.31 ^{b,c}	95.71 ± 19.71 ^{b,c}	
	1546 (46.26)	[b]	21.51 ± 4.95 ^{a,c}	24.46 ± 7.07 ^{a,c}	14.81 ± 4.21 ^{a,c}	22.03 ± 7.1 ^{a,c}	82.82 ± 20.23 ^{a,c}	
	670 (20.05)	[c]	18.12 ± 5.84 ^{a,b}	20.29 ± 7.35 ^{ab}	13.1 ± 4.62 ^{ab}	18.17 ± 7.11 ^{ab}	69.69 ± 22.26 ^{ab}	
F (p Value)			379.889 (<0.001)***	310.123 (<0.001)***	120.024 (<0.001)***	242.796 (<0.001)***	348.794 (<0.001)***	
Weekly exercise frequency	≤1 time		22.65 ± 5.05	25.96 ± 7.68	15.45 ± 4.52	23.35 ± 7.53	87.42 ± 21.6	
	>1 time		19.17 ± 5.89	22.06 ± 7.59	13.42 ± 4.47	19.53 ± 7.44	74.18 ± 22.69	
	t (p Value)		14.542 (<0.001)***	12.142 (<0.001)***	10.765 (<0.001)***	12.158 (<0.001)***	14.467 (<0.001)***	
Time of each exercise	<1 h		22.33 ± 5.26	25.62 ± 7.75	15.27 ± 4.57	23.02 ± 7.64	86.24 ± 22.17	
	≥1 h		19.71 ± 5.76	22.58 ± 7.74	13.73 ± 4.47	20.06 ± 7.38	76.08 ± 22.31	
	t (p Value)		9.987 (<0.001)***	8.5 (<0.001)***	7.306 (<0.001)***	8.428 (<0.001)***	9.904 (<0.001)***	

(Continues)

TABLE 1 (Continued)

Variable	n (%)	Label	Transition shock					Total score
			Physiological	Psychological	Knowledge and skills	Social development		
Body mass index (kg/m ²)	<18.5	[^a]	22.24 ± 5.45	25.67 ± 8.09	15.4 ± 4.84	23.07 ± 8.03	86.37 ± 23.43	
	18.5–23.9	[^b]	21.69 ± 5.47	24.74 ± 7.71	14.78 ± 4.48	22.21 ± 7.55	83.42 ± 22.17	
	24–27.9	[^c]	22.42 ± 5.24	26.18 ± 7.78	15.57 ± 4.58	23.23 ± 7.61	87.4 ± 22.1	
	≥28	[^d]	22.17 ± 5	26.25 ± 8.3	15.54 ± 4.83	23.18 ± 7.78	87.14 ± 23.21	
F (p Value)		3.084 (0.026) [*]	5.459 (0.001) ^{**}	5.437 (0.001) ^{**}	3.497 (0.015) [*]	5.48 (0.001) ^{**}		
Balance work and life	Yes	2199 (65.8)	20.55 ± 5.47	22.89 ± 7.35	13.98 ± 4.35	20.26 ± 7.08	77.67 ± 21.1	
	No	1143 (34.2)	24.48 ± 4.34	29.39 ± 6.89	17 ± 4.37	26.86 ± 6.86	97.72 ± 19.03	
	t (p Value)		22.664 (<0.001) ^{***}	25.28 (<0.001) ^{***}	19.007 (<0.001) ^{***}	25.804 (<0.001) ^{***}	27.82 (<0.001) ^{***}	
Psychological consultation	Yes	292 (8.74)	22.23 ± 6.03	26.2 ± 8.06	15.03 ± 4.94	22.33 ± 7.98	85.79 ± 23.86	
	No	3050 (91.26)	21.86 ± 5.38	25.01 ± 7.8	15.01 ± 4.55	22.54 ± 7.64	84.41 ± 22.38	
	t (p Value)		1.013 (0.312)	2.48 (0.013) [*]	0.082 (0.935)	0.434 (0.664)	0.999 (0.318)	
Gluttony	Yes	972 (29.08)	24.36 ± 4.64	29.2 ± 7.26	16.6 ± 4.55	25.68 ± 7.45	95.84 ± 20.33	
	No	2370 (70.92)	20.88 ± 5.42	23.43 ± 7.42	14.36 ± 4.44	21.22 ± 7.38	79.89 ± 21.71	
	t (p Value)		18.746 (<0.001) ^{***}	20.539 (<0.001) ^{***}	13.194 (<0.001) ^{***}	15.794 (<0.001) ^{***}	20.192 (<0.001) ^{***}	

^aCompared with layer 1, $p < 0.05$;^bCompared with layer 2, $p < 0.05$;^cCompared with layer 3, $p < 0.05$;^dCompared with layer 4, $p < 0.05$;^eCompared with layer 5, $p < 0.05$;^fCompared with layer 6, $p < 0.05$;^gCompared with layer 7, $p < 0.05$;^hCompared with layer 8, $p < 0.05$;^{*} $p < 0.05$; ^{**} $p < 0.01$; ^{***} $p < 0.001$.

3 | RESULTS

A total of 3414 new nurses from 189 hospitals in China participated in the study; these nurses represented 16 provinces, including Gansu, Guangdong, Guangxi, Guizhou, Hebei, Liaoning, Inner Mongolia, Shandong, Shaanxi, Sichuan, Tibet, Xinjiang, Yunnan, Zhejiang, Chongqing, and Hubei, covering seven regions, including Northwest, South, Southwest, North, Northeast, East and Central China, as shown in (Figure 1). Seventy-two invalid questionnaires were deleted, while 3342 valid questionnaires were collected, with an effective response rate of 97.89%. Of the participants submitting valid questionnaires, 171 were male (5.12%), and 3171 were female (94.88%); see Table 1 for details. Univariable analysis of the association of sociodemographic characteristics with transition shock showed that new nurses who worked in rural areas, had pre-job anxiety, did not accept pre-job training and continuing education, perceived inadequate human resources, had the intention to resign, experienced adverse events related to patient safety, exercised less than or equal to once a week, exercised less than 1 h, could not balance work and life, and had the habit of gluttony had higher transition shock, and these differences were statistically significant ($p < 0.001$) (Table 1).

As shown in Table 2, the average total transition shock score for the participants was 84.53 ± 22.52 , and in terms of dimension scores, the score for the psychological dimension was the highest (25.11 ± 7.83).

A multivariable regression analysis showed that pre-job anxiety, dissatisfaction with welfare benefits, resignation intention, experience of patient safety adverse events, poor sleep quality, 1 or fewer exercise sessions per week, inability to balance work and life, and the habit of gluttony had adverse effects on physiology, psychology, knowledge and skills, and social development. There were also

specific factors that independently affected these four dimensions. See Table 3 for details.

We used a table format for the text analysis of open questions, which highlighted key information, the concerns of new nurses, suggestions for training, and the hindrance and promotion factors of self-perception during the transition period, as shown in Table 4.

4 | DISCUSSION

The results of this study showed that the transition shock of the 3342 participants was at a moderate level (84.53 ± 22.52), with an average score of 3.02 ± 0.83 for each item, which was basically consistent with the results of some previous studies.^{10,11,15} The transition from student to nurse is often described as challenging. These challenges include the gaps between theoretical knowledge and clinical practice, the expected environment, and the clinical

TABLE 2 Score of each dimension of transition shock ($N = 3342$).

Item	Number of items	Min	Max	Average score	Average score of each item
Physiology	6	6	30	21.89 ± 5.44	3.65 ± 0.91
Psychological	8	8	40	25.11 ± 7.83	3.14 ± 0.99
Knowledge and skills	5	5	25	15.01 ± 4.59	3.00 ± 0.92
Social development	8	8	40	22.52 ± 7.67	2.82 ± 0.96
Total score	27	27	135	84.53 ± 22.52	3.02 ± 0.83

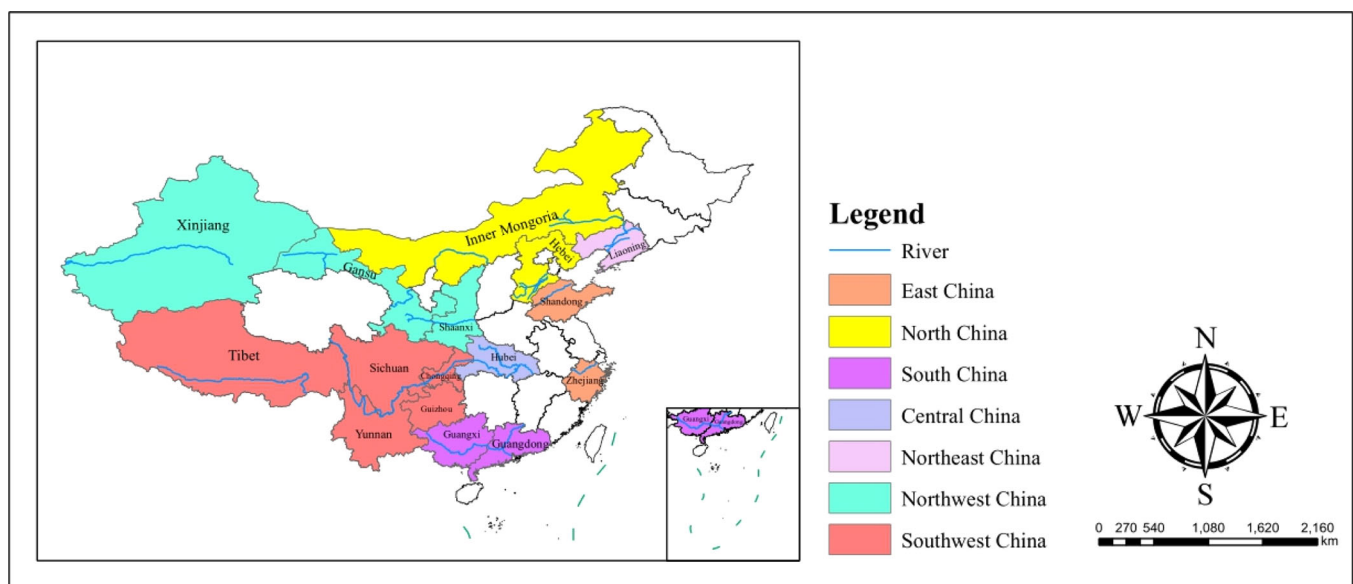


FIGURE 1 Map of the study area (Arcmap 10.8).

TABLE 3 Results of multivariable regression model of the transition shock of new nurses (N = 3342).

Variable		Coefficient	Standard error	Standardized regression coefficient	t	p	VIF
<i>Physiology^a</i>							
	Intercept	12.404	0.37	0	33.482	<0.001	
Prejob anxiety	Yes	1.844	0.173	0.156	10.649	<0.001	1.13
	No	0.0 (Reference)					
Work department	Internal department	0.974	0.24	0.085	4.061	<0.001	2.321
	Surgery	0.985	0.251	0.079	3.924	<0.001	2.126
	Department gynecology and obstetrics	1.071	0.356	0.049	3.006	0.003	1.403
	Pediatrics	1.022	0.425	0.037	2.408	0.016	1.253
	Emergency department	0.54	0.392	0.022	1.378	0.168	1.328
	ICU	0.329	0.435	0.012	0.758	0.449	1.287
	Operating room	0.868	0.397	0.034	2.189	0.029	1.285
	Other	0.0 (Reference)					
Working years	<1 year	0.0 (Reference)					
	1–3 years	0.306	0.239	0.028	1.276	0.202	2.502
	3–5 years	0.669	0.268	0.054	2.496	0.013	2.503
	5 years	1.006	0.304	0.063	3.309	0.001	1.913
Night shift frequency	Not on night shift	0.0 (Reference)					
	1 time per week	0.068	0.244	0.006	0.278	0.781	2.431
	2 times per week and above	0.875	0.249	0.077	3.52	<0.001	2.548
	Other frequencies	0.124	0.298	0.007	0.416	0.677	1.659
Welfare treatment	Dissatisfied	1.148	0.292	0.083	3.925	<0.001	2.34
	Neutral	0.647	0.209	0.059	3.098	0.002	1.94
	Be satisfied	0.0 (Reference)					
Rest satisfaction	Dissatisfied	1.287	0.296	0.081	4.353	<0.001	1.802
	Neutral	0.57	0.195	0.052	2.926	0.003	1.654
	Be satisfied	0.0 (Reference)					
Resignation intention	Yes	0.95	0.183	0.087	5.2	<0.001	1.469
	No	0.0 (Reference)					
Adverse event	Yes	0.38	0.181	0.03	2.098	0.036	1.11
	No	0.0 (Reference)					
Sleep quality	Be poor	3.26	0.242	0.283	13.455	<0.001	2.335
	Neutral	1.841	0.21	0.169	8.778	<0.001	1.948
	Good	0.0 (Reference)					
Weekly exercise frequency	≤1 time	1.531	0.203	0.116	7.527	<0.001	1.257
	>1 time	0.0 (Reference)					
Time of each exercise	<1 h	0.608	0.22	0.042	2.761	0.006	1.211
	≥1 h	0.0 (Reference)					

TABLE 3 (Continued)

Variable		Coefficient	Standard error	Standardized regression coefficient	t	p	VIF
Balance work and life	Yes	0.0 (Reference)					
	No	1.091	0.18	0.095	6.072	<0.001	1.293
gluttony	Yes	1.622	0.174	0.135	9.328	<0.001	1.111
	No	0.0 (Reference)					
<i>Psychology^b</i>							
	Intercept	14.991	0.407	0	36.837	<0.001	0
Geographical location of the hospital	Urban	0.0 (Reference)					
	Rural	0.678	0.215	0.043	3.148	0.002	1.029
Prejob training	Yes	0.0 (Reference)					
	No	0.864	0.391	0.031	2.213	0.027	1.036
Prejob anxiety	Yes	3.772	0.245	0.222	15.423	<0.001	1.123
	No	0.0 (Reference)					
Working years	<1 year	0.0 (Reference)					
	1–3 years	−0.078	0.312	−0.005	−0.249	0.803	2.12
	3–5 years	0.05	0.341	0.003	0.148	0.883	2.02
	5 years	0.941	0.399	0.041	2.359	0.018	1.644
Welfare treatment	Dissatisfied	1.378	0.364	0.069	3.788	<0.001	1.805
	Neutral	0.919	0.268	0.059	3.434	0.001	1.587
	Be satisfied	0.0 (Reference)					
Atmosphere satisfaction	Dissatisfied	2.302	0.546	0.061	4.217	<0.001	1.155
	Neutral	1.109	0.262	0.064	4.24	<0.001	1.243
	Be satisfied	0.0 (Reference)					
Resignation intention	Yes	1.64	0.258	0.104	6.363	<0.001	1.458
	No	0.0 (Reference)					
Adverse event	Yes	1.04	0.253	0.058	4.104	<0.001	1.084
	No	0.0 (Reference)					
Sleep quality	Be poor	3.53	0.339	0.213	10.427	<0.001	2.272
	Neutral	1.768	0.295	0.113	5.993	<0.001	1.92
	Good	0.0 (Reference)					
Weekly exercise frequency	≤1 time	1.304	0.265	0.069	4.913	<0.001	1.066
	>1 time	0.0 (Reference)					
Balance work and life	Yes	0.0 (Reference)					
	No	2.589	0.253	0.157	10.25	<0.001	1.274
gluttony	Yes	3.12	0.246	0.181	12.691	<0.001	1.106
	No	0.0 (Reference)					
<i>Knowledge and skills^c</i>							
Intercept	Intercept	10.022	0.225	0	44.595	<0.001	0
Same hometown as city of work	Yes	0.0 (Reference)					
	No	0.508	0.164	0.047	3.101	0.002	1.032

(Continues)

TABLE 3 (Continued)

Variable		Coefficient	Standard error	Standardized regression coefficient	t	p	VIF
Hospital Geographical location of the hospital	Urban	0.0 (Reference)					
	Rural	0.356	0.142	0.039	2.512	0.012	1.054
Prejob training	Yes	0.0 (Reference)					
	No	0.931	0.252	0.056	3.692	<0.001	1.022
Prejob anxiety	Yes	2.188	0.158	0.219	13.832	<0.001	1.113
	No	0.0 (Reference)					
Welfare treatment	Dissatisfied	0.815	0.252	0.07	3.237	0.001	2.047
	Neutral	0.454	0.185	0.049	2.454	0.014	1.795
	Be satisfied	0.0 (Reference)					
Rest satisfaction	Dissatisfied	0.945	0.269	0.07	3.506	<0.001	1.765
	Neutral	0.685	0.178	0.074	3.842	<0.001	1.636
	Be satisfied	0.0 (Reference)					
Resignation intention	Yes	0.618	0.167	0.067	3.712	<0.001	1.441
	No	0.0 (Reference)					
Adverse event	Yes	0.749	0.163	0.071	4.583	<0.001	1.068
	No	0.0 (Reference)					
Sleep quality	Be poor	0.721	0.22	0.074	3.279	0.001	2.269
	Neutral	0.383	0.192	0.042	1.995	0.046	1.921
	Good	0.0 (Reference)					
Weekly exercise frequency	≤1 time	0.851	0.172	0.077	4.935	<0.001	1.065
	>1 time	0.0 (Reference)					
Balance work and life	Yes	0.0 (Reference)					
	No	1.261	0.165	0.13	7.649	<0.001	1.285
gluttony	Yes	1.02	0.16	0.101	6.391	<0.001	1.104
	No	0.0 (Reference)					
<i>Social development^{t,d}</i>							
Intercept	Intercept	13.059	0.3	0	43.478	<0.001	0
Prejob training	Yes	0.0 (Reference)					
	No	1.35	0.354	0.049	3.811	<0.001	1.025
Prejob anxiety	Yes	2.531	0.222	0.152	11.402	<0.001	1.112
	No	0.0 (Reference)					
Welfare treatment	Dissatisfied	2.429	0.354	0.124	6.853	<0.001	2.059
	Neutral	1.153	0.261	0.075	4.424	<0.001	1.81
	Be satisfied	0.0 (Reference)					
Rest satisfaction	Dissatisfied	2.055	0.395	0.091	5.199	<0.001	1.927
	Neutral	1.189	0.26	0.077	4.581	<0.001	1.757
	Be satisfied	0.0 (Reference)					
Atmosphere satisfaction	Dissatisfied	3.353	0.513	0.091	6.536	<0.001	1.226
	Neutral	1.762	0.249	0.104	7.088	<0.001	1.35

TABLE 3 (Continued)

Variable		Coefficient	Standard error	Standardized regression coefficient	t	p	VIF
Resignation intention	Be satisfied	0.0 (Reference)					
	Yes	3.871	0.236	0.251	16.386	<0.001	1.472
	No	0.0 (Reference)					
Adverse event	Yes	1.33	0.229	0.076	5.797	<0.001	1.068
	No	0.0 (Reference)					
Sleep quality	Be poor	1.455	0.308	0.09	4.721	<0.001	2.264
	Neutral	0.892	0.269	0.058	3.318	0.001	1.917
	Good	0.0 (Reference)					
Weekly exercise frequency	≤1 time	1.104	0.242	0.059	4.562	<0.001	1.065
	>1 time	0.0 (Reference)					
Balance work and life	Yes	0.0 (Reference)					
	No	2.203	0.232	0.136	9.508	<0.001	1.288
gluttony	Yes	1.723	0.224	0.102	7.69	<0.001	1.105
	No	0.0 (Reference)					
<i>Total score^e</i>							
	Intercept	52.609	0.923	0	57.025	<0.001	0
Marital status	Married	1.294	0.627	0.027	2.063	0.039	1.036
	Unmarried	0.0 (Reference)					
Geographical location of the hospital	Urban	0.0 (Reference)					
	Rural	1.259	0.585	0.028	2.154	0.031	1.042
Prejob training	Yes	0.0 (Reference)					
	No	3.357	1.048	0.041	3.203	0.001	1.026
Prejob anxiety	Yes	10.28	0.657	0.21	15.639	<0.001	1.116
	NO	0.0 (Reference)					
Welfare treatment	Dissatisfied	4.819	1.048	0.084	4.596	<0.001	2.063
	Neutral	2.676	0.771	0.059	3.471	0.001	1.812
Rest satisfaction	Be satisfied	0.0 (Reference)					
	Dissatisfied	5.465	1.17	0.083	4.673	<0.001	1.931
	Neutral	3.14	0.768	0.069	4.086	<0.001	1.763
Atmosphere satisfaction	Be satisfied	0.0 (Reference)					
	Dissatisfied	5.987	1.517	0.056	3.947	<0.001	1.227
	Neutral	2.906	0.735	0.058	3.954	<0.001	1.35
Resignation intention	Be satisfied	0.0 (Reference)					
	Yes	7.162	0.698	0.158	10.256	<0.001	1.472
Adverse event	No	0.0 (Reference)					
	Yes	3.636	0.68	0.07	5.347	<0.001	1.074
Sleep quality	No	0.0 (Reference)					
	Be poor	9.026	0.914	0.189	9.879	<0.001	2.277

(Continues)

TABLE 3 (Continued)

Variable		Coefficient	Standard error	Standardized regression coefficient	t	p	VIF
Weekly exercise frequency	Neutral	4.867	0.796	0.108	6.114	<0.001	1.923
	Good	0.0 (Reference)					
	≤1 time	5.022	0.717	0.092	7.007	<0.001	1.069
Balance work and life	>1 time	0.0 (Reference)					
	Yes	0.0 (Reference)					
Gluttony	No	7.061	0.685	0.149	10.304	<0.001	1.29
	Yes	7.623	0.662	0.154	11.507	<0.001	1.105
	No	0.0 (Reference)					

^aModel $F = 379.798$, $p < 0.001$; $R^2 = 0.3715$, adjust $R^2 = 0.366$;

^bModel $F = 613.425$, $p < 0.001$; $R^2 = 0.3886$, adjust $R^2 = 0.3855$;

^cModel $F = 417.494$, $p < 0.001$; $R^2 = 0.2479$, adjust $R^2 = 0.2445$;

^dModel $F = 1302.258$, $p < 0.001$; $R^2 = 0.4705$, adjust $R^2 = 0.4681$;

^eModel $F = 851.850$, $p < 0.001$; $R^2 = 0.463$, adjust $R^2 = 0.4603$.

TABLE 4 Open question analysis (N = 3342).

Question	Response rate	High-frequency keywords	Implication
What was your concern during the transition shock?	2604 (77.92%)	Competence, relationship, ability, pressure, responsibility	Helping nursing managers to understand the true voice of new nurses
What were your suggestions on training new nurses?	1779 (53.23%)	Mentorship, mental health training, mental quality	Helping nursing managers to improve the training program for new nurses
Please describe the driving and hindering factors during your transition period.	2151 (64.36%)	Driving factors: self-confidence, professionalism, career ideal Hindrances factors: high work intensity, poor physical fitness, irregular daily work and rest, lack of sleep, and a large amount of psychological pressure	Helping nursing managers to improve the transition support for new nurses

status of new nurses, and in recent years, nursing managers and educators have gradually realized that the transition that new nurses make has a significant impact on their personal growth and nursing work quality; as such, they continue to carry out standardized and preservice training for nurses. In some regions of China, specialist nurses need 2 years of standardized training before they can enter the workforce, and nurses with bachelor's degrees need 1 year of training before they can enter clinical practice, which may buffer the impact of the transition shock for new nurses. However, training content and programs need to be further enriched and improved, and there is still a gap between China and developed countries. Therefore, the transition shock of the participants in this study was at a moderate level, indicating that attention should be given to transition shock among new nurses in China, and this study found some new and valuable associated factors.

The results of the multivariable regression analysis showed that the common factors affecting the four dimensions of physiology,

psychology, knowledge and skills, and social development included dissatisfaction with welfare benefits, resignation intention, adverse events related to patient safety, poor sleep quality, 1 or fewer exercise sessions per week, inability to balance work and life, and gluttony, which were significant and needed to be noted. These factors could be summarized as nurses' own factors and organizational factors. Ross et al collected information on the physical activity and sitting of 335 nurses in the United States through a cross-sectional network survey. The results showed that more than half of the nurses were overweight (34.1%) or obese (23.4%), and 80.1% were "sedentary" (sitting for more than 3 h a day).¹⁶ Nurses should strive to coordinate work and life, strengthen physical exercise, and balance diet to reduce transition shock. There are few reports about the shock of physical exercise and balanced diet on the role transition of new nurses, so the important findings of this study can be used as a reference. For organizations, transition support programs for new nurses can be carried out with an emphasis on training new nurses,

and medical institutions must invest in programs that recruit and retain high-quality new nurses. Schroyer et al found that a mentor program had an important impact on the growth of new nurses and reduced the resignation rate. The resignation rate of the nurse with the mentor was 25% lower than that of the nurse without the mentor.¹⁷ Chen et al also confirmed the positive role of mentors in the growth of new nurses.^{15,18,19} Based on the answers to the open-ended questions, the participants in this study also advocated the implementation of mentor guidance for new nurses, and developing a new nurse mentorship in the Chinese context is a topic worth studying.

Poor sleep quality, night shift work at least twice a week, and unsatisfactory rest time and compensatory leave mode were also important factors influencing new nurses' physiological shock. There are more night shifts among nurses in China than among those in other parts of the world. A survey of 3,206 nurses in China by Feng et al showed that 55.1% of nurses had poor sleep quality, higher than the result of our study (33.69%). Night shift work was significantly related to poor sleep quality. Night shift nurses have more sleep disorders and physical health problems.²⁰ Kim et al also found that "adequate nurse staffing and resources" had an impact on the transition of nurse roles.²¹ Therefore, nursing managers should ensure an adequate number of night shift nurses and a reasonable shift schedule to ensure the quality of sleep and adequate rest time during the transition period of new nurses. In addition, this study found that the transition shock in the four dimensions of new nurses who experienced patient safety adverse events was higher than that in those who did not experience adverse events. Therefore, new nurses who experience adverse patient safety events should also be a group that is focused on. The results of our study showed that 854 (25.55%) of the new nurses reported adverse events at work. A study by Zhang et al showed that the greatest concern for nurses after adverse events was psychological distress.²² Therefore, it is necessary to evaluate the psychological status of new nurses with patient safety adverse events in a timely manner to reduce psychological shock. At present, there is a lack of adequate information on the impact of patient safety adverse events on the psychological shock of new nurses during the transition period. The results of this study could be used as an important reference. Wang et al found that the proportion of new nurses (work experience \leq 5 years) is an important indicator for predicting patient safety adverse events. This group has limited work experience and cannot be competent at work quickly, which increases the risk of adverse patient safety events.²³ Murray et al found that new nurses' awareness of patient safety and quality problems needs to be improved during the transition period and that questioning their abilities to show growth in their participation in patient safety may cause patient safety adverse events to persist.²⁴ Nurses who have had a patient safety adverse event are also victims; this view is reflected by the second victim phenomenon, which is widely used to describe the suffering of providers, including nurses, in the face of patient safety adverse events, which is often ignored. The survey results of Mok et al. showed that younger and more inexperienced nurses were more likely to experience a greater

second victim response, suggesting that nursing managers pay attention to the feelings of new nurses who have experienced a patient safety adverse event, providing timely and strong organizational support, alleviating the trauma after the adverse event, and promoting reconciliation after the error.²⁵

The results of this study showed that the scores and ranking of the four dimensions of transition shock were as follows: psychology (25.11 ± 7.83) > social development (22.52 ± 7.67) > physiology (21.89 ± 5.44) > knowledge and skills (15.01 ± 4.59). This finding indicated that the psychological shock of the transition period for new nurses is indeed worthy of attention. The study showed that 2326 (69.6%) of the respondents had prejob anxiety, which affected their rapid adaptation to the work environment. Nurses are always in the first line of patient care, and the heavy workload and complex clinical environment increase work pressure. The particularities of the occupation cause nurse to have a higher risk of developing a negative mental state. Poor mental health status is not only harmful to individuals but may also affect clinical work, which in turn affects the quality of care for patients. Spa et al systematically reviewed 13 studies on the mental health of clinical first-line health care workers during the COVID-19 pandemic that included a total of 33,062 participants; they found that the total prevalence of anxiety was 23.2% and that female medical staff and nurses were high-risk groups.²⁶ The COVID-19 pandemic has disrupted global nursing education and practice. The lack of experience of nursing students graduating during a pandemic can increase the likelihood of transition shock, and a multifaceted approach is required to provide support. Nurse leaders should recognize that a new nurse starting practice during a pandemic may have a more complex transition experience than a previous new nurse.^{27,28} Our research was conducted during the COVID-19 pandemic, and 1779 (53.23%) new nurses in our study described in their training suggestions their desire for psychological health training to enhance their psychological quality. Pre-job training should not only focus on theory and skills in China but also pay attention to the psychological problems of new nurses and involve practical, effective, and targeted psychological health training to help new nurses reduce the psychological shock of the transition period. During the COVID-19 pandemic, Chachula et al. conducted art-based activities, including sandtable and statue physical exercises, collages, reflection and theme writing, and group concept mapping, to help new nurses constantly adjust and adapt to the team environment.²⁹ This novel approach is worth learning for Chinese nursing managers.

In addition, the unique factors influencing psychological shock during the transition period of new nurses included a rural area as the hospital location, a length of work of 5 years, and an unsatisfactory organizational atmosphere. This indicated that it is necessary to pay attention to new nurses working in rural hospitals. China is the largest developing country in the world. Compared with urban hospitals, rural hospitals may have even less adequate medical facilities and human resources. Therefore, the psychological transition shock of new nurses in rural hospitals is stronger. The results regarding the length of work showed that compared with participants who worked for less than 1 year, participants with 5 years of work had higher

transition shock, which is similar to the study result of Su et al.¹⁵ but the results were inconsistent with those of Kim et al.³⁰ The different results may be due to the differences in the evaluation scales used and the differences in national conditions and other factors. Our study suggested that psychological shock might persist, and it is necessary to carry out a large population-based study involving international cooperation to verify this result. The organizational atmosphere is also an important factor that affects the psychological shock of new nurses. Studies have proven that positive and friendly cooperative relationships between new nurses and doctors and the humanistic care behavior of nursing managers can help new nurses reduce transition shock, and a harmonious atmosphere has a positive correlation with nurses' well-being.^{21,31,32}

The analysis of the open questions used in this study showed that the promotion factors of the transition period include new nurses' self-confidence, professionalism, and career ideals. Hindrance factors include high work intensity, poor physical fitness, irregular daily work and rest, lack of sleep, and a large amount of psychological pressure. Nurses are critical to achieving the goal of universal health coverage, but there is a risk that newly qualified nurses will leave the care team. The transition from nursing students to qualified nurses is a vulnerable time.³³ Organizations should implement appropriate transition plans that strengthen new nurses' awareness and perception of transition shock, which is critical to improving their ability to provide high-quality care.¹⁸ It is necessary to strengthen the connection between school nursing educators and hospital nursing managers, pay attention to transition shock in new nurses' career development, make new nurses feel the value and significance of their sacred profession, constantly strengthen the construction of nursing teams, and improve the quality of nursing service.

5 | CONCLUSION

Our study analyzed the level of transition shock of 3342 new nurses with 5 years or less of nursing experience in China. Based on the four dimensions of physiology, psychology, knowledge and skills, and social development, we explored the influencing factors of transition shock. Overall, the participants' transition shock was at a moderate level. The common factors influencing the four dimensions included prejob anxiety, unsatisfied welfare benefits, resignation intention, experience of adverse patient safety events, poor sleep quality, exercise frequency less than or equal to one session per week, inability to balance work and life, and gluttony. Notably, compared with the other three aspects of transition shock, psychological transition shock was the strongest; thus, we recommend that an in-depth qualitative study be conducted with new nurses to better understand the barriers to preventing psychological transition shock in new nurses. At the same time, this study also found participants with 5 years of service still experienced transition shock and that their transition shock was even more serious. This finding suggests that attention to the impact of transitioning should not be limited to

nurses newly graduated within the last year, that new nurses with 5 years or less of work experience should be highly valued by nursing managers, and that future studies should expand the number of working years examined to explore whether more senior nurses still have transition shock or role maladjustment. The analysis results of the open questions also showed that new nurses are eager to carry out training in mental health, competency, relationships, ability, pressure, and responsibility. During the transition period, the perceived promotion and hindrance factors could help nursing managers improve transition support for new nurses.

6 | STRENGTHS AND LIMITATIONS

Our study has strengths and limitations worth mentioning. One of the main strengths is that this study focused on new nurses, who are a vulnerable group in nursing teams but are also an important talent reserve force. In addition, the study included 3342 new nurses from 189 hospitals across 17 provinces in China. Furthermore, this was a multicenter, large-sample study covering a wide area in China, and the study also included open questions. Combined with the quantitative survey, the overall study results provide a relatively comprehensive picture of the factors affecting the transition shock of new nurses. Regarding the limitations, first, as a cross-sectional survey, the study could only explain the status. The factors influencing new nurses' transition shock should be verified by longitudinal or experimental studies. In addition, this study used an online questionnaire, and each questionnaire or scale was analyzed according to the results of the self-evaluations of the respondents. There may be recall bias, and the extrapolation of the results has certain limitations.

AUTHOR CONTRIBUTIONS

Lili Yao: Conceptualization; investigation; writing—original draft. **Jie Chen:** Data curation; formal analysis; investigation. **Qinghua Zhao:** Conceptualization; investigation. **Dingqun Bai:** Conceptualization; investigation. **Yuerong Li:** Investigation; methodology. **Mingzhao Xiao:** Methodology; supervision. **Yanhui Du:** Investigation. **Ling Liu:** Conceptualization; funding acquisition; writing—review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

All authors have read and approved the final version of the manuscript, corresponding author had full access to all the data in this study and takes complete responsibility for the integrity of the data and the accuracy of the data analysis. Data are available upon reasonable request. Data can be shared upon reasonable request.

ETHICS STATEMENT

This study was approved by the Ethics Committee of the First Affiliated Hospital of Chongqing Medical University (Reference NO. 2021-530). Participants were explained the background and significance of the study. They were told that they were not required to disclose private information such as ID cards and that participation was entirely voluntary. After they were accepted, they were asked to sign the consent form. They are assured that the information they collect will be anonymous and confidential. While filling out the questionnaire, they have the right to stop answering at any time without giving any reason. This data is collected, entered, and analyzed only in strict confidence and for scientific purposes only.

TRANSPARENCY STATEMENT

The lead author Ling Liu affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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