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The effects of work readiness, organizational justice and professional identity on the work performance of new nurses: a cross-sectional survey

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Abstract

Background With the evolution of disease patterns and the continuous pursuit of persons for high-quality nursing services, new nurses are the reserve talents of the nursing team and shoulder a major mission. However, due to their low work performance and high turnover rate, this is not conducive to the stable development of nursing teams, and it is urgent to solve this problem. The purpose of this study was to explore the effect of work readiness on the work performance of new nurses, focusing on the mediating role of organizational justice and professional identity.

Method A cross-sectional design was employed. Using convenience sampling methods, 607 new nurses were surveyed in 5 hospitals in Henan Province, China, from January to February 2023. Data were collected using demographic characteristics questionnaire, the Work Performance Scale, the Work Readiness Scale for Graduate Nurses, the Organizational Justice Scale, and the Professional Identity Rating Scale for Nurses. AMOS 26.0 was used for model drawing and mediation path testing, and SPSS 25.0 was used for data analysis.

Results The mediation model shows a good fit ($\chi^2/df=2.747$, CFI=0.987, GFI=0.948, AGFI=0.926, TLI=0.984, IFI=0.987, and RMSEA=0.054). In this study, we found professional identity is a mediating variable between work readiness and the work performance of new nurses ($\beta=0.113$, $P<0.01$), organizational justice is a mediating variable between work readiness and the work performance of new nurses ($\beta=0.269$, $P<0.01$) and Organizational justice and professional identity play a chain mediating role in work readiness and work performance ($\beta=0.066$, $P<0.01$).

Conclusions The study highlights the importance of improving the work performance of new nurses. To improve work performance, managers should create a fair atmosphere, formulate transparent policies, improve the organizational justice of new nurses, and promote the professional identity and work readiness of new nurses by holding activities or conducting lectures. This will help stabilize the nursing team, improve the medical environment, stimulate the work enthusiasm of new nurses, and contribute to the development of the hospital.

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Keywords New nurses, Organizational justice, Professional identity, Work readiness, Work performance

Introduction

The World Health Organization estimates that a global shortage of nurses and midwives will be around 7.6 million by 2030 [1]. At the end of 2023, the National Health Commission showed that the national shortage of nurses was close to 2.8 million, and the proportion of new nurses in China is about 5% [2]. The nurse shortage has become an ongoing and urgent problem worldwide [3], as an important part of medical and health human resources, clinical nurses are a basic link that cannot be ignored in the daily operation of medical institutions [4]. As the turnover rate of clinical nursing staff increases, it hurts nursing professions, medical institutions, and high-quality nursing services [5–7]. New nurse refers to the working time of less than a year after graduation nurses [8]. Compared with nurses with work experience, new nurses are more likely to leave the nursing profession, and studies have shown that the turnover rate of new nurses (29.0%) is 2.1 times that of experienced nurses (13.9%) [9]. According to the Transition Shock Theory [10], new nurses face more difficulties and challenges in clinical work due to its professional nature, high risk, and heavy workload [11], which affects their work enthusiasm and may lead to relatively low work performance [12, 13]. Work performance can directly affect employees' job stability, enhance personal happiness, and stimulate work enthusiasm and responsibility [14–16]. As the new nurses are the fresh blood of the clinical nursing team, they are the reserve force of a new generation of nursing talents [17]. Therefore, exploring the influencing factors affecting new nurses' work performance to realize the sustainable development of the hospital is a problem that cannot be ignored and must be solved.

Background

Work performance refers to work behavior that perfectly matches the work objectives of the organization [18], and its essence is the result that the organization expects [19]. Borman and Motowidlo [20] divide work performance into task performance and relationship performance, the task performance mainly refers to the completion of work content and tasks; relationship performance refers to the improvement of organizational operation efficiency under the influence of external factors. Work performance is influenced by the personal characteristics of employees, such as gender, education, working years, professional title [21, 22], and also related to the working environment [23–25] and the style of the manager [26, 27]. Studies show that organizational resilience, social support, organizational commitment, job satisfaction, and burnout also affect employees' work performance

[28–30]. The above research shows that many factors can affect the work performance of industrial workers, but the research on the factors affecting the work performance of new nurses needs to be supplemented. At present, the relationship between work readiness and work performance has attracted more and more attention from scholars. For new nurses, the degree of professional identity is related to their love and devotion to nursing work, and organizational justice affects their perception and evaluation of the working environment. Exploring professional identity and organizational justice's roles in work readiness and work performance of new nurses is helpful to understand the working status and development needs of new nurses, and provides new ideas and methods for improving their job performance and stabilizing the nursing team.

Work readiness is seen as an indicator of a graduate's future job performance, promotion, and career development potential [31, 32]. Due to the gap between theory and practice in nursing education, work readiness is often used to indicate whether new nurses can immediately enter the role [33], whether they can seamlessly connect with clinical practice [34], and whether they can independently conduct clinical nursing practice at the initial stage of work [35]. Nurses with good work readiness can greatly shorten the time they grow to become clinical nursing backbone, and can predict long-term work ability [36]. Job demands-resources theory believes that work resources help to achieve work goals and stimulate personal growth and development [37], so when work readiness is a work resource, recruits gain more motivation and enthusiasm for work, thus increasing work engagement [38]. Studies have shown that work readiness is positively correlated with job satisfaction and job engagement [39] and that employees' high engagement in work can achieve high work performance [40]. Given this, this study proposes hypothesis 1: The work readiness of new nurses is positively correlated with work performance.

Professional identity, as a variable beneficial to both individuals and organizations [41, 42, 43], is defined as the individual's view of the goals, attitudes, values, and other related factors of the profession that are consistent with society's evaluation and expectations of the profession [44]. There is literature indicating that good readiness to work helps nurses affirm their professional roles and professional values [43], when a person affirms his professional value, it will promote his professional identification [44]. Studies have shown that professional identity affects work performance [45, 46], and social identity theory suggests that individuals' actions are based on their recognition of the group [47]. When employees

identify with their group, they may identify more with their profession; this may affect their work attitudes and behaviors [43] thereby affecting their work performance. Hall and Chandler [48] have pointed out that professional identity will give employees a heartfelt sense of mission, which will bring them positive feedback on work performance. Therefore, this study proposes hypothesis 2: Professional identity plays a mediating role in the relationship between work readiness and the work performance of new nurses.

Organizational justice is the fair feelings of people in the organization or unit to the organizational system and policies and measures related to individual interests [49]. The core view of fairness theory [50] is that employees' satisfaction with distribution fairness affects their working enthusiasm. When a person is in a fair environment, it will have an impact on work performance. Some scholars believe that organizational justice is related to work performance [51–53]. As for the relationship between work readiness and organizational justice, Walker et al. [31] divide work readiness into five dimensions, two of which are organizational acuity and social competence. The research of Firestone-Howard et al. holds that when organizational acuity is relatively high, it is conducive to an individual's understanding of fair behaviors such as distribution within the organization [54], thus affecting an individual's organizational justice [55]. Walker et al. [31] maintain that social interaction has a positive predictive impact on interpersonal justice (a dimension of organizational justice) and strong personal social competence means more sufficient social interaction. This shows that the strength of personal social competence may influence interpersonal justice. Some scholars also believe that when nurses are fully prepared for their careers, they are more likely to take a positive and healthy attitude to view things [56], which in the process deepens their perception and experience of fairness [57]; thus, forming a virtuous cycle. Social identity theory [47] holds that if the distribution of labor results meets the internal needs of employees, this distribution makes them feel fair, and they are easy to derive a sense of identity. There are also studies verifying that organizational justice will affect an individual's professional identity [44, 58]. So, this study proposes hypothesis 3: organizational justice plays a mediating role in the relationship between work readiness and the work performance of new nurses, and hypothesis 4: professional identity plays a mediating role in the relationship between organizational justice and the work performance of new nurses.

Based on the above reasoning and literature review, the existing literature on nurses' work performance mainly focuses on the exploration of the relationship between two variables, and research on the potential influence mechanism of work performance is still insufficient. This

study hopes to provide some theoretical guidance certain theoretical guidance for nursing managers to improve the work performance of new nurses, help them formulate more scientific and reasonable human resource management strategies, better train and manage new nurses, and improve the overall performance level of the nursing team. This study will not only explore the relationship between work readiness and work performance but also further discuss whether professional identity and organizational justice play a mediating role between work readiness and work performance. The theoretical framework is shown in Fig. 1.

Methods

Research design, participants, and data collection

This study used a convenience sampling method to conduct an anonymous questionnaire survey on new nurses in five hospitals in Henan Province, China from January to February 2023. A cross-sectional study was adopted to explore the relationship between work readiness, work performance, organizational justice, and professional identity. Inclusion criteria were (a) nurses with a nurse qualification certificate (b) nurse working for less than 1 year and (c) voluntarily participating in the study and (d) nurses working in the clinical front line. Exclusion criteria were (a) nurses who were on leave for reasons and (b) nurses who went to the hospital for further study. With the consent of hospital leaders and the nursing department, we conducted a pre-survey of 50 new nurses. Statistical analysis of the 50 data obtained from the preliminary survey showed that the scale used in this study had good reliability and validity. Participants said that the questionnaire was easy to understand and the entire questionnaire filling time was 10–15 min. The sample size was calculated according to the formula [59]: $N = 4U\alpha^2S^2/\delta^2$, and pre-survey calculation $S = 0.56$, allowable error δ was set to 0.1 and α was set to 0.05, so $N = 4 \times 1.96^2 \times 0.56^2 / 0.1^2 = 482$. This study issued 689 questionnaires and excluded 82 questionnaires with incomplete answers and unreliable data (For example, the answers to the questionnaire are regular, or the same options are selected for each item), we recovered 607 valid questionnaires, and the effective recovery ratio was 88.10%.

Measures

Demographic characteristics

There are 10 questions. It involved gender, age, marital status, highest education, hospital type, labor and personnel relations, departments, average monthly income (salary+bonus), average daily working hours, and average monthly night shifts (times).

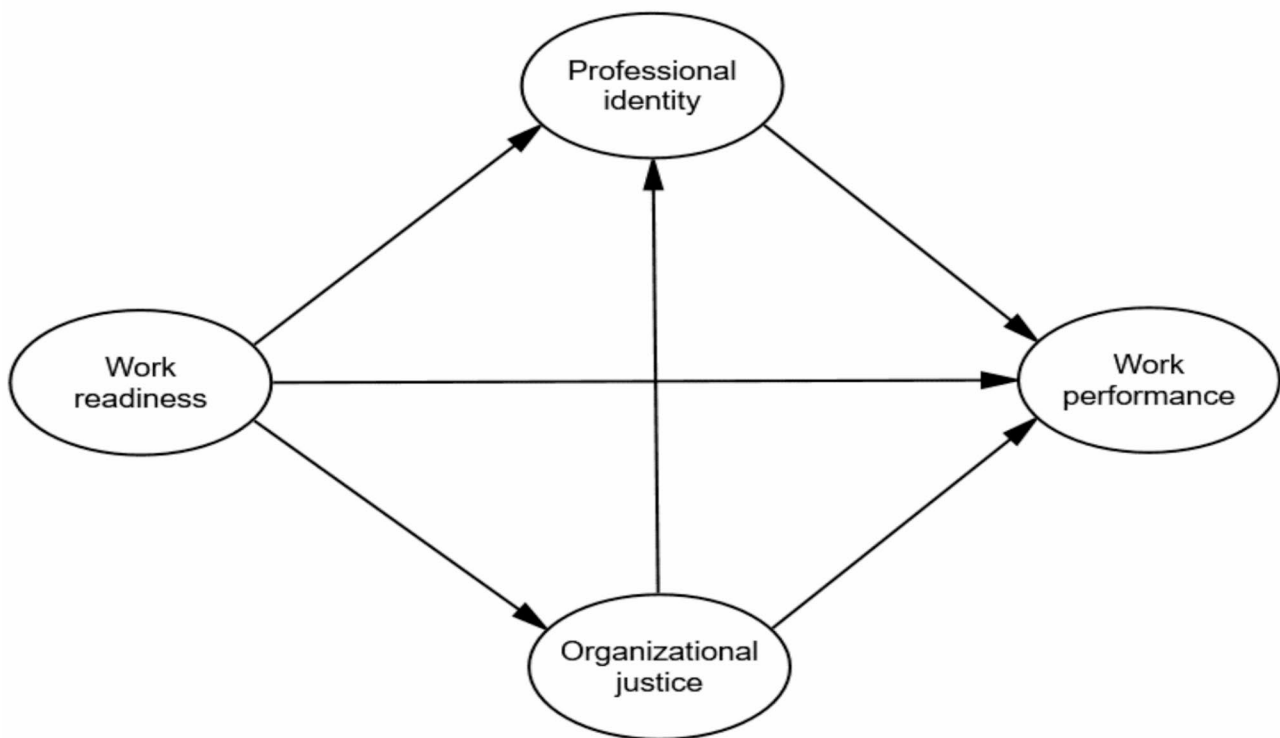


Fig. 1 Basic architecture diagram

Work performance

The Work Performance Scale compiled by Borman and Motowidlo [20] and translated by Yu [60], was used to evaluate the work performance of new nurses. This scale was tested in nurses and showed good reliability and validity (Cronbach's α coefficient=0.900) [44]. This scale consists of two dimensions: task performance (5 items) and relationship performance (6 items), with 11 items. It uses the Likert-5 score method, which ranges from 1 (absolutely inconsistent) to 5 (absolutely consistent). A higher score on this scale represents a higher work performance of new nurses. In this study, the Cronbach's α coefficient was 0.938.

Work readiness

We used the Work Readiness Scale for Graduate Nurses compiled by Walker et al. [31] and localized by Li [61] to evaluate the work readiness of new nurses, which has 38 items in five dimensions: job competitiveness (8 items), social competence (9 items), vocational development (9 items), organizational acuity (7 items), and personal work characteristics (4 items). It uses the Likert-10 score method, completely disagreeing to agree is counted as 1–10 points respectively. Higher scores indicate a higher level of work readiness for new nurses. The Cronbach's α coefficient of the scale was 0.920 [31]. The Cronbach's α coefficient was 0.985 in this study.

Professional identity

Professional Identity Rating Scale for Nurses, which was compiled by Liu et al. [62] was used to measure the professional identity of new nurses. The scale consists of 30 items used for testing 5 dimensions: occupational cognitive evaluation (9 items), occupational social support (6 items), occupational social skills (6 items), occupational frustration coping (6 items), and occupational self-reflection (3 items). It uses a Likert-5 point scoring method, which ranges from 1 (very non-compliant) to 5 (very compliant). Higher scores on this scale, indicate a higher level of professional identity among nurses. The Cronbach's α coefficient of the scale was 0.938 [62]. The Cronbach's α coefficient in this study was 0.978.

Organizational justice

We used the Organizational Justice Scale to measure organizational justice, which was compiled by Colquitt [63] and translated by Zhang [64]. This scale consists of twenty items, including the following four parts: distributive (4 items), procedural (7 items), interpersonal (4 items), and informational justice (5 items). It adopts the Likert-5 point scoring method, which ranges from 1 (highly disagree) to 5 (highly agree). The higher the score on this scale, the higher the organizational justice of the new nurse. The Cronbach's α coefficient of the scale was 0.910 [63]. The Cronbach's α coefficient in this study was 0.933.

Ethics considerations

First, this study is a cross-sectional study without clinical experiments and has no impact on the body and mind of the participants. Second, before filling out the questionnaire, we informed the participants about the purpose and importance of the study, and they were able to drop out at any time. Third, we will not disclose information about the participants, and the data and information collected were only used for this study. The study obtained the informed consent of all study participants. Finally, we passed the ethical review by the Ethics Committee of Henan University on November 16, 2022. (ID: HUSOM 2022–375).

Statistical analysis

We performed the data analysis using SPSS 25.0 and AMOS 26.0 software. Firstly, this study applied descriptive statistics to measure demographic characteristics, work readiness, work performance, professional identity, and organizational justice exhibited by participants. Secondly, the test shows that the data collected in this study is normally distributed and the variables are linearly correlated, so we used Pearson's correlation analysis to consider the relationship between the four variables. Furthermore, AMOS 26.0 was used to map the model and explore the relationships and parameters among the variables. This study performed a chi-square test and degree of freedom (χ^2/df), comparative fit index (CFI), adjusted goodness of fit index (AGFI), root mean square error of approximation (RMSEA), goodness-of-fit index (GFI), incremental fit index (IFI) and Tucker-Lewis index (TLI) to measure the overall fit of the hypothetical model. The smaller the value of χ^2/df , the higher the model fit; the smaller RMSEA, the better the model fit; GFI, TLI, CFI, and AGFI are 0 to 1, the closer 1 indicates the better the fit [65]. Finally, this study calculated a 95% confidence interval (CI) for bias-corrected percentile bootstrapping across a 5000 bootstrapped sample [66] and the p-value is two-tailed, below 0.05, showing statistical significance.

Results

Participant characteristics

Of the 607 valid questionnaires, 73.10% were female and 26.90% were male; New nurses aged under 25 years were 94.40%, unmarried people accounted for 93.10% and 67.20% had bachelor degrees; more than half of participants had monthly income not more than 4000 RMB (\$1 \approx ¥7.28) (64.40%); 71.00% were from tertiary hospitals and 29.00% were from Secondary or below; The proportion of new nurses working in the internal medicine department, surgery department, obstetrics and gynecology, pediatric department, emergency department, intensive care unit, and other departments was 29.80%,

20.60%, 6.90%, 5.80%, 8.10%, 5.60% and 23.20%, respectively. See Table 1 for details.

Pearson's correlation analysis

The range, median, standard deviation, sig (two-tailed), and correlation coefficient of each of the variables in this study are shown in Table 2. The new nurses' work readiness average score was 272.19 ± 64.75 , which was at an upper-middle level. Their professional identity, organizational justice, and work performance were 111.78 ± 24.85 , 72.78 ± 18.00 , and 39.29 ± 10.52 respectively, which were in the middle level.

Correlation analysis found moderate positive relations between work readiness and work performance ($r=0.580$, $p < 0.01$), high positive relations between work readiness and professional identity ($r=0.647$, $p < 0.01$), high positive relations between work readiness and organizational justice ($r=0.604$, $p < 0.01$). The relationship between work performance and professional identity was highly positive ($r=0.635$, $p < 0.01$), and organizational justice ($r=0.676$, $p < 0.01$). There were high positive correlations between organizational justice and professional identity ($r=0.634$, $p < 0.01$). The above results indicate that work readiness, organizational justice, and professional identity are all important factors affecting the work performance of new nurses.

Mediating effect analysis and hypothesis testing

Firstly, according to the mediation effect testing procedure [67], this study applied the structural equation model of AMOS 26.0 to analyse the relationship of four variables, the result is shown in Fig. 2, work readiness has a positive predictive effect on work performance, professional identity, and organizational justice ($\beta=0.16$, $P < 0.01$; $\beta=0.42$, $P < 0.01$ and $\beta=0.62$, $P < 0.01$, respectively); organizational justice positively predicted professional identity and work performance ($\beta=0.39$, $P < 0.01$; $\beta=0.43$, $P < 0.01$); professional identity positively predicted work performance ($\beta=0.27$, $P < 0.01$). The dimensions of vocational development and organizational acuity in work readiness and dimensions of occupational cognitive evaluation and occupational social support in professional identity are highly correlated in this study. To make the model reflect the actual situation more accurately, MI correction [68] was used to optimize the model. In this way, the model can be adjusted and improved to obtain a better fitting effect. The optimized model is shown in Fig. 2. The model fitting indexes were $\chi^2=263.721$, $df=96$, $\chi^2/df=2.747$, CFI=0.987, GFI=0.948, AGFI=0.926, TLI=0.984, IFI=0.987, and RMSEA=0.054, which indicated that the model could be successfully established.

Secondly, the nonparametric percentile bootstrap program was selected to test the mediating significance level. This study was sampled 5000 times from the raw data to

Table 1 Descriptions of nurse characteristics (N=607)

Variables		n	%	P
Gender	Male	163	26.90	0.217
	Female	444	73.10	
Age (years)	≤ 25	573	94.40	0.066
	>25	34	5.60	
Marital status	Unmarried	565	93.10	0.509
	Married	42	6.90	
Highest education	Junior college and below	114	18.80	0.419
	Bachelor's	408	67.20	
	Master's or above	85	14.00	
Hospital level	Tertiary	431	71.00	0.183
	Secondary or below	176	29.00	
Labor and personnel relations	Regular establishment staff	110	18.10	0.416
	Personnel agency	112	18.50	
	Contract worker	385	63.40	
Departments	Internal medicine department	181	29.80	0.285
	Surgery department	125	20.60	
	Obstetrics and gynecology	42	6.90	
	Pediatric department	35	5.80	
	Emergency department	49	8.10	
	Intensive care unit	34	5.60	
Average monthly income (salary + bonus)	Other departments	141	23.20	0.109
	Less than 4000 RMB	391	64.40	
	4000 ~ 7000 RMB	170	28.00	
	7001 ~ 10,000 RMB	25	4.10	
Average daily working hours	Above 10,000 RMB	21	3.50	0.014
	≤ 8	190	31.30	
	8 ~ 10	341	56.20	
	≥ 10	76	12.50	
Average monthly night shifts (times)	≤ 5	273	45.00	0.366
	5 ~ 8	235	38.70	
	≥ 8	99	16.30	

Table 2 Descriptive statistics and correlations of the study variables (N=607)

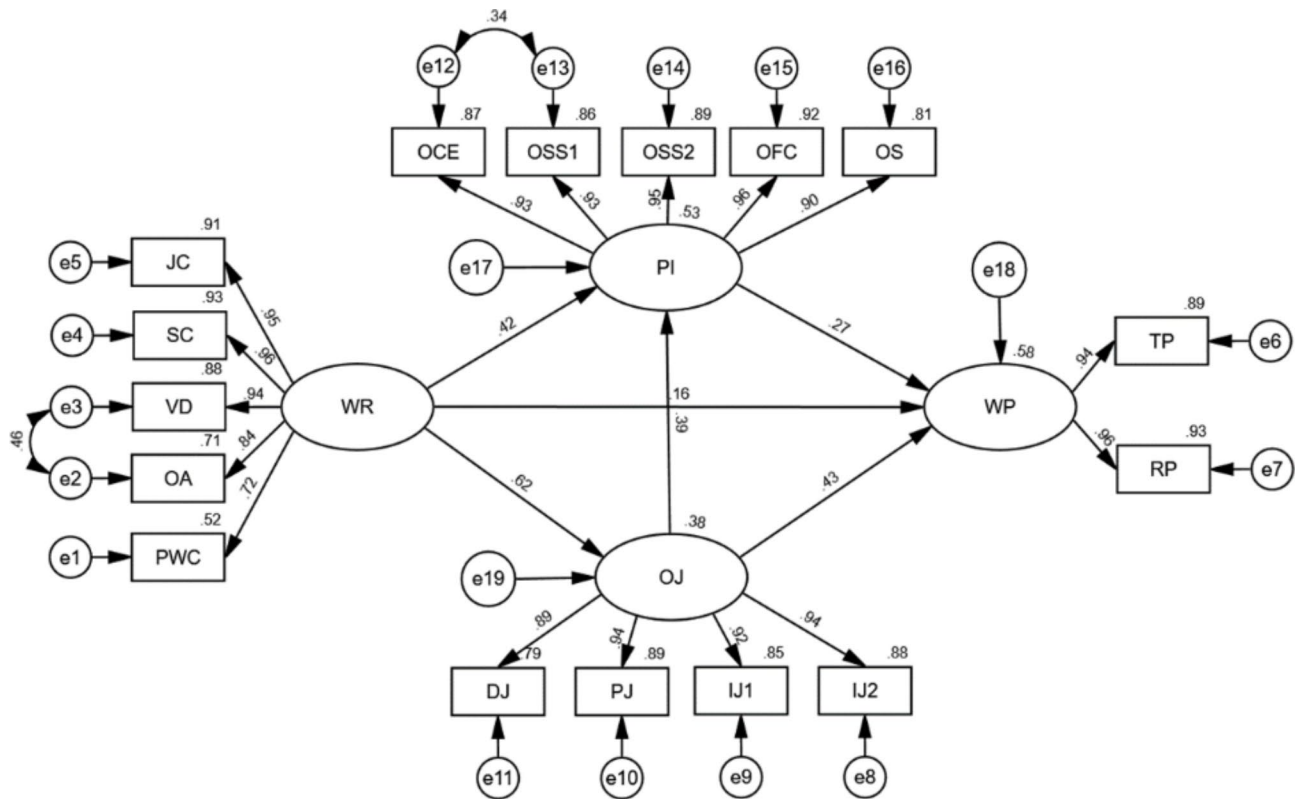
Variable	Work readiness	Work performance	Professional identity	Organizational justice	Range	Median	Mean ± SD
Work readiness	1				1 ~ 10	290.00	272.19 ± 64.75
Sig (two-tailed)	N/A						
Work performance	0.580**	1			1 ~ 5	41.00	39.29 ± 10.52
Sig (two-tailed)	0.000	N/A					
Professional identity	0.647**	0.635**	1		1 ~ 5	114.00	111.78 ± 24.85
Sig (two-tailed)	0.000	0.000	N/A				
Organizational justice	0.604**	0.676**	0.634**	1	1 ~ 5	75.00	72.78 ± 18.00
Sig (two-tailed)	0.000	0.000	0.000	N/A			

**P<0.01 (two-tailed)

SD: Standard deviation.

calculate a 95% confidence interval. As shown in Table 3, from work readiness to work performance, bootstrap 95% CI is (0.054, 0.265), $P<0.05$, thus confirms hypothesis 1; from work readiness to professional identity to work performance, bootstrap 95% CI is (0.061, 0.179), $P<0.01$, thus confirms hypothesis 2; from work readiness to organizational justice to work performance, bootstrap 95% CI was (0.204, 0.345), $P<0.01$, thus confirms

hypothesis 3; from work readiness to organizational justice, professional identity to work performance, the chain of mediating role of 95% CI was (0.039, 0.101), $P<0.01$, thus confirms hypothesis 4. The above results suggest that good work readiness can improve the perception of organizational justice of new nurses, thereby improving their professional identity and ultimately promoting the improvement of work performance. Besides, the direct



Model fit statistics: $\chi^2 = 263.721$, $df = 96$, $\chi^2/df = 2.747$, $P = 0.001$, CFI = 0.987, GFI = 0.948, AGFI = 0.926, TLI = 0.984, IFI = 0.987, RMSEA = 0.054

Fig. 2 Diagram of path analysis of work readiness, work performance, professional identity and organizational justice and its model fitting test
Abbreviations: JC, job competitiveness; SC, social competence; VD, vocational development; OA, organizational acuity; PWC, personal work characteristics; WR, work readiness; OCE, occupational cognitive evaluation; OSS1, occupational social support; OSS2, occupational social skills; OFC, occupational frustration coping; OS, occupational self-reflection; PI, professional identity; DJ, distributive justice; PJ, procedural justice; IJ1, interpersonal justice; IJ2, informational justice; OJ, Organizational justice; TP, task performance; RP, relationship performance; WP, work performance.

Table 3 Total, direct, and indirect effect of professional identity on job embeddedness

Effect	Path relationship	Effect	Bootstrap SE	Bootstrap 95% CI	P-value	Relative mediating effect (%)
Direction effect	work readiness → work performance	0.155	0.054	(0.054, 0.265)	0.003	25.70
Indirection effect	work readiness → professional identity → work performance	0.113	0.030	(0.061, 0.179)	0.000	18.74
	work readiness → organizational justice → work performance	0.269	0.036	(0.204, 0.345)	0.000	44.61
	work readiness → organizational justice → professional identity → work performance	0.066	0.015	(0.039, 0.101)	0.000	10.95
Total mediating effect		0.448	0.033	(0.363, 0.541)	0.000	74.30

effect of work readiness on work performance is 0.155, and the total mediation effect value was 0.448, which is the sum of the mediation effect of the three mediation paths, namely the total indirect effect. The effect value of the three mediation pathways in this study was 18.74%, 44.61%, and 10.95%, respectively.

Discussion

In this study, the work readiness scores were higher than the results of the survey of newly graduated nurses by Li et al. [31]. The difference may be because most of the respondents in this study work in tertiary hospitals with higher levels of professional management. Before the entry of new nurses, hospital managers will conduct induction training for them. In this process, the managers pay more attention to the cultivation of practical skills

and social abilities of new nurses, so the participants have a relatively high degree of work readiness. Participants' professional identity scores were slightly higher than the findings of Zhou et al. who sampled more experienced nurses [69]. This may be because new nurses are more likely to get help from colleagues and clinical leaders in the early stages of their employment, and after experiencing the epidemic, the new generation of nurses may be more aware of the importance of the nursing profession [70]. In addition, this may be related to the education level of the study subjects, 67.2% of the nurses in this study were undergraduates. The higher the educational and cultural background of new nurses, the more specialized knowledge they will have. When facing complex nursing work, they can solve problems more calmly by applying the knowledge they have learned, showing higher professional qualities. This can not only provide patients with better quality nursing services but also help them maintain their love for this profession and improve their professional identity. The participants' organizational justice scores were slightly lower than the findings of Viseu et al. who sampled Hotel staff [71], and the difference in results may be due to differences in who was studied. First of all, the research object of this study is new nurses. Due to many work contents, complex interpersonal relationships, and low wages, they may feel unfair when facing great pressure and challenges in work. Secondly, the research samples of Viseu et al. are hotel staff. The nursing industry and the hospitality industry differ in job content, management system, and wage ratio, so their levels of organizational justice are different. Work performance scores were lower than in the study by Li et al. who sampled more senior nurses [72], which may be because new nurses are not familiar with the department environment, rules and regulations, and work habits, and lack rich work experience and problem-solving ability, so their work performance is slightly lower.

This study found that new nurses' work readiness had a significant positive impact on work performance, consistent with the expectation of hypothesis 1. This is because when new nurses enter the workforce with a higher level of work readiness, they will have a more comprehensive work ability, which helps to boost their confidence and become more enthusiastic about their work [30, 73], thus improving work performance. The above results show that we should strengthen the awareness of the importance of work readiness for new nurses. First, schools should continuously optimize the curriculum setting of nursing majors according to the development needs of the nursing industry and the requirements of actual job positions. Arrange training courses that simulate real work scenarios, such as simulated first aid drills and discussions on complex cases, and conduct intensive training for nursing students, such as venous puncture

and wound care, to improve students' work readiness. Schools should strengthen cooperation with hospitals to provide students with more internship opportunities. Second, internship hospitals should arrange experienced clinical instructors to guide the internship of nursing students and provide nursing students with more clinical operation opportunities. For example, nursing students can be arranged to participate in patients' daily care, basic care, and specialized care work so that they can improve their work readiness by completing practical nursing operations.

This study found that professional identity was a mediating variable for work readiness and work performance of new nurses, consistent with the expectation of hypothesis 2. The mediating pathway found in this study fills the gap of previous studies. After new nurses are well prepared for work, it is conducive to the formation and strengthening of their professional values and role cognition [61]. When they recognize their vocation, their personal value is reflected in the vocation for which they are willing to work [74, 75]. Professional identity can help nurses actively participate in clinical work and have a positive impact on work performance. This result suggests that we should strengthen the fostering of new nurses' professional identity. First, school teachers should cultivate the professional ethics and qualities of nursing students through formal classroom teaching and extra-curricular communication. They should transmit professional values to students and strengthen their recognition of the nursing profession. Additionally, schools should organize communication and sharing sessions between nursing students and outstanding alumni. This way, nursing students can intuitively see the development prospects of the nursing major and enhance their professional identity. Second, nursing managers should formulate personalized career planning plans for each new nurse. They should also set up a special reward fund for new nurses and give material and spiritual rewards to those who perform excellently in professional skills, patient satisfaction, and other aspects. Third, hospitals should establish a special nursing culture publicity team. Through speech contests, essay contests and reports on the internet platform and other forms, we can promote the nursing professional spirit and enhance the professional identity of new nurses.

This study found that organizational justice was a mediating variable for work readiness and work performance of new nurses, consistent with the expectation of hypothesis 3. This is the first time to verify the mediating role of organizational justice in work readiness and work performance and provide a new theoretical framework and guidance for improving the work performance of new nurses. When new nurses have a high level of work readiness, it helps them to understand fair behavior

within the organization [76] and be more adaptable and flexible in interacting with patients and colleagues, thereby enhancing interpersonal justice [77]. Nurses with a high organizational justice are more inclined to invest and contribute, more focused on their jobs, and pay more attention to personal growth and work performance [53]. When nurses sense unfair treatment, they are likely to have doubts and may even distrust the organization [51], thus harming their work passion and work performance. This study found that professional identity was a mediating variable of organizational justice and work performance of new nurses, consistent with the expectation of hypothesis 4. According to the cognitive-emotional theory, individual cognition and emotional response mainly come from the role of situational information, and then activate individual behavior decisions [78]. This implies that open and transparent decision-making and management will assist individuals in fully understanding the distribution process [61]. Not only does it strengthen an individual's trust and sense of identity in the organization, making them willing to contribute to it, but it can also enhance employees' professional thinking and correct the tendency of employees' bad behavior [79], which positively affect the staff's work performance. To improve new nurses' organizational justice, first, nursing managers should create a fair working atmosphere for new nurses, treat every new nurse fairly in daily work, and provide them with fair training and development opportunities. Second, hospitals should formulate reasonable and transparent salary standards, performance appraisal systems, and promotion systems. A nurse representative committee can be established or staff feedback meetings can be held regularly to encourage new nurses to put forward suggestions and participate in the performance appraisal process. For the unfair issues raised by new nurses, investigations and handling should be carried out promptly. This will help to enhance the organizational justice of new nurses.

Limitation and future research direction

First of all, this study only investigated some newly recruited nurses in five hospitals in Henan Province and concentrated in one province in one country. This geographical and cultural specificity has an impact on the generality of the findings. Therefore, future studies can expand the sample sources and adopt multi-center survey methods to improve the universality of the study. Second, this study is a cross-sectional study and cannot well explain the causal relationship. In the future, longitudinal research can be implemented to capture the evolution of work readiness and work performance of new nurses by clarifying time nodes. Third, this study collected data by subjectively filling out a questionnaire, which is easily influenced by the social expectation effect, and future

studies could adopt a more objective approach and study from multiple perspectives. This paper only discusses the impact of work readiness, professional identity, and organizational justice on work performance, without considering the potential impact of personality traits on the work performance of new nurses. Personality traits not only affect an individual's learning motivation and adaptability in the work preparation stage but also have an impact on work attitude and behavior. Therefore, future studies can further explore the role of personality traits in work readiness and work performance.

Conclusion

This study examined work readiness, work performance, professional identity, and organizational justice among new nurses. The process and mechanism by which the work readiness of new nurses influenced work performance was explored. The study found that professional identity and organizational justice play a chain mediating role in the effect of work readiness on the work performance of new nurses. It provided some theoretical support and guidance for the research and intervention of the work performance of new nurses and also helped the hospital to maintain and cultivate the new generation of nursing talents and constantly improve the development prospect of the nursing industry.

Abbreviations

SPSS Statistical Product and Service Solutions

Acknowledgements

We would like to thank the Key Project of Undergraduate Teaching Reform Research and Practice of Henan University (Grant Number: HDXJJG2020-25) and "Research on the Status Quo and Cultivation Mechanism of Social and Emotional Ability of Henan Adolescents" (Grant Number: SKL-2022-55) for the funding of this study. We would like to sincerely thank all the nurses involved in the survey and the hospital for their support of this study.

Author contributions

JZ and SY finished the manuscript of the article. JZ, SY, and CCR provided the study design. JZ, MR, SY, and LJ conducted data collection and data processing. CCR and LGL proposed key revisions. All authors read and approved the final manuscript.

Funding

This research was sponsored by the Key Project of Undergraduate Teaching Reform Research and Practice of Henan University (Grant Number: HDXJJG2020-25) and "Research on the Status Quo and Cultivation Mechanism of Social and Emotional Ability of Henan Adolescents" (Grant Number: SKL-2022-55).

Data availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Before filling out the questionnaire, we informed the participants about the purpose and importance of the study, and they were able to drop out at any time. We will not disclose information about the participants, and the data and information collected were only used for this study. The study obtained

the informed consent of all study participants and passed the ethical review by the Ethics Committee of Henan University on November 16, 2022, and the ethics review number is HUSOM2022-375.

Consent for publication

The subjects of this study consented to publication.

Competing interests

The authors declare that they have no competing interests.

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Received: 29 April 2024 / Accepted: 8 October 2024

Published online: 16 October 2024

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