

ORIGINAL ARTICLE

Impact of clinical pathway implementation satisfaction, work engagement, and hospital–patient relationship on quality of care in Chinese nurses

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Abstract

Aims: This study aimed to investigate how clinical pathway implementation satisfaction, work engagement, and hospital–patient relationship impact the quality of care that is provided by nurses in public hospitals.

Background: Clinical pathways are recommended as a form of quality improvement by broader healthcare systems and are widely used in the world. Nurses are the most involved group of healthcare professionals in the implementation of clinical pathways in public hospitals. So, it is important to investigate how their satisfaction with the process affects the quality of care they provide and influencing factors.

Methods: This descriptive cross-sectional study surveyed nurses practicing across seven tertiary public hospitals in Sichuan Province, China, online. The survey consisted of a questionnaire for the general characteristics of the participants and four Chinese maturity scales validated by previous studies: clinical pathway implementation satisfaction scale, work engagement scale, hospital–patient relationship perception scale, and quality of care scale. The bootstrap method was used to test a moderated mediation model using Hayes' PROCESS macro models 4 and 8. We followed STROBE guidelines to prepare the study report.

Results: A total of 880 nurses filled out the questionnaires, 821 of which were regarded as valid. Clinical pathway implementation satisfaction had a positive effect on quality of care ($B = 0.873$, $P < 0.001$). Work engagement played a mediation role between nurses' clinical pathway implementation satisfaction and the quality of care (effect = 0.080, Boot 95% CI = [0.023, 0.142]). This mediation model was moderated by the hospital–patient relationship ($P < 0.01$).

Conclusion: Clinical pathway implementation satisfaction may enhance the quality of care by work engagement of nurses. Moreover, a good hospital–patient relationship can enhance the positive impact of nurses' satisfaction on work engagement and health service quality.

Implications for nursing and nursing policy: Public hospital managers need to pay attention to nurses' evaluation of and perceptions toward clinical pathway implementation and then take corresponding measures to improve their satisfaction to enhance the quality of care. At the same time, the government, society, and hospitals also need to foster good hospital–patient relationships to ensure that nurses have a high level of work engagement that aids in providing high-quality care services.

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KEYWORDS

Clinical pathway, hospital–patient relationship, mediation, moderation, nurses, quality of care, work engagement

INTRODUCTION

In the service industry, service quality is a crucial factor that determines an organization's success (Srivastava & Prakash, 2019). The quality of the service provided by an organization to its customers often depends on the organization's employees (Goula et al., 2022). In the healthcare service industry, service quality describes the extent to which medical workers are able to provide health services that meet patients' needs and achieve positive health effects (Jin et al., 2018; Woo & Choi, 2021). It is a crucial indicator of the efficiency of medical workers and the effectiveness of their services and has direct implications on patient diagnosis, treatment safety, and overall health outcomes (Jin et al., 2018; Woo & Choi, 2021). Nurses are among the essential participants in the healthcare service industry, and they significantly contribute to healthcare service quality (Abdullah et al., 2021). However, Goula et al. (2022) showed that most studies on healthcare service quality focused on patients, with few examining how healthcare professionals evaluate healthcare service quality. Therefore, studying healthcare service quality and related influencing factors from the nurses' perspective may enhance the provision of high-quality services.

In the health service industry, a diagnosis and treatment model/clinical pathway is being widely promoted. Clinical pathway refers to a standardized service plan for patients with a specific disease and is formulated by a group of multidisciplinary professionals. It is a tool used to guide evidence-based healthcare with the aim to promote organized and efficient patient care (Wind et al., 2022). Clinical pathways are recommended as a form of quality improvement by broader healthcare systems and are widely used in the world. In fact, over 80% of hospitals in the United States reported to have implemented clinical pathways in 2003 and most European countries have used them in 2019 (Sun et al., 2021). In China, 91.3% of two-level and above public hospitals implemented clinical pathways by the end of 2021 (National Health Commission of the People's Republic of China, 2022), covering over 1,000 types of diseases (Li et al., 2021). Therefore, the effects of clinical pathway implementation in hospitals reflect the level of healthcare service quality to some extent. However, a previous study showed that some health staff are not proactive in promoting the clinical pathway, and this may limit its effectiveness upon implementation (Wang et al., 2014). Implementing clinical pathways is a special work that involves diagnosis, treatment, and nursing. Since nurses are one of the most involved healthcare professionals in the implementation of clinical pathways in public hospitals, it is important to investigate how their satisfaction with the process affects the quality of care.

A previous study highlighted that employees' job satisfaction is an important factor that affects the quality of services provided (Varey, 1995). Job satisfaction refers to an individual's positive subjective evaluation or attitude toward various aspects of work, and this can be influenced by several factors such as the nature of the work, work challenges, salary scheme, interpersonal relationships, working conditions, work motivation, and organizational environment (Geese et al., 2022; Penconek et al., 2021). The job satisfaction of nurses is reflected in their positive evaluation or attitude toward all aspects of the healthcare services in which they participate. A previous study suggested that job satisfaction and work engagement should be researched in tandem as they are closely linked to individual motivation (Schaufeli & Bakker, 2004). Work engagement is defined as a positive, emotional motivational state of work-related well-being characterized by vitality, dedication, and concentration (Szilvassy & Širok, 2022), and it has been demonstrated to be closely related to job satisfaction (Ofei-Dodoo et al., 2020). Work engagement is determined using the job demands-resources theoretical model, which assumes that engagement depends on work demand and work resources (Mazzetti et al., 2023). The level of work engagement can be enhanced by various resources within the organization, such as support from colleagues and superiors, enhanced role clarity, feedback on work, and team supervision (Foà et al., 2020). Job satisfaction generally encompasses nine dimensions, which are salary, promotion opportunities, fringe benefits, rewards, supervision, interpersonal relationships, nature of work, communication, and working conditions (Li et al., 2019a, 2019b). Interpersonal relationships, communication, fringe benefits, and working conditions are explicit sources of support from colleagues and superiors, while salary, promotion opportunities, and rewards fall under feedback on work. In other words, high job satisfaction correlates with increased satisfaction with work resources, which can effectively stimulate work-related motivation in employees, thereby further enhancing their work engagement. Work engagement is one of the most important factors that aid success in any work environment, considering that it is associated with positive work outcomes (Gillet et al., 2019). The outcome variables of work engagement consist of organizational efficiency and performance (Zhang et al., 2020b). Organizational efficiency and performance reflect the quality of healthcare services in the healthcare service industry (Jin et al., 2018). Thus, work engagement may mediate the association between clinical pathway implementation satisfaction and quality of care.

In addition, the hospital–patient relationship is one of the focal points of concern in the healthcare service industry. The hospital–patient relationship is a work-oriented interpersonal

relationship established between the health staff and patients, along with their families through diagnosis, treatment, and nursing activities (Ozaras & Abaan, 2018). It is an inevitable aspect of the process of diagnosis, treatment, and nursing, running through the medical activities of patients and directly affects treatment and rehabilitation outcomes (Gou et al., 2021). In recent years, the hospital–patient relationship has become a general concern in societies due to increased violence against medical professionals (Zhang et al., 2021). Effective hospital–patient interactions are associated with a wide range of positive work behaviors, such as improving diagnostic accuracy, health resource utilization, and medical care. Conversely, poor relationships may reduce healthcare quality (Molina-Mula & Gallo-Estrada, 2020). Furthermore, a study confirmed that the hospital–patient relationship is strongly related to job satisfaction and work engagement (Zhang et al., 2020a). Prior studies on quality of healthcare service, job satisfaction, and work engagement have primarily examined the hospital–patient relationship as a predictor or outcome variable. There are no studies that explored the impact of healthcare service quality predictors on healthcare service quality at different levels of hospital–patient relationships. Therefore, this study mainly focuses on how clinical pathway implementation satisfaction by nurses affects the quality of care at varying levels of hospital–patient relationships.

In conclusion, we put forward the following hypotheses to determine the potential impact mechanism of nurses' satisfaction with clinical pathway implementation on the quality of care.

Hypothesis 1. Nurses' clinical pathway implementation satisfaction can positively influence the quality of care.

Hypothesis 2. Nurses' work engagement plays a mediating role in the relationship between clinical pathway implementation satisfaction and quality of care.

Hypothesis 3. Hospital–patient relationship moderates the association between clinical pathway implementation satisfaction and work engagement and the connection between clinical pathway implementation satisfaction and quality of care.

METHODS

Design and participants

A descriptive cross-sectional design was used for this study. Nurses practicing in seven tertiary public hospitals in Sichuan China, and who met eligibility criteria, were surveyed using an online questionnaire from March to June 2022. The inclusion criteria included having worked for at least one year, holding a nurse practice certificate, and participating in clinical pathway implementation. Participation in the study was voluntary for

all eligible nurses. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines were followed.

Measures

The survey consisted of four Chinese maturity scales validated by previous studies and a questionnaire for the general characteristics of the participants (S1).

Clinical pathway implementation satisfaction

The Clinical Pathway Implementation Satisfaction Scale, developed by Li et al. in 2021, comprises three dimensions: organizational support, process identification, and effect perception. This scale includes 21 items (Li et al., 2021). The Likert five-level scoring method is used in this scale, and all items are scored positively. The rating ranges from “very dissatisfied” to “very satisfied,” with 1–5 points. The higher the score, the greater the satisfaction level. The Cronbach's alpha coefficient was 0.978 (Li et al., 2022) and 0.983 in this study.

Work engagement

Work engagement was measured using the Work Engagement Scale that was developed by Schaufeli et al. in 2002 and revised by Li et al. in 2006. The scale is comprised of three dimensions: vitality, dedication, and concentration, with a total of 16 items (Li et al., 2006). The scale uses a Likert seven-level scoring method, with scores ranging from “never” to “always,” assigned 1–7 points, respectively. All items are scored positively, and the higher the score, the greater the level of work engagement. The Cronbach's alpha coefficient was reported at 0.930 (Liu et al., 2017) and 0.967 in this study.

Hospital–patient relationship

The Hospital–Patient Relationship Perception Scale was developed by Hahn et al. in 1996 and revised by Yang in 2011. This scale is comprised of three dimensions: subjective experience, perception of patients' objective behavior, and the combination of subjective experience and perception of patients' objective behavior, with a total of 8 items (Yang, 2011). The scale adopts a Likert five-level scoring method, with scores ranging from “completely inconsistent” to “very consistent,” each represented by 1–5 points, respectively. The reverse items are scored in reverse order. The higher the score, the worse the level of hospital–patient relationship perception. The Cronbach's alpha coefficient was 0.705 (Chen, 2016) and 0.942 in this study.

Quality of care

The study adopted the Healthcare Service Quality Scale that was developed by Yang et al. in 2018 (Yang et al., 2018) and made appropriate adjustments to the items to adapt to the survey of quality of care. The scale includes three dimensions of psychosocial care, diagnosis, and treatment care, as well as quality assurance, with a total of 13 items. The scale uses a Likert five-level scoring method, with scores ranging from “very bad” to “very good,” represented by 1–5 points, respectively. All items are scored positively, and the higher the score, the better the quality of the care works’ self-assessment. The Cronbach’s alpha coefficient was reported at 0.984 (Li et al., 2022) and 0.986 in this study.

Participants’ general characteristics

This part of the questionnaire was designed by the researchers of this study. It included factors such as gender, age, marital status, education, work income, professional title, working years, position, and whether they are establishment personnel or not.

Data collection

Due to health restrictions and protocols related to the COVID-19 pandemic, a field investigation was not conducted for this study. The data were collected using an online questionnaire survey platform called Questionnaire Star. The hyperlinks for accessing the questionnaire and QR codes were disseminated among nurses in seven public hospitals. Low response rate, representativeness, and item-response are typical problems with online surveys (Grande et al., 2022). To mitigate these issues and improve the quality and effectiveness of the survey, several steps were taken. First, the questionnaire provided a clear description of the completion process, informing respondents of the study’s purpose and significance. Respondents participated in the survey after selecting the option “Informed and agreed to participate voluntarily in the survey.” Second, the language that is appropriate to nurses was used to describe questions and options, while avoiding the use of grids or matrices to represent the Likert’s scale answers (Grande et al., 2022). Finally, after the survey, the data were exported from the Questionnaire Star website before being reviewed and sorted. Incomplete forms and outliers were deleted.

Data analysis

IBM SPSS Statistics for Windows, version 26.0 (IBM Corp., Armonk, NY, USA) was used to enter and analyze the data. The general data were described by frequency and constituent ratio (%). The total and item scores on each scale were represented as means (\pm standard deviations). Single-

factor analyses of quality of care were conducted using the independent-sample *t* test and one-way ANOVA. The bootstrap method was used to test a moderated mediation model using Hayes’ PROCESS macro models 4 and 8. The statistically significant variables in the univariate analysis (educational background, job income, and position) were included as control variables in the regression models. $P < 0.05$ (two-tailed) was considered as an indication of statistical significance.

Ethical considerations

This study was approved by the Ethics Committee of Sichuan Vocational College of Health and Rehabilitation (CWKY-20211214-28). Informed consent was required on the first page of the survey. Respondents formally participated in the survey by selecting the option “Informed and agreed to participate voluntarily in the survey.” Completing the set of self-report questionnaires was the expression of consent to participate in the study. The survey did not obtain the names and other identifying information of the respondents, and all data were anonymous and confidential.

RESULTS

Participant characteristics

A total of 880 questionnaires were collected, though 821 were valid after excluding the unqualified ones, with an effective rate of 93.30%. Table 1 displays the descriptive characteristics of the respondents ($n = 821$). The study group included 17 males (2.07%) and 804 females (97.93%). The average age of the respondents was (32.06 ± 6.36) years.

Single-factor analysis of quality of care

The results are shown in Table 1. The differences in the quality of care with varying educational statuses ($P < 0.001$), work income ($P < 0.05$), and positions ($P < 0.001$) were statistically significant. However, the differences in the quality of care with dissimilar genders, ages, marital statuses, professional titles, work years, and establishment personnel status were not statistically significant ($P > 0.05$).

The mediating effects of work engagement

The statistically significant variables in the univariate analysis, which are educational background, job income, and position, were included as control variables in the regression model. The aim was to test the mediating effect of work engagement. As shown by the results that are presented in Table 2, the clinical pathway implementation satisfaction of nurses was found to be a positive predictor of quality

TABLE 1 Participant characteristics.

Variables	N (%)	M ± SD	t/F	P
Gender			−1.424	0.155
Male	17(2.07)	4.317 ± 1.017		
Female	804(97.93)	4.550 ± 0.659		
Age (yrs old)			1.181	0.316
20–30	482(58.71)	4.560 ± 0.625		
31–40	247(30.09)	4.532 ± 0.664		
41–50	70(8.53)	4.571 ± 0.814		
≥51	22(2.67)	4.294 ± 1.024		
Marital status			−0.170	0.865
Other marital status	263(32.03)	4.539 ± 0.698		
Married	558(67.97)	4.548 ± 0.654		
Education			9.372	<0.001
Junior college and below	284(34.59)	4.624 ± 0.680		
Bachelor	511(62.24)	4.526 ± 0.655		
Master and above	26(3.17)	4.056 ± 0.555		
Work income (yuan)			2.972	0.019
<2,000	19(2.31)	4.174 ± 1.214		
2,000–5,000	426(51.89)	4.577 ± 0.631		
5,001–8,000	303(36.91)	4.556 ± 0.672		
8,001–10,000	59(7.19)	4.356 ± 0.629		
>10,000	14(1.70)	4.545 ± 0.668		
Professional title			2.464	0.061
None	87(10.60)	4.489 ± 0.712		
Primary	482(58.71)	4.597 ± 0.600		
Intermediate	195(23.75)	4.468 ± 0.758		
Associate professor and above	57(6.94)	4.448 ± 0.781		
Work years			1.046	0.382
<5	237(28.87)	4.527 ± 0.644		
5–9	283(34.47)	4.533 ± 0.618		
10–19	207(25.21)	4.601 ± 0.661		
20–29	62(7.55)	4.572 ± 0.673		
≥30	32(3.90)	4.363 ± 1.144		
Position			4.971	<0.001
Yes	126(15.35)	4.277 ± 0.698		
No	695(84.65)	4.593 ± 0.651		
Establishment personnel or not			−0.579	0.563
Yes	286(34.84)	4.526 ± 0.706		
No	535(65.16)	4.555 ± 0.647		

of care ($B = 0.873$, $P < 0.001$). When both work engagement and clinical pathway implementation satisfaction were included in the model, the latter remained a positive predictor of quality of care ($B = 0.793$, $P < 0.001$). At the same time, the clinical pathway implementation satisfaction had a positive predictive effect on work engagement ($B = 0.912$, $P < 0.001$), and work engagement could also positively impact

the quality of care ($B = 0.088$, $P < 0.001$). In addition, the bias-corrected bootstrap showed that the indirect effect of work engagement was 0.080 (95% CI [0.023–0.142]). The upper and lower limits of bootstrap 95% confidence intervals are greater than 0, indicating that the nurses' work engagement serves as an essential mediator in the relationship between clinical pathway implementation satisfaction and quality of care.

TABLE 2 The mediating effects of work engagement.

Variables	Quality of care			Quality of care			Work engagement		
	B	95% CI	P	B	95% CI	P	B	95% CI	P
Education	−0.021	(−0.061, 0.019)	0.301	−0.019	(−0.060, 0.022)	0.371	0.028	(−0.068, 0.125)	0.566
Work income	−0.020	(−0.048, 0.009)	0.180	−1.020	(−0.050, 0.009)	0.173	−0.008	(−0.077, 0.060)	0.811
Position	0.001	(−0.019, 0.021)	0.900	0.006	(−0.015, 0.026)	0.583	0.051	(0.003, 0.099)	0.038
Clinical pathway implementation satisfaction	0.793	(0.753, 0.833)	<0.001	0.873	(0.843, 0.903)	<0.001	0.912	(0.841, 0.983)	<0.001
Work engagement	0.088	(0.059, 0.117)	<0.001						
R ²	0.807			0.799			0.4403		
F	683.182			810.325			160.5027		
Effect breakdown	Effect value		Boot SE	Boot LLCI			Boot ULCI		Proportion
Mediating effect	0.080		0.031	0.023			0.142		9.17%
Direct effect	0.793		0.062	0.663			0.895		90.83%
Total effect	0.873		0.037	0.790			0.933		

The moderating effects of the hospital–patient relationship

The statistically significant variables in the univariate analysis (educational background, job income, and position) were included as control variables in the regression model, in a bid to test the moderating effect of the hospital–patient relationship. The results, as shown in Table 3, revealed that clinical pathway implementation satisfaction posed a direct impact on both work engagement ($B = 0.920$, $P < 0.001$) and quality of care ($B = 0.790$, $P < 0.001$). Moreover, the effects of the interaction variable clinical pathway implementation satisfaction \times hospital–patient relationship perception on work engagement ($B = -0.115$, $P < 0.01$) and quality of care ($B = -0.057$, $P < 0.001$) were found to be also statistically significant. The findings showed that hospital–patient relationship perception moderated the direct effect of clinical pathway implementation satisfaction on quality of care. It also moderated the mediation model of “clinical pathway implementation satisfaction–work engagement–quality of care.”

The conditional indirect effects posed by the hospital–patient relationship on the indirect path from clinical pathway implementation satisfaction through work engagement to quality of care were analyzed (Table 3). Nurses with worse hospital–patient relationship perception (+1 SD) showed less improvement with regard to work engagement induced by clinical pathway implementation satisfaction. On the other hand, those with better hospital–patient relationship perception (−1 SD) showed a higher increase in work engagement as a result of clinical pathway implementation satisfaction. This indicates that the mediating effect of work engagement on the relationship between clinical pathway implementation satisfaction and quality of care had a downward trend as nurses perceived a worse hospital–patient relationship. This implies that when the nurses’ perception of poor hospital–patient relationship increases, it is more difficult for the clinical path-

way implementation satisfaction to improve the quality of care by increasing work engagement. These findings provided potent statistical evidence to support our hypothesis conceptual model.

DISCUSSION

The research findings indicate that the clinical pathway implementation satisfaction of public hospital nurses is a positive predictor of quality of care. Based on the results, hypothesis 1 is confirmed. Clinical pathway implementation satisfaction is a psychological perception of the organizational support, practicality, and implementation-related effects of the pathway by medical staff when they participate in clinical pathways (Wang et al., 2014). When nurses perceive that the organization has provided them with more facilities, environment, emotional support, attention, and affirmation in their work that is related to the clinical pathway, they become motivated (Li et al., 2019a), and exhibit more willingness to create results that are beneficial to the organization. This would result in the provision of better-quality healthcare services for the hospital.

Pathway practicality refers to the perception of the medical staff regarding the rationality and efficiency of the working environment, with much focus on aspects such as the implementation scheme and operation mechanism of the clinical pathway. The practicality of the clinical pathway can be classified as a hygiene factor defined by the motivation-hygiene theory. This highlights the fact that if the pathway practicality is not met, nurses are negatively affected, a state that reduces their efficiency and performance, ultimately compromising the quality of the healthcare services they provide.

The pathway implementation effect perception describes the evaluation of the implementation effect of the clinical pathway by medical staff, assessing aspects such as clinical pathway implementation on their work income, work efficiency, as well as diagnosis and treatment results. From the

TABLE 3 The moderating effects of the hospital–patient relationship.

Variables	Work engagement				Quality of care					
	B	SE	t	95% CI	P	B	SE	t	95% CI	P
Clinical pathway implementation satisfaction	0.920	0.037	25.116	(0.848, 0.992)	<0.001	0.790	0.020	39.092	(0.750, 0.830)	<0.001
Hospital–patient relationship	0.019	0.024	0.817	(−0.027, 0.066)	0.414	0.005	0.010	0.453	(−0.015, 0.024)	0.651
Work engagement						0.085	0.015	5.841	(0.056, 0.113)	<0.001
Clinical pathway implementation satisfaction × hospital–patient relationship	−0.115	0.039	−2.938	(−0.192, −0.038)	0.003	−0.057	0.016	−3.486	(−0.089, −0.025)	<0.001
Education	0.006	0.051	0.121	(−0.093, 0.106)	0.904	−0.008	0.021	−0.398	(−0.050, 0.033)	0.691
Work income	−0.028	0.037	−0.739	(−0.101, 0.046)	0.460	−0.004	0.016	−0.280	(−0.035, 0.026)	0.780
Position	0.106	0.078	1.356	(−0.048, 0.260)	0.175	−0.102	0.033	−3.144	(−0.166, −0.038)	0.002
R ²	0.445						0.813			
F	108.690						503.575			
Conditional indirect effect	Hospital–patient relationship		Indirect effect	Boot SE		Boot LLCI		Boot ULCI		
	Mean − 1 SD		0.089	0.035		0.024		0.158		
	Mean		0.078	0.027		0.025		0.127		
	Mean + 1 SD		0.067	0.020		0.024		0.103		

motivation theory model, if nurses' evaluation of the clinical pathway implementation effect is lower than expected, and the needs of individuals cannot be met by the current work, they will develop a sense of job alienation. This will directly affect the quality of care. These findings indicate that improving nurses' clinical pathway implementation satisfaction is an effective way to improve the quality of care.

Research showed that work engagement played a mediation role in the relationship between clinical pathway implementation satisfaction of nurses in public hospitals and the quality of care. This confirms hypothesis 2, indicating that while clinical pathway implementation satisfaction directly affects the quality of care, it also indirectly and positively impacts the quality of care through the mediating variable of work engagement. Work engagement focuses on positive psychological states such as vitality, dedication, and concentration of individuals in their work. According to the job demands-resources model, work engagement includes work demand and resources, and the latter can positively impact work (Mazzetti et al., 2023). An individual's satisfaction with work reflects their feelings at an emotional level. In other words, this is an emotional resource for individuals at work (Schaufeli & Bakker, 2004). Therefore, nurses' clinical pathway implementation satisfaction is an essential emotional resource that is obtained in their work. When nurses feel a high level of clinical pathway implementation satisfaction, they can exhibit more behaviors that are beneficial to the organization, thereby improving the efficiency of the hospital (Cai, 2015). The nurses would demonstrate more energy, focus, and dedication to their work. A higher level of work engagement will enable nurses to show better work efficiency and performance in clinical pathway activities (Bhatti et al., 2018). The efficiency and performance of nurses in clinical pathways largely reflect the quality of care.

The findings from this research revealed that the hospital-patient relationship moderates the mediation path of "clinical pathway implementation satisfaction-work engagement-quality of care." It moderates the first half of the mediation model as well as the direct impact of clinical pathway implementation satisfaction on quality of care, supporting the third hypothesis. Specifically, the direct positive predictive effect of clinical pathway implementation satisfaction on quality of care is higher when nurses perceive a better hospital-patient relationship compared with a poorer one. Nursing activities belong to a kind of emotional labor. As a special interpersonal relationship between the hospital and patients, the hospital-patient interaction highly involves the emotional reaction of both parties, with regard to diagnosis and treatment activities. Nurses who perceive a more harmonious hospital-patient relationship exhibit a better emotional state and organizational citizenship behavior (Boerner et al., 2005), and this enhances more positive evaluation and perception of clinical pathway implementation. This leads to better job performance, in addition to improving the quality of care. Moreover,

better nurses' perception of hospital-patient relationships correlates with more significant levels of work engagement that are promoted by clinical pathway implementation satisfaction. This means that as an emotional reaction, the perception of hospital-patient relationships plays a moderation role in the impact of other variables of work engagement. Being an emotional resource generated by nurses' work, clinical pathway implementation satisfaction can play a positive role in work engagement. However, when nurses perceive tense hospital-patient relationships, their emotions are negatively affected, and this will weaken their clinical pathway implementation satisfaction and reduce their vitality, concentration, and dedication (Han, 2017). This contributes to reduced work engagement, which will directly lead to compromised work performance, ultimately leading to lower quality of care.

Limitations

This study has some limitations that are worth mentioning. First, the cross-sectional design that was adopted in this study could not evaluate the changes in nurses' related variables over time. Therefore, future studies can adopt longitudinal designs to further examine the causality between each study variable. Second, this study only investigated nurses from seven third-level public hospitals in Sichuan, which may have affected the representativeness of the sample, to some extent. Therefore, future research can expand the scope of the study and include aspects such as primary care or different levels of health care. Future studies may also include bigger samples that are more representative of wider populations. Finally, the data in this study were obtained from self-reporting methods, which may have been affected by social desirability bias. Subsequent studies can try to collect data in a variety of ways, such as "others' reporting" strategies, to improve the reliability and validity of the findings.

CONCLUSIONS

To the best of our knowledge, this should be recognized as the first study to explore the impact mechanism of nurses' clinical pathway implementation satisfaction on quality of care. As indicated by our findings, clinical pathway implementation satisfaction not only directly and positively predicts quality of care but also indirectly affects it through the mediation variable work engagement. It is important to note that this mediation process is moderated by the hospital-patient relationship. This model clarifies how the clinical pathway implementation satisfaction of nurses in public hospitals affects the quality of care (the mediation role of work engagement). It also determines the conditions under which clinical pathway implementation satisfaction has more significant predictive effects on quality of care (the moderation role of hospital-patient relationship perception).

Implications for nursing and health policy

Currently, clinical pathways are widely used globally, and this study provides evidence from China for nurses' participation in clinical pathway management practices in various countries. The results from this study suggest that good clinical pathway implementation satisfaction and hospital-patient relationship perception are important for ensuring high-quality care services. Continuously improving the quality-of-care services is a common pursuit of healthcare organizations around the world. So, hospitals not only in China but also in other countries, should fully consider how to create a good level of clinical pathway implementation satisfaction and hospital-patient relationships when implementing clinical pathway management and policy formulation. Hospital managers need to pay attention to nurses' evaluation and perceptions toward the clinical pathway implementation process and then take corresponding measures to improve their satisfaction to enhance the quality-of-care services. At the same time, the government, society, and hospitals also need to foster good hospital-patient relationships to ensure that nurses have a high level of work engagement that aids in providing high-quality care services.

AUTHOR CONTRIBUTIONS

Concept and design: J Li, J P; data acquisition and analysis: J Li, L X, Q L, J Liu; interpretation of data: J Li, L X, Q L, J Liu; drafting of the manuscript: J Li; critical revision of the manuscript: J Li, J P. All authors gave final approval and agreed to be accountable for all aspects of the work.

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CONFLICT OF INTEREST STATEMENT

These authors have no potential conflicts of interest.

DATA AVAILABILITY STATEMENT

The data sets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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SUPPORTING INFORMATION

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