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Impact of caring leadership on nurses' work engagement: examining the chain mediating effect of calling and affective organization commitment

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Abstract

Background Previous studies have established a positive link between nurse managers' caring leadership and nurses' work engagement, but the processes and conditions through which this leadership style influences positive work behaviors remain largely unexplored. To address this gap and contribute to the existing body of knowledge, we developed a chain-mediated effects model to elucidate the impact of caring leadership on nurses' work engagement and the underlying mechanisms. In this model, we identified professional mission and affective organizational commitment as the mediating variables, offering a novel perspective on the relationship between caring leadership and work engagement.

Methods A robust multi-center and large-sample cross-sectional survey was conducted, involving 2502 first-line nurses from six general tertiary hospitals across the eastern, central, and western regions of China. The data collection instruments included a comprehensive questionnaire covering demographic information, the caring leadership scale, the Chinese calling scale, the affective organizational commitment scale, and the Utrecht work engagement scale. Data were meticulously screened and analyzed, employing descriptive analysis to summarize the demographic information, correlation analysis to test the relationship among the variables, stepwise regression analysis to explore the mediating role of calling and affective organization commitment, and the bootstrap method to test the chain mediating effect. This rigorous methodology not only ensures the reliability and validity of research findings but also instills confidence in the robustness of this research.

Results The results indicated a positive relationship among caring leadership, calling, affective organizational commitment, and nurses' work engagement ($p < 0.001$). Specifically, caring leadership was significantly associated with nurses' calling ($\beta = 0.55$, $p < 0.001$), affective organizational commitment ($\beta = 0.21$, $p < 0.001$), and work

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engagement ($\beta = 0.05$, $p < 0.001$). And the analysis further revealed that calling and affective organizational commitment mediate the process between caring leadership and work engagement(Effect: 0.17, 0.03, 0.05), with a relative effect size of 89.3% for the total indirect effect. These findings highlight the crucial role of these factors in enhancing nurses' work engagement, providing valuable insights for healthcare leaders and policymakers.

Conclusion Caring leadership positively predicts nurses' work engagement and indirectly mediates calling and affective organizational commitment. The results of this study revealed that the mechanisms of caring leadership influence nurses' work engagement, which provides a new approach to strengthening nurses' work engagement and improving patient healthcare outcomes and organizational performance. Healthcare organizations face continuous challenges; this study embodies the significance of caring leadership in improving nurses' work experience and increasing their work engagement. Nursing managers should enhance their knowledge of caring leadership and receive caring leadership training, thus actively improving their leadership behaviors in nurse management, enhancing leadership effectiveness, and creating more possibilities for developing healthcare organizations.

Keywords Caring leadership, Calling, Organization commitment, Work engagement, Chain mediating effect, Cross-sectional survey

Introduction

Leadership plays an increasingly crucial role in the management of healthcare organizations. Effective leadership not only motivates nurses' positive work behaviors, but also contributes to improved patient outcomes and the excellent development of healthcare organizations [1–3]. Currently, nursing management is facing continuous challenges, including high workloads and turnover rates, increasing demands for human-centered nursing services, as well as limited healthcare budgets, which urgently require nursing managers to be able to maintain a balance among stakeholders [4]. Many different types of leadership have been applied in nursing management, such as transformational leadership, authentic leadership, and ethical leadership [5–8]. However, a significant number of leadership types have been developed without attention to the characteristics of healthcare settings and the specificities of healthcare, which may result in inadequate leadership effectiveness. Therefore, exploring leadership suitable for healthcare organizations is of great importance in improving the management and practice of healthcare organizations.

Caring leadership is regarded as one of the most effective leadership styles in healthcare organizations, and is sparking the interest of an increasing number of researchers due to its alignment with the type of leadership desired by followers and the characteristics of nursing [9, 10]. As a relationship-oriented type of leadership, caring leadership is characterized by being benevolent to others, appreciating uniqueness, facilitating self-actualization, maintaining mutual benefits, and motivating with charisma [11]. Caring leadership emphasizes the establishment of good interpersonal interactions between leaders and followers, willingness to pay attention to the needs and interests of followers, and providing respect, support and appreciation of followers, then motivating the followers to demonstrate positive work behaviors. Comparing with existed types of leadership like transformational leadership and servant leadership, caring leadership is not task-oriented, nor does it weaken the role and position of the leader, it emphasizes the leader's responsibility and obligation to the organization and employees, advocates an employee-centered management style, and guides and motivates employees with common interests, so as to realize the congruence of interests between the leader and the follower and thereby promote the achievement of organizational goals. Previous studies have demonstrated the possible positive outcomes of caring leadership, including increased job satisfaction among nurses [9] and prevention of workplace bullying [12]. However, the relationship between caring leadership and followers' positive work behaviors still needs further evidence.

Work engagement is described as being physically, psychologically, and emotionally involved in an individual's work and includes three main characteristics: vigor, dedication, and focus [13–15], and is regarded as an important predictor of employees' positive work behaviors. In previous studies, a high level of work engagement was associated with positive organizational outcomes like work performance, productivity, and benefits [15]. In healthcare organizations, nurses' work engagement is emphasized due to the complex circumstances in current nursing care practice, such as nurse shortage, the need to improve healthcare quality, and the reduction of adverse events, which helps to maintain an optimal balance among the organization, patients, and nurses, yielding various benefits [16]. Therefore, it is essential to take effective measures to promote nurses' work engagement.

High-quality leader-member relationships are often viewed as an important variable that plays a significant role in promoting employees' work engagement [17]. One possibility for establishing high-quality leader-member relationships is provided by social exchange theory,

which suggests that high-quality relationships are based on mutual obligation, trust, and reciprocity, and are long-lasting social relationships rather than simple economic exchanges [17, 18]. According to the characteristics of caring leadership, caring leaders are more inclined to establish positive interpersonal relationships with their followers through focusing on follower benefits, prompting the formation of high-quality leader-member exchange relationships between leader and followers. Therefore, it is hypothesized there are some positive associations between caring leadership and employee work engagement, but this relationship is not yet supported by empirical evidence.

While social exchange theory provide reasonable evidence to explain the antecedents of nurses' work engagement, the cognitive and affective processing that exists behind individuals' behavior was ignored to some degree [19]. As indicated by social cognitive theory, individual behavior is influenced by both cognition and environmental factors [20]. It indicates that in healthcare organizations, nurses' engagement may also be influenced by both their perceptions of their profession and their emotions toward the organization. Previous studies showed that caring leadership positively influences nurses' working behaviors through the caring and leading process [11, 21]. Caring helps to strengthen nurses' affection for the organization while leading helps to improve their identification and pursuit of their career, but there is a lack of empirical evidence for this process.

Calling refers to the intense passion and force for a particular profession that brings about purpose, fulfillment, and happiness in the working process [22, 23]. A high level of calling indicates that individuals tend to regard their work as the primary means of achieving self-actualization or self-pleasing, triggering their positive work behaviors. The essence of nursing is caring for the dignity and value of individuals [24]. When nurses realize the value and meaning of caring, they will pay more attention to the patient and be proactive in providing help and support, thus promoting patient outcomes. The concept of caring leadership focuses on the value, dignity, and well-being of nurses, emphasizing positive support and guidance for them [11, 25, 26], promoting nurses' positive work experiences, and strengthening their professional values and meaning. Therefore, it hypothesized that the professional calling serves as a mediator in the relationship between caring leadership and their work engagement.

Organizational commitment pertains to the degree of an employee's identification and engagement with a particular organization, indicating their emotional connection to the organization and their embrace of its values and visions. Organizational commitment primarily encompasses emotional commitment, normative commitment, and continuation commitment [27]. Affective commitment pertains to an individual's inclination to establish a sense of identification and active engagement with the organization [28]; the more significant the individual's loyalty to the organization, the greater the willingness to contribute proactively at work. Furthermore, affective organizational commitment is a reliable and consistent predictor of employee performance [29]. Previous research suggested that effective organizational commitment is related to positive employee experiences [27]. When nursing managers possess caring leadership, they focus on the interests and well-being of nurses and actively foster a healthy work environment for them, facilitating nurses' positive feelings and identification of the organization and leading to their positive work behaviors. However, the relationships among caring leadership, affective commitment, and nurses' work engagement have not been tested.

There is a possible relationship existing between nurses' calling and their organizational commitment. Previous studies have shown that individuals with a higher sense of career calling have a stronger willingness to pursue professional success [30]. The organization serves as an important channel for individuals to achieve career success, and based on the social exchange theory, individuals with a high sense of calling are more motivated to demonstrate pro-organizational behaviors and to establish high-quality exchange relationships with the organization, which are internalized as a commitment to the organization. Previous studies have revealed a relationship between nurses' calling and organizational commitment [31], suggesting that promoting employees' commitment can be achieved by motivating their sense of professional value and meaning. Nevertheless, the correlation between affective commitment, which strongly correlates with employee performance, and work engagement remains unexplored. Similarly, the connection between nursing managers' caring leadership and those variables has not been investigated.

This study used a cross-sectional survey methodology to investigate the impact of nurses' perceived caring leadership of nursing managers on their work engagement at six tertiary general hospitals in China. Additionally, the study aims to find the internal mechanisms underlying this relationship. Therefore, it offers both theoretical and empirical support for promoting nurses' work engagement and improving the leadership effectiveness of nursing managers.

Sampling and methods

Sampling

Based on the analysis of regional economic trends, a convenient selection process was employed to select six teaching hospitals in China's eastern, central, and western

areas. Two hospitals were included in each region. A suitable sampling approach was applied to select frontline nurses engaged in the six hospitals from January 10 to 15, 2022. The inclusion criteria of the nurses are as follows: ① Undertake frontline clinical care; ② At least two years of work experience in the current department; ③ Willing to participate and sign the informed consent form. The exclusion criteria are as follows: ① Informal employees like training nurses and rotation nurses; ② Unoccupied for over six months; ③ Previously diagnosed with cognitive or psychiatric disorders.

According to research design data, the sample size was calculated using the formula $N = (\frac{Z_{\alpha/2}\sigma}{\delta})^2$ [32]. Where $Z_{\alpha/2}$ is the t-value for an α level of 0.05 (1.96);σ is the standard deviation in the pre-test (22.40); δ is the acceptable margin of error for the mean (1.00); the calculated sample size is about 1928. Considering the additional 10% invalid response, the minimum sample size was approximately 2143. Furthermore, the suggested sample size for detecting causal mediation effects is over 767 to ensure a power of at least 0.8, and larger sample sizes can enhance the statistical efficacy and the reliability of the results [33]. Therefore, a larger sample size of participants was recruited in this study to ensure the reliability of the results.

Variables and measures

Demographic information

The research team designed a self-designed questionnaire to collect the participants' demographic information, including nurses' age, gender, marital status, education level, title, working years, work department, and other related information.

Caring leadership

The measurement of caring leadership used the Caring Leadership Scale (CLS) developed by Zhang [34]. It consisted of five dimensions with 27 items using the 5-point Likert scale, 1 is strongly disagreed with and 5 is strongly agreed with. The total score on the scale ranged from 27 to 135; a higher score indicated nurses' stronger perception of caring leadership from their nurse managers. The results of the psychometric assessment indicated that the I-CVI exhibited a range of values between 0.90 and 1.00, the S-CVI/UA scored 0.89, and the S-CVI/Ave score was 0.99. The confirmatory factor analysis revealed the following model fitting indicators: RMSEA=0.079, CFI=0.946, NFI=0.939, TLI=0.939, IFI=0.946 whereas Cronbach's α coefficient was 0.993, and the Spearman-Brown split-half correction coefficient was 0.974. In this study, Cronbach's α coefficient for the scale was 0.994.

Career calling

The measurement of nurses' career calling was conducted using the Chinese Calling Scale (CCS) established by Zhang et al. [35]. The study utilized a 10-item scale encompassing three dimensions: altruism, guiding force, meaning and purpose. Each item was assessed using a 5-point rating system, with responses ranging from 1 (indicating strong disagreement) to 5 (indicating strong agreement). The scale's total score varied between 10 and 50, with a higher score indicating a greater level of calling. In this study, Cronbach's α coefficient was 0.97 and 0.89 in Chinese populations.

Organizational commitment

This study used a brief five-item affective organizational commitment scale (ACS) developed by Gao-Urhahn et al. [29]. to evaluate nurses' organizational commitment. The scale utilized a Likert 7 rating method, ranging from strongly disagree (1) to agree (7) strongly [29]. Cronbach's α coefficient measured in Korea was above 0.90, and in the present study, it was 0.98.

Work engagement

Utrecht Work Engagement Scale (UWES) developed by Schaufeli [36] was used to evaluate nurses' work engagement, which consisted of vigor, dedication, and absorption [15]. The original version of the scale included 17 items, then shortened to 9 items. Each item was scored using a 7-point rating method: "0" means never, and "6" means always [36]. Cronbach's α coefficient for the simplified scale of the Chinese version was 0.88 [13]. In this study, Cronbach's α coefficient for the scale was 0.97.

Data collection

The questionnaire was translated to an electronic questionnaire through an online questionnaire platform (Wenjuanxing, https://www.wjx.cn/). Before the online survey began, a small sample test, including 20 frontline nurses, was invited to complete the online questions to assess the required time and modify the questionnaire according to their views. After the preliminary test, the link and corresponding QR code of the questionnaire were transferred to the WeChat workgroup of clinical nurses with the assistance of the nursing director and head nurses. The respondents could click the link or scan the QR code to view the introduction and basic content of the questionnaire and choose whether to fill in this questionnaire according to their own will. The minimum sample size of each hospital and department was clarified according to the number of nurses in the target hospitals before the formal survey. During the survey process, preliminary data analysis was performed to identify the participants' characters, and then a series of reminders were sent to the nurses' WeChat working group.

Questionnaires cannot be submitted unless they have been thoroughly completed.

Data analysis

The statistical software SPSS 26.0 and AMOS 24.0 were used for data organization and analysis. Descriptive analysis, structural equation model, stepwise regression, and bootstrap method were used for statistical analysis. Categorical data were statistically described using frequencies (n) and percentages (%), and quantitative data were statistically described using means (M) and standard deviations (SD) after the normal distribution test. Chain mediation effects were tested using the macro program PROCESS 3.5 developed by Hayes [37]. In SPSS 26.0, the bootstrap method of 5000 times sampling was set during the analysis. The results were considered significant when the upper and lower 95% confidence intervals (95% CI) did not contain zero. Before data analysis, AMOS 24.0 was used to adjust for the influence of an unmeasured latent techniques component to assess common method bias [38].

Table 1 The demographic information of nurses ($n=2502$)

Characteristics	Frequency (*n*)	Percentage (%)
Gender		
Male	59	2.36
Female	2443	97.64
Age (M ± SD)	31.52 ± 6.38	
<30	1196	47.80
30 ~ 39	1112	44.44
40 ~ 49	166	6.63
≥ 50	28	1.12
Marital status		
Unmarried	839	33.53
Married	1601	63.99
Divorced or widowed	62	2.48
Education		
Master degree or above	15	0.60
Bachelor degree	1852	74.02
Associate degree	635	25.38
Years of work (M ± SD)	9.55 ± 6.65	
<10	1553	62.07
10 ~ 19	778	31.10
20 ~ 29	138	5.52
≥ 30	33	1.32
Title		
Senior	36	1.44
Middle	406	16.23
Primary	2060	82.33
Work department		
Medicine	647	25.86
Surgery	485	19.38
Obstetrics/Gynecology/Pediatrics	435	17.39
Outpatient/Emergency/ICU/Operating	447	17.87
Others	488	19.50
Average monthly income (CNY)		
<5000	916	36.61
5000 ~ 10,000	1323	52.88
>10,000	263	10.51

Ethical consideration

This study was approved by the ethical institution of Tongji Medical College, affiliated with Huazhong University of Science and Technology (S137). Informed Consent Guidance for IRBs, Clinical Investigators, and Sponsors [39] was followed during the study, and the questionnaire will not be available for completion if the participant does not agree.

Results

A total of 2,741 nurses completed the questionnaire. 239 responses were excluded for trained nurses (n = 32), wrong answers to commonsense questions (n = 46), too short a response time (n = 96), and regular responses (n = 65). Finally, the remaining 2,502 valid responses were enrolled in the analysis, with the final valid response rate of 91.3%.

Demographic information

Among 2502 nurses, 97.64% were female, and 2.36% were male, with an average age of 31.52 ± 6.38 years. About 63.99% of nurses were married, and most (74.02%) were educated with bachelor's degrees. The average working years of nurses was 9.55 ± 6.65 years, and 62.07% of nurses worked less than 10 years. Most of the nurses who participated in this study have a junior title (82.33%), about half (45.24%) of the nurses were recruited from the medicine and surgery department, and half of the nurses (52.88%) had an average monthly income ranging from 5000 to 10,000 CNY. Table 1 depicts detailed information on this.

The control and statistical test of common method bias

Before the survey was initiated, a pretest using the online questionnaire was conducted to determine the latent troubles and ensure the participants could complete the online questionnaire patiently and conscientiously. During the survey, respondents were allowed to complete the questionnaire anonymously to make the most realistic choices. After the survey was finalized, the responses were screened based on the criteria to eliminate invalid responses.

Controlling for the effects of an unmeasured latent methods factor (ULMC) was used to test the common method bias. First, a base model including latent variables and all measures was built in AMOS 24.0; the model

Table 2 Means, standard deviations, and correlations of variables ($N = 2502$)

Variables	M	SD	CLS	CCS	ACS	UWES
CLS	119.12	21.20	1			
CCS	42.43	7.62	0.55***	1		
ACS	28.31	6.65	0.60***	0.82***	1	
UWES	38.35	11.92	0.50***	0.78***	0.73***	1

Note ***$p<0.001$; CLS: caring leadership; CCS: career calling; ACS: affective organizational commitment; UWES: work engagement

Table 3 Regression analysis of the variables ($n = 2502$)

Dependent variable	Independent variable	Coefficient	t	β	LLCI	ULCI	R^2	F
CCS	CLS	0.2	33.24***	0.55	0.19	0.21	0.31	1105.19***
ACS	CLS	0.07	16.13***	0.21	0.06	0.07	0.71	3069.64***
	CCS	0.62	54.92***	0.71	0.60	0.64		
UWES	CLS	0.03	3.18***	0.05	0.01	0.04	0.64	1481.40***
	CCS	0.87	26.00***	0.56	0.81	0.94		
	ACS	0.43	10.95***	0.24	0.36	0.52		
UWES	CLS	0.28	29.12***	0.50	0.26	0.30	0.25	847.94***

Note ***$p<0.001$; CLS: caring leadership; CCS: career calling; ACS: affective organizational commitment; UWES: work engagement

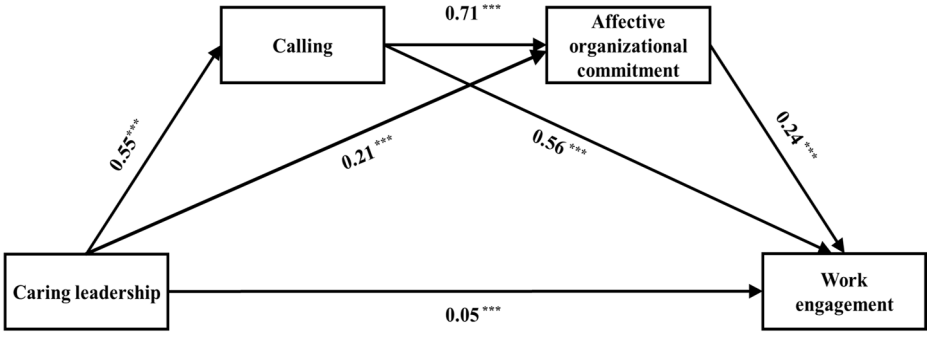

Fig. 1 Chain-mediation model of caring leadership, affective commitment, calling, and work engagement

fit indicators were recorded after calculation. Then, the model fit was calculated after adding a common method factor with all measures as indicators. Compared with the base model, the model fit indicators were improved after adding a common method factor; the absolute change of RMSEA was 0.01(<0.05), and the absolute change of CFI, TLI, IFI, and NFI was 0.028, 0.025, 0.028, 0.028 (<0.1), respectively, indicating no existence of common method bias [38].

Descriptive analysis and correlation of variables

The average scores for nurses' perceived caring leadership, calling, affective organizational commitment, and work engagement were 119.12±21.20, 42.43±7.62, 28.31±6.65, and 38.35±11.92, respectively. The results of correlation analysis suggested positive relationships among nurses' perceived caring leadership, calling, affective organizational commitment, and work engagement, with correlation coefficients r between 0.50 and 0.82 ($p<0.001$), as depicted in Table 2.

Caring leadership and work engagement: chained mediating analyses

The macro program PROCESS 3.5 was used to conduct stepwise regression analysis using a chain mediation effect model (Model 6). The independent variable in this study was caring leadership, while the mediating variables were calling and affective organizational commitment. Moreover, nurses' work engagement was used as the dependent variable. Table 3 depicts the results, which suggested that caring leadership was a significant positive predictor of nurse's calling, affective organizational commitment, and work engagement (β=0.55, CI [0.19, 0.21], $p<0.001$; β=0.21, CI [0.06, 0.07], $p<0.001$; β=0.05, CI [0.01, 0.04], $p<0.001$). Further, career calling was a significant positive antecedent factor of affective organizational commitment and nurses' work engagement (β=0.71, CI [0.60, 0.64], $p<0.001$; β=0.56, CI [0.81, 0.94], $p<0.001$). Moreover, affective organizational commitment was a significant positive predictor of nurses' work engagement (β=0.24, CI [0.36, 0.52], $p<0.001$). Figure 1 presents the relationship of caring leadership,

calling, affective organization commitment, and work engagement.

Bootstrap method with 5000 times resamples was used to test mediation effects, and the results shown in Table 4 suggested a statistically significant difference in mediation effects. The total effect was 0.28 (Boot95% CI [0.26, 0.30]). The chain-mediation model had a direct impact of 0.03 (Boot95% CI [0.01, 0.04]), representing 10.7% of the entire effect. Furthermore, the total indirect effect was 0.26 (Boot95% CI [0.23, 0.28]), reflecting 89.3% of the total effect. The indirect effect of pathway caring leadership→calling→work engagement was 0.17 (Boot95% CI [0.15, 0.19]), representing 60.7% of the total effect. The indirect effect of pathway care leadership→affective organizational commitment→work engagement was 0.03 (Boot95% CI [0.02, 0.04]), representing 10.7% of the total effect. And, the indirect effect of pathway caring leadership→calling→affective organizational commitment→work engagement was 0.05, (Boot95% CI [0.04, 0.07]), indicating 17.9% of the total effect.

Discussion

This study showed a positive relationship between caring leadership, calling, effective organization commitment, and work engagement. The role of these variables on nurses' work engagement has been tested. According to the results of the data analysis, all the hypotheses of this study were confirmed.

The relationship between caring leadership and work engagement

The findings of this study indicate a substantial relationship between nurses' sense of caring leadership exhibited by their managers and their level of work engagement ($r=0.50$, $p<0.001$), which corroborates the fundamental insights of social exchange theory. Previous studies showed that nurse managers' caring behaviors have a positive influence on improving nurses' job satisfaction and well-being and decreasing workplace bullying [11, 12, 40], which contributes to dispelling depletion in nurses' work and shaping a conducive work climate, thus promoting their work engagement. This study provides further empirical evidence demonstrating that nurses' perceived caring leadership has a moderate impact on their work engagement, reflecting the importance and necessity of reinforcing caring leadership among nursing managers in healthcare organizations.

The mediating effect of calling

Calling is an important intrinsic motivation for nurses to exhibit positive work behaviors; its relationship with work engagement has been widely validated, and strengthening nurses' calling is crucial for improving nurses' work engagement. Previous studies have shown that effective leadership plays a crucial role in shaping an individual's sense of calling [41, 42]. Certain conventional leadership approaches, such as transformational leadership, have demonstrated a favorable impact on employees' perception of their sense of calling [41]. This study found that caring leadership directly influenced both nurses' sense of calling and work engagement, owing to the leader's effectiveness in maintaining a high-quality exchange relationship with the nurses, which allowed them to continue benefiting from their work. This result provides new insight into enhancing nurses' sense of calling and work engagement. Further studies have shown that caring leadership can influence nurses' work engagement by reinforcing their professional calling, and the mediating effect accounts for a major percentage of the total effect. According to social cognitive theory, promoting an individual's positive behavior can be achieved through changing individual cognition [20], and the result is consistent with the hypothesis of social cognitive theory. The reinforcement of calling is closely related to value, meaning, and objective well-being, while nurses experience positive feedback and intrinsic fulfillment from their work, they will develop positive perceptions of their profession. Caring leadership appreciates an individual's uniqueness and value. It provides chances for individual growth, which helps nurses feel their growth, enabling them to achieve professional and personal growth, thereby giving greater meaning to their work and increasing engagement.

Table 4 Chain mediating effect on caring leadership, calling, affective organization commitment, and work engagement ($n=2502$)

Effect type	Model pathways	Effect	BootSE	Boot 95%CI		Relative effect
				Lower	Upper	
Direct effect	CLS→UWES	0.03	0.01	0.01	0.04	10.7%
Indirect effect	CLS→CCS→UWES	0.17	0.01	0.15	0.19	60.7%
	CLS→ACS→UWES	0.03	0.01	0.02	0.04	10.7%
	CLS→CCS→ACS→UWES	0.05	0.01	0.04	0.07	17.9%
Total indirect effect		0.26	0.01	0.23	0.28	89.3%
Total effect		0.28	0.01	0.26	0.30	100.00%

Note CLS: caring leadership; CCS: career calling; ACS: affective organizational commitment; UWES: work engagement

The mediating effect of affective organizational commitment

Previous studies showed the effect of organizational commitment on individuals' work engagement [43]. However, affective organizational commitment has been less explored as a major predictor of employee behavior. This study provided powerful evidence of the relationship between affective organizational commitment and nurse work engagement. Furthermore, this study provides a new type of leadership closely related to developing effective organizational commitment. It demonstrates the role of affective organizational commitment in the relationship between caring leadership and nurse work engagement, which provides new perspectives on improving nurses' work engagement. The affective organizational commitment of nurses indicates their inner emotional attachment and favorable psychological agreement with the organization, which is a significant motivator for their positive work behaviors, and the formation of this affective organizational commitment relies on high-quality exchange relationships. This study found that caring leadership is a vital antecedent factor that facilitates the development of an individual's affective organizational commitment, which provides a novel approach to strengthening an individual's affective organizational commitment. Caring leadership is characterized by being person-centered, providing assistance and support, thereby facilitating nurses in cultivating a favorable evaluation of the organization and establishing a robust connection with it. Consequently, nurses are more inclined to assimilate into the organization and exhibit proactive behaviors that contribute to its growth and transformation. Therefore, emphasizing caring leadership in healthcare organizations not only promotes nurses' affective organizational commitment and strengthens their work engagement but also helps to ameliorate the current problems of apparent burnout and high turnover rates among nurses.

The chain-mediating effect of calling and affective organizational commitment

The present study has identified a significant relationship between caring leadership and nurses' work engagement, mediated by the interplay of professional calling and affective organizational commitment. Moreover, the results also confirm the assumptions of previous research on how caring leadership works [11]. As described by social cognitive theory, both environmental and cognitive factors can influence individual behavior [20]. The results presented a direct influence between a nurse manager's caring leadership and nurses' work engagement, where the influence relies more on nurses' positive career calling and affective organizational commitment. The results also indicate a high correlation between nurses' professional calling and their affective organizational commitment, which indicates that powerful professional calling can strengthen their affective organizational commitment. Nurses' strong calling means they can experience passion and meaning in their work, which helps nurses to regard the organization as the key towards professional success, strengthen their exchange with the organization, increases their sense of belonging to the organization and leads to intensive psychological bounding towards the organization. However, the direct influence of caring leadership on nurses' work engagement is limited, it primarily influences nurses' work engagement indirectly through career calling and affective organizational commitment. This result may be related to the characteristics and traits of caring leadership. Caring leadership prioritizes variables that are directly linked to nurses' work experience, such as cultivating an optimal interpersonal relationship, enhancing the work environment, and promoting individual growth rather than focusing on direct bonus rewards [11, 44, 45]. When caring leadership is demonstrated, nurses can get a positive experience of the profession and the organization and a rewarding obligation to the organization, thus improving their work engagement. This result supports the views from social exchange theory and social cognitive theory, and provides new insights into the relationship between leadership and nurses' work engagement, highlighting the importance of individual cognition and affections in leader-member relationship. Therefore, for nursing managers, it is essential to take caring leadership into consideration, and actively accept relevant education and training programs, as a leader's efficient caring leadership helps nurses develop positive experiences of their profession and organization, thereby demonstrating desired extra-role behaviors.

Limitations

This research investigated the impact of caring leadership on nurses' work engagement and the underlying influencing relationship, providing new perspectives and empirical support for strengthening nurses' work engagement and improving the leadership of nurse managers. There are certain limitations of this study. First, the data was collected using a self-reported method, which may result in potential bias. Still, this bias was well controlled by collecting a large sample of data, using strict research procedures, and conducting statistical testing. Second, only calling and affective organizational commitment are used to explain the influence of relationships between caring leadership and work engagement, some possible variables need to be taken into consideration. In subsequent studies, other related variables can be further explored.

Conclusion

The perception of caring leadership among nurses was found to correlate favorably with their career calling, emotional, organizational commitment, and work engagement. The influence of caring leadership on nurses' work engagement can be observed through the mediating effects of calling and affective organizational commitment. This empirical evidence supports that caring leadership can enhance nurses' work engagement. Nursing managers can continuously strengthen caring leadership to improve nurses' work experience, motivate them to pursue their careers and strong affective attachments to the organization and enhance their work performance.

Abbreviations

ACS	Affective organizational commitment scale
CCS	Chinese calling scale
CFI	Comparative fit index
CI	Confidence interval
CLS	Caring leadership scale
GFI	Goodness of fit index
IFI	Incremental fit index
I-CVI	Item-level content validity index
NFI	Normed fit index
RMSEA	Root mean square error of approximation
S-CVI/UA	Universal agreement of scale-level content validity index
S-CVI/Ave	Average scale-level content validity index
ULMC	Controlling for the effects of an unmeasured latent methods factor
UWES	Utrecht work engagement scale

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12912-024-02388-9.

Supplementary Material 1

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Author contributions

Fengjian Zhang wrote the main manuscript text and Jie Chen review and editing the manuscript. Lei Huang,Yang Fei and Xiao Peng supported with the data analysis, Yilan Liu, Ning Zhang and Cheng Chen provide the support for data collection.

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Data availability

Data and materials can be accessed through the corresponding authors.

Declarations

Ethics approval and consent to participate

This study was approved by the ethical institution of Tongji Medical College, affiliated with Huazhong University of Science and Technology (S137). Nurses were required to read the electronic informed consent and select the agreement option before completing the questionnaire.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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