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# Relationship between head nurse leadership and nurses' burnout: parallel mediation of job demands and job resources among clinical nurses

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## Abstract

**Background** Many elements in the workplace contribute to nurses' burnout experiences, affecting patient safety and the healthcare organizations' efficiency. Leaders' presence and conduct are the most potent "master" factors in every work setting. Although previous studies have shown that head nurse leadership, job demands, job resources, and job burnout are significantly related, the interaction mechanism remains unclear. This study investigates the parallel mediating roles of job demands and job resources between head nurse leadership and job burnout in nursing staff.

**Methods** A cross-sectional, anonymous, and confidential online survey was conducted from March to June 2024 to collect data from 579 registered nurses in four hospitals in Hunan provinces. The independent variable was head nurse leadership, the mediating variables were job demands and resources, and the dependent variable was job burnout. Parallel mediation analysis was performed using the PROCESS macro in SPSS.

**Results** This study found that head nurse leadership negatively relates to nurses' burnout. The parallel mediation analysis suggests that job resources and job demands play parallel roles in the relationship between head nurse leadership and job burnout. As predicted, head nurse leadership weakened job burnout through job resources and contributed to job burnout through job demands.

**Conclusion** This study finding highlights the importance of head nurse leadership in decreasing nurses' job burnout and reveals two potential mechanisms through which head nurse leadership is related to nurses' burnout. By understanding the role of head nurse leadership, job demands, and job resources, interventions can be targeted to improve nurses' mental health.

**Keywords** Head nurse leadership, Job demands, Job resources, Burnout, Nurse

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## Background

Burnout occurs when individuals experience prolonged emotional and interpersonal pressures in the workplace. It is a complex phenomenon that consists of three key components: emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment [1]. Burnout is prevalent among healthcare professionals, especially among nurses [2, 3]. In a national survey, over two-thirds of registered nurses in the United States indicated suffering from burnout [4]. Burnout among nurses reached 64.5% in China and 60% in South Korea and Japan [5, 6]. As the workloads on hospital systems and physicians have escalated, the pressures placed on nurses have also intensified [7, 8]. Burnout, a response to work-related stresses, promotes chronic stress in nurses and presents as a variety of mental and physical health problems, such as headaches, exhaustion, irritability, and difficulty concentrating [9, 10]. If neglected, burnout can trigger many personal repercussions, such as anxiety and sleep issues, which impact mental health [11]. Furthermore, some studies reveal that individuals experiencing severe burnout may have suicidal tendencies [12, 13]. Job burnout also reduces work efficiency and undermines decision-making, reactivity, and critical thinking skills [14, 15]. Burnout eventually leads to increased medical errors, missed nursing care, and decreased patient satisfaction [16]. Therefore, to protect nurses' well-being and relieve burnout among nurses, identifying the underlying factors of burnout has remained a vital research theme in nursing management.

There has been a growing focus on the emotional and physical well-being of nurses, with extensive research on burnout, and the Job Demands-Resources (JD-R) model serving as the most widely used framework for understanding occupational stress and its relationship with employee health [17]. The central assumption of the JD-R model is that each employment is related to two broad categories of work characteristics: job demands and job resources [18]. Job demands refer to the elements of a job requiring extended physical or mental work, thereby having certain physiological and psychological costs [19]. Job resources are "those physical, psychological, social, or group aspects of the job that are either/or (1) functional to accomplish work goals, (2) shorten job demands and physiological and psychological costs, and (3) motivate personal growth, learning, and development" [20]. The JD-R model emphasizes two key pathways: the motivating pathway and the health deterioration pathway. The motivational pathway suggests that engagement with work and job resources foster positive outcomes and reduce burnout, while excessive job demands lead to burnout and negative health impacts [21, 22]. Various job demands and resources are identified as predictors of burnout in nurses. A meta-analysis found that job demands, such as workplace conflicts, role conflict, and role ambiguity are significant contributors to burnout. Key job resources such as autonomy, social support, and access to adequate personnel are crucial in alleviating burnout [23]. Recently, researchers have expanded the JD-R model to encompass factors beyond job demands and resources, including personal resources, empowerment, work-family conflict, and so on [18, 24]. These enhancements provide a more thorough understanding of the evolution and effect of occupational burnout. Notably, the model also underscores the crucial role of managers in reconciling job demands and job resources in the workplace [25, 26]. Leadership is the process of motivating a group to achieve a goal, and it can significantly influence employee performance, serving as a key predictor of an organization's success or failure [27, 28].

Nurse managers are essential in healthcare departments, managing the main workforce group in leading direct care units: the nursing staff. It should be noted that the daily work of nursing managers often involves organizing, planning work, and managing resources [29]. Leaders' top-down influence may also create structural changes in resource and demand that affect huge groups [30]. Head nurse leadership might be considered a higher-order job resource or demand that simultaneously affects many people [31]. Building on the ideas of Tummers and Bakker and integrating JR-R theory with Einarsen's conceptualization of leadership [32, 33], we argue that head nurse leadership might generate extra demands or resources. Therefore, leadership could be a moderator that directly influencing job demands and resources. For example, when workers face an elevated workload, supervisors may alleviate this job demand by identifying organizational priorities and recognizing which tasks can be safely disregarded [34]. By allowing workers to choose their work schedule and location, leaders can augment job resources through increased job autonomy [35]. Effective leadership is shown by granting nurses autonomy, exhibiting compassion and empathy, and ensuring an adequate nurse-patient ratio, which may reduce stress and physical burdens while improving job satisfaction [36]. However, leadership among nurse managers varies significantly among organizations; unsatisfactory or unfavorable workplace conditions marked by insufficient leadership skills, a shortage of nursing personnel, and high stress levels impede the quality of nursing performance [37, 38]. Many scholars pointed to a lack of attention paid by researchers, hospital administrators, and policymakers to unit-level management. They called for more systematic studies on nurse manager leadership and management skills and practices that affect nurses' occupational mental health.

To date, the associations between head nurse leadership, job demands, and resources with burnout among

nurses have not been explored. It is also unclear how job demands and resources mediate the effect of head nurse leadership on job burnout. Thus, underpinning the JD-R theory as the foundation of this study, this study aimed to examine the relationship between head nurse leadership, job demands, job resources, and job burnout among nurses in China and to investigate the role of job demands and job resources in mediating the relationships between head nurse leadership and job burnout among nurses in China. We hypothesized that (1) higher leadership levels in nurse managers are associated with lower levels of job burnout among nurses. (2) Job demands and job resources would mediate the association between head nurse leadership and burnout.

## Methods

### Design and participants

A cross-sectional survey was performed using a convenience sample approach among nurses from four hospitals in Changsha, Hunan Province, from March to June 2024. The inclusion criteria were registered nurses who comprehended the survey's objective, consented, and participated willingly, with more than one year of experience in the department. The exclusion criteria included nurses with psychiatric disorders or those on extended leave (e.g., maternity leave).

The appropriate sample size for hierarchical regression analysis was determined using G*power. Taking into consideration an effect size (f) of 0.15 (median), a power (1 – β) of 0.95, a significance level (α) of 0.05, and a total of 31 variables. A theoretical minimum sample size of 229 is required.

With the help of the nursing department, 610 target nurses received the call to participate via a link on the WeChat platform. The questionnaire is composed of research purpose, informed consent, data confidentiality, questionnaire information, etc. After reviewing the study's objectives and contents, the nurses decided to join or not, and they were free to leave at any moment. Lastly, we used the Wenjuanxing platform (https://www.wjx.cn/) to gather 579 valid surveys (response rate: 94.9%). Since every question was marked as required, no information was missing.

### Measurements

#### *Demographic variables*

A demographic questionnaire was utilized in this study to collect the characteristics of participants, including gender, age, marital status, educational level, length of nursing work, income, professional title, current working department, and department head nurse's education.

#### Head nurse leadership

The head nurse leadership scale developed by Huang Chunmei was used to evaluate the head nurse's leadership [39]. Six characteristics make up this scale: decisiveness, influence, charisma, affinity, foresight, and strength of control. The 44 items were evaluated using a 5-point Likert scale (1 = never, 2 = rarely, 3 = partially, 4 = often, and 5 = always). A higher total score indicates more effectiveness in the head nurse's leadership. The scale's Cronbach's alpha was 0.961.

#### Job demand-resource

Chinese researcher Li Jie created the employment demand-resource scale [40], which consists of two parts. The first section is the Job Demands Questionnaire, which consists of 19 questions and covers six dimensions: shifting work, surroundings, psychological and emotional demands, workload, and time management. Each item has a negative phrase, and a 5-point Likert scale is used to rate it (1 = never, 5 = almost always). The higher the overall score, the greater the work demands. The second section consists of the Job Resources Questionnaire, which has 15 questions and covers five dimensions: social support, decision-making involvement, job control, incentives, and skill diversity. Items with negative phrasing are scored positively, and those with positive phrasing are scored inversely. Notably, a higher score indicates fewer job resources. Cronbach's alpha for the scale was 0.893.

#### Job burnout

The survey utilized the Chinese version of the Occupational Burnout Scale, revised by Chinese researchers such as Li Chaoping [40]. The scale comprises three dimensions: emotional exhaustion (5 items), depersonalization (4 items), and reduced personal accomplishment (6 items), totaling 15 items. It employs a 7-point Likert scale, where 0 to 6 correspond to "never," "almost never," "rarely," "sometimes," "often," "quite often," and "very frequently," respectively. The reduced personal accomplishment dimension is reverse-scored, while the other items are scored positively. Higher scores indicate more severe feelings of occupational burnout. The overall Cronbach's α coefficient of the scale is 0.903.

### Statistical analysis

The outcomes were downloaded from Questionnaire Star and evaluated using SPSS 25.0 statistical software. Descriptive statistics, including frequency and percentage, were used to characterize sample demographics and occupational attributes. Pearson was used to describe the correlations among research variables, At the same, multivariate linear hierarchical regression analysis was performed to examine the possible predictive influence of

**Table 1** Demographic characteristics of the sample

| Variables | | Frequency (*n*) | Percentage (%) |
|---|---|---|---|
| Gender | Female | 545 | 94.1 |
| | Male | 34 | 5.9 |
| Age group (years) | ≤ 30 | 242 | 41.8 |
| | 31–40 | 256 | 42.2 |
| | ≥ 41 | 81 | 14.0 |
| Married status | Married | 415 | 71.7 |
| | Unmarried | 164 | 28.3 |
| Profession title | Practitioner | 303 | 52.3 |
| | Senior nurse | 276 | 47.7 |
| Education level | Junior college or below | 80 | 13.8 |
| | Bachelor degree | 439 | 75.8 |
| | Master's degree or above | 60 | 10.4 |
| Income(yuan) | < 5000 | 149 | 25.7 |
| | 5000–10,000 | 311 | 53.7 |
| | > 10,000 | 119 | 20.6 |
| Work experience (years) | ≤ 10 | 310 | 53.5 |
| | 11–20 | 197 | 34.0 |
| | ≥ 21 | 72 | 12.4 |
| Department head nurse's education level | Junior college or below | 38 | 6.6 |
| | Bachelor degree | 325 | 56.1 |
| | Master's degree or above | 216 | 37.3 |

head nurse leadership, work demand, and job resources on job burnout. The results of the Harman one-way test for common method bias indicate that if the first-factor explanation rate is below 40%, the data in this study does not exhibit significant common method bias. The mediation effect analysis was conducted using Hayes' SPSS macro program, PROCESS, employing the Bootstrap method with 5000 resamples to calculate the 95% confidence interval. The mediation effect is deemed significant if none of the results include 0. Differences were considered statistically significant at $P < 0.05$.

## Results

### Test of common method bias

Harman's single-factor analysis was used to check for common methodological bias. The results indicated that 15 factors had eigenvalues of more than 1, and the first one interpreted 26.97% of the variability. This result is below the threshold of 40%, suggesting that there was no serious problem with common-method bias in this study.

### Characteristics of participants

This study showed that almost all the nurses were female; most participants (71.7%) were married, aged 31–40 (42.2%). Most nurses (52.3%) held a practitioner nurse title or lower, while 47.7 held a senior nurse title or above. Regarding education level, 80 (13.8%) had junior high school education, 439 (75.8%) had a bachelor's degree, and 60 (10.4%) had a master's degree or above. See Table 1 for more detailed demographic information.

### Correlations between variables

Pearson correlation analysis demonstrated that the correlation coefficient between the total score of head nurse leadership and the total score of job burnout of 579 nurses was ($r = -0.183$, $P < 0.001$), job demands ($r = -0.142$, $P < 0.001$), and job resources ($r = -0.316$, $P < 0.001$). The correlation coefficient between the total score of job demands and the total score of job burnout was $r = 0.491$, and the correlation coefficient between the total score of job resources and job burnout was $r = 0.364$, all $P < 0.001$. As shown in Table 2. These significant correlations in the expected direction presented initial support for the postulated relations.

### Parallel mediation analysis results

Table 3; Fig. 1 show the regression analysis results in the mediating effect model under the control of gender, education level, department, and income. The first result of these tests suggested that head nurse leadership scores had a negative and significant effect on job burnout scores (– 0.031, $P < 0.01$). Secondly, the mediating variables job demands scores and job resource scores were negatively influenced by the head nurse leadership scores ($\beta = -0.027$, $p < 0.05$; $\beta = -0.049$, $p < 0.001$). Thirdly, job demands and resources scores significantly mediated job burnout scores ($\beta = 0.490$, $p < 0.001$; $\beta = 0.256$, $p < 0.01$). This result indicates that job demands and resources mediated the relationship between head nurse leadership and job burnout, confirming the hypothesis.

In these analyses, we observed the mediating effects of job demands and job resources conflict on the relationship between head nurse leadership and burnout. Table 4 shows that the direct effect was – 0.027, and the effect size

**Table 2** Mean, standard deviation, and correlations

| | Variable | M | SD | 1 | 2 | 3 |
|---|---|---|---|---|---|---|
| 1 | Head nurse leadership | 176.65 | 30.96 | 1 | | |
| 2 | Job demands | 66.30 | 13.55 | -0.142*** | 1 | |
| 3 | Job resources | 42.27 | 7 | -0.316*** | 0.504*** | 1 |
| 4 | Job burnout | 46.78 | 15.60 | -0.183*** | 0.491*** | 0.364*** |

Note: *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$

**Table 3** Results of the parallel mediation analysis

| Outcome variable | Job demands | | Job resources | | Job burnout | |
|---|---|---|---|---|---|---|
| **Predictor variable** | **β** | **T** | **β** | **T** | **β** | **T** |
| Head nurse leadership | −0.027* | −2.102 | −0.049*** | -7.667 | −0.031** | −2.349 |
| Job demands | | | | | 0.490*** | 10.019 |
| Job resources | | | | | 0.256** | 2.820 |
| R2 | 0.062 | | 0.107 | | 0.272 | |
| Adjust $R^2$ | 0.007 | | 0.091 | | 0.266 | |
| F | 4.417* | | 58.776*** | | 67.907*** | |

Note: *$P<0.05$, **$P<0.01$, ***$P<0.001$

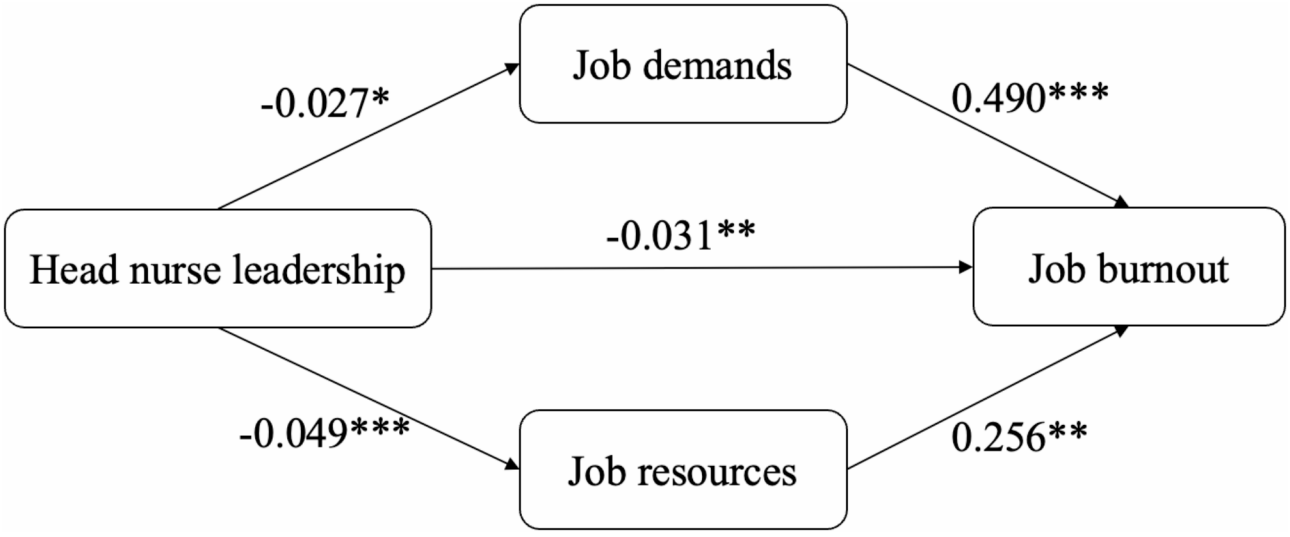


**Fig. 1** Parallel mediation pathway model. Note: *$P<0.05$, **$P<0.01$, ***$P<0.001$

**Table 4** Bootstrap analysis of parallel mediation effects

| | Effect | Bootstrap SE | Boot LLCI | Boot ULCI |
|---|---|---|---|---|
| Total effects | -0.061 | 0.014 | -0.088 | -0.034 |
| Direct effects | -0.027 | 0.013 | -0.052 | -0.002 |
| Total indirect effect | -0.034 | 0.008 | -0.050 | -0.019 |
| Indirect effect 1 | -0.020 | 0.006 | -0.032 | -0.008 |
| Indirect effect 2 | -0.014 | 0.005 | -0.026 | -0.004 |

was 44%; the total indirect effect of head nurse leadership and job burnout was −0.034, and the effect size was 56%. This shows a significant mediating role in the relationship between head nurse leadership and job burnout. Specifically, the mediating effect consisted of the indirect effects from two pathways. (1) The mediating effect of job demands was 0.02 (95% CI: −0.032 – −0.008). The effect size was 33%. (2) The mediating effects of job resources were 0.014 (95% CI: −0.026 – −0.004). The effect size was 23%. Both indirect effect paths were significant.

## Discussion

This study aimed to enhance understanding of how head nurse leadership influences job characteristics by examining job demands and resources among a sample of nurses. Our findings suggest potential mechanisms through which nurse managers mitigate nurse burnout, offering valuable insights for interventions and a fresh perspective on the factors leading to burnout in nurses. Consistent with the hypothesis, higher levels of head nurse leadership are inversely correlated with burnout among nurses. Job demands and job resources partially mediated the association between head nurse leadership and burnout. Job demand as a risk factor and job resource as an alleviating factor should be addressed to decrease nurses' job burnout.

Researchers have explored negative mental states in nurses, such as job burnout. Many factors could cause job burnout in nurses, such as work environment, hours worked, workload, and so on [41, 42]. This study found that head nurse leadership was one of the risk factors for job burnout, consistent with previous literature. For instance, a survey of over 40,000 healthcare employees found that a 1-point improvement in leadership scores was associated with a 7% decrease in burnout likelihood [43]. Furthermore, a systematic review of nursing leadership highlighted that positive leadership styles boost nurses' well-being in the workplace [44]. Multiple linear regression analysis showed that the relationship between head nurse leadership and burnout remained

significant even after adjusting for confounding variables. This strongly suggested that head nurse leadership could be associated with burnout. Recognizing the significance of strong leadership in burnout prevention may inform targeted interventions and organizational strategies. Transformational leadership, emphasizing individualized support, visionary inspiration, and ethical modeling, enhances team cohesion through trust-building and goal alignment, while fostering psychological resilience against burnout [45]. Transactional leadership reinforces this through structured accountability systems and performance-based rewards, effectively reducing role ambiguity and occupational stress [46]. Empirical evidence demonstrates transformational leadership's consistent negative correlation with burnout rates [45, 47], particularly when integrated with transactional elements to create ambidextrous leadership capabilities [48]. Head nurse leadership development should adopt multilevel strategies, including curricular integration, progressive training, and embedded evaluation. First, integrating transformational-transactional competencies into medical and nursing curricula builds foundational leadership skills, and identifies interdisciplinary leadership talents with innovation potential. Action learning, using clinical simulations and problem-based scenarios, follows this to enhance the application of leadership principles in real-world contexts. Incorporating leadership evaluation into annual assessments promotes continuous improvement. Based on these evaluations, tiered training systems aligned with career paths can provide targeted skill development.

The mediation analysis indicated that job demands partially mediated the relationship between head nurse leadership and burnout, with ineffective leadership increasing job demands and the risk of burnout. This established association aligns with previous research conducted in the field. Toxic leadership exacerbates stress by increasing job demands and hindering recovery processes [49]. Conversely, transformational leadership fosters a supportive environment that enhances resilience and lowers burnout risk [50]. Given the healthcare industry's manpower shortages and increasing job demands [42, 51], high-quality leader-member relationships, along with support and appreciation from leaders, can help nurses reframe challenges and improve job satisfaction [52, 53]. However, sustained exposure to high job demands environments may critically impair nurses' cognitive functioning through chronic activation of stress response pathways [54]. Evidence shows that prolonged occupational stress disrupts the hypothalamic-pituitary-adrenal axis, elevating cortisol levels, which impair prefrontal cortex executive functions and contribute to cognitive decline [55]. This neurocognitive erosion undermines nurses' capacity to perceive leadership and engage with workplace support, despite the availability of job resources [56]- a phenomenon consistent with the Conservation of Resources Theory's prediction of depleted psychological capital in chronically stressed individuals [57]. While nurse managers possess partial agency to modulate job demands within their teams through task delegation and workflow adjustments, their ability to enact systemic change remains constrained by organizational hierarchies and resource allocation policies [58]. This necessitates collaborative intervention from institutional administration to implement organization-wide job demand controls based on staffing ratios and workload auditing systems. Crucially, the efficacy of such interventions depends on establishing systematic monitoring mechanisms to assess nurses' perceived job demands, coupled with real-time resource reallocation processes.

This study enhances existing literature by demonstrating how head nurse leadership negatively impacts nurses' job burnout through the mediating role of job resources, as explained by the JD-R theory [59]. In particular, positive nurse manager leadership as a specific form of job resource facilitates nurse job crafting as a motivational process, decreasing job burnout. Supporting evidence includes Sabei's research, which highlighted the importance of management skills and sufficient resources in alleviating burnout among emergency staff [60], and Chen Shu-chuan's findings that managerial support and job resources significantly reduce burnout, overshadowing personal resources [61]. Additionally, about half of nursing job resources relate to leadership factors such as supervisory support and transformational leadership [23]. The current findings suggest that high job resources are associated with low burnout levels among nurses, underscoring the need for nurse managers to provide effective support and foster positive work environments to mitigate burnout [20]. We therefore motivate nurse managers to offer the most effective internal and external supportive resources for nurses, including organizing work environments, fostering harmonious leadership-member relationships and inter-member relationships, and improving reward systems to mitigate burnout as much as possible.

This model provided a pathway of the relationship among head nurse leadership, job demands, job resources, and burnout of Chinese nurses. Namely, head nurse leadership may lead to burnout through the parallel mediating effects of job demands and resources. Our results not only revealed the possible mechanism underlying the relationship between head nurse leadership and burnout but also provided practical intervention to promote burnout problems in nurses. Consequently, simultaneous and comprehensive intervention (both decrease

job demand or increase job resources) could help reduce job burnout more so than head nurse leadership alone.

### Strengths and limitations of the study

Our study had some strengths. First, to the best of our knowledge, this is the first study to investigate the impact of head nurse leadership upon burnout among Chinese nurses via the parallel mediating effects of job demand and job resources. Through these studies, we may not only further explore the influencing aspect of nurses' burnout, but also give a reference for hospital management to develop effective management measures. Second, adjusting for covariates allowed us to incorporate major potential confounders and better account for the association between head nurse leadership and job burnout among nursing staff. Also, several limitations in the current study need to be mentioned. First, due to the cross-sectional study design, we cannot establish causal relationship between the variables. More robust and dynamic data about the relationship between head nurse leadership, job demands, job resources, and job burnout over time could be obtained by future researchers through longitudinal or experimental study. Second, the subjects of the present study were all from Hunan province. Due to the cultural context and differences in supervisor-subordinate dynamics between different regions and countries, it is essential to exercise caution when extrapolating these findings to a more diverse and global healthcare context. Therefore, more multi-center studies are required to assess the generalizability of these findings to nursing populations across various cohorts and in other nations. Third, our respondents completed the self-reported survey with mobile devices, which might lead to self-reported biases and social desirability response bias, as some participants may have provided inaccurate responses. Additionally, this study primarily utilized quantitative methods. A more objective approach, such as observational methods or a qualitative approach, would complement the findings by exploring the underlying factors and dynamics that shape the influence of nurse leadership on burnout among nursing staff.

## Conclusion

This study revealed that job demands and resources mediate the association between head nurse leadership and burnout among nurses, and nurses with lower levels of head nurse leadership might be at high risk for burnout. These findings have important implications for the early detection, prevention, and treatment of burnout symptoms among nurses. The present study's findings highlight that nurse managers play a role in influencing nurses' well-being, as they shape their working environment through their job character. Organizations should plan adequate training activities to improve head nurse leadership and set positive examples. At the same time, the effects of job demand and job resources should be comprehensively considered when implementing the intervention.

### Abbreviations

JD-R Job demands-resources
CI Confidence interval
LLCI Lower Limit of the Confidence Interval
ULCI Upper Limit of the Confidence Interval

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### Author contributions

Conceived and designed the research: Y-m L. Wrote the paper: J-q H. Analyzed the data: J-q H and Y-s T. Revised the paper: M-m Z, J-x Y, EE, and MY. The authors read and approved the final manuscript.

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### Data availability

The datasets collected and analyzed in this study are not publically accessible but can be obtained from the corresponding author upon reasonable request.

## Declarations

### Ethics approval and consent to participate

This study was conducted in compliance with the declaration of Helsinki ethical approval. Ethical approval for this study was obtained from the Ethics Committee of The Second Xiangya Hospital of Central South University (LYF20230048), and applicable ethical standards and regulations followed all procedures. Informed consent was obtained from all participants before the commencement of data collection. The nurses who participated were assured of the confidentiality and anonymity of their responses.

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

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### References

1. Edú-Valsania S, Laguía A, Moriano JA. Burnout: A review of theory and measurement. Int J Environ Res Public Health. 2022;19(3):1780.
2. Mao X, Lin X, Liu P, Zhang J, Deng W, Li Z, Hou T, Dong W. Impact of insomnia on burnout among Chinese nurses under the regular COVID-19 epidemic prevention and control: parallel mediating effects of anxiety and depression. Int J Public Health. 2023;68:1605688.
3. Chou LP, Li CY, Hu SC. Job stress and burnout in hospital employees: comparisons of different medical professions in a regional hospital in Taiwan. BMJ Open. 2014;4(2):e004185.
4. Share of registered nurses who feel burned out on most days in the United States. in 2023 [https://www.statista.com/statistics/1389778/nurses-feeling-burnout-united-states/]
5. Lake ET, Riman KA, Sloane DM. Improved work environments and staffing lead to less missed nursing care: A panel study. J Nurs Manag. 2020;28(8):2157–65.

6. Aiken LH, Sloane DM, Clarke S, Poghosyan L, Cho E, You L, Finlayson M, Kanai-Pak M, Aungsuroch Y. Importance of work environments on hospital outcomes in nine countries. Int J Qual Health Care. 2011;23(4):357–64.
7. Doleman G, De Leo A, Bloxsome D. The impact of pandemics on healthcare providers' workloads: A scoping review. J Adv Nurs. 2023;79(12):4434–54.
8. Griffiths P, Saville C, Ball J, Jones J, Pattison N, Monks T. Nursing workload, nurse staffing methodologies and tools: A systematic scoping review and discussion. Int J Nurs Stud. 2020;103:103487.
9. Sasangohar F, Jones SL, Masud FN, Vahidy FS, Kash BA. Provider burnout and fatigue during the COVID-19 pandemic: lessons learned from a High-Volume intensive care unit. Anesth Analg. 2020;131(1):106–11.
10. Lee HY, Jang MH, Jeong YM, Sok SR, Kim AS. Mediating effects of anger expression in the relationship of work stress with burnout among hospital nurses depending on career experience. J Nurs Scholarsh. 2021;53(2):227–36.
11. Chen C, Meier ST. Burnout and depression in nurses: A systematic review and meta-analysis. Int J Nurs Stud. 2021;124:104099.
12. Melnyk BM. Burnout, depression and suicide in nurses/clinicians and learners: an urgent call for action to enhance professional Well-being and healthcare safety. Worldviews Evid Based Nurs. 2020;17(1):2–5.
13. Kakemam E, Chegini Z, Rouhi A, Ahmadi F, Majidi S. Burnout and its relationship to self-reported quality of patient care and adverse events during COVID-19: A cross-sectional online survey among nurses. J Nurs Adm Manag. 2021;29(7):1974–82.
14. Teixeira C, Ribeiro O, Fonseca AM, Carvalho AS. Ethical decision making in intensive care units: a burnout risk factor? Results from a multicentre study conducted with physicians and nurses. J Med Ethics. 2014;40(2):97–103.
15. Jackson J, Vandall-Walker V, Vanderspank-Wright B, Wishart P, Moore SL. Burnout and resilience in critical care nurses: a grounded theory of managing exposure. Intensive Crit Care Nurs. 2018;48:28–35.
16. Jun J, Ojemeni MM, Kalamani R, Tong J, Crecelius ML. Relationship between nurse burnout, patient and organizational outcomes: systematic review. Int J Nurs Stud. 2021;119:103933.
17. Ghanayem M, Srulovici E, Zlotnick C. Occupational strain and job satisfaction: the job demand–resource moderation–mediation model in haemodialysis units. J Nurs Adm Manag. 2020;28(3):664–72.
18. Gou J, Zhang X, He Y, He K, Xu J. Effects of job demands, job resources, personal resources on night-shift alertness of ICU shift nurses: a cross–sectional survey study based on the job demands-resources model. BMC Nurs. 2024;23(1):1–12.
19. Van den Oetelaar WF, Roelen CA, Grolman W, Stellato RK, van Rhenen W. Exploring the relation between modelled and perceived workload of nurses and related job demands, job resources and personal resources; a longitudinal study. PLoS ONE. 2021;16(2):e0246658.
20. Kohnen D, De Witte H, Schaufeli WB, Dello S, Bruyneel L, Sermeus W. What makes nurses flourish at work? How the perceived clinical work environment relates to nurse motivation and well-being: A cross-sectional study. Int J Nurs Stud. 2023;148:104567.
21. Sarıköse S, Göktepe N. Effects of nurses' individual, professional and work environment characteristics on job performance. J Clin Nurs. 2022;31(5–6):633–41.
22. Blok AC, Anderson E, Swamy L, Mohr DC. Comparing nurse leader and manager perceptions of and strategies for nurse engagement using a positive deviance approach: A qualitative analysis. J Nurs Manag. 2021;29(6):1476–85.
23. Broetje S, Jenny GJ, Bauer GF. The key job demands and resources of nursing staff: an integrative review of reviews. Front Psychol. 2020;11:84.
24. Li T, Helian Z, Hu L, Ma M. The effects of demand-resource relationship on work-family conflict under Chinese culture: a cross-sectional study. Front Psychol. 2024;15:1334538.
25. He G, Wang Y, Zheng X, Guo Z, Zhu Y. Linking paternalistic leadership to work engagement among Chinese expatriates: a job demand-resource perspective. Int J Manpow. 2022;43(4):889–909.
26. Chiu CY, Nahrgang JD, Bartram A, Wang J, Tesluk PE. Leading the team, but feeling dissatisfied: investigating informal leaders' energetic activation and work satisfaction and the supporting role of formal leadership. J Organizational Behav. 2021;42(4):527–50.
27. McCauley CD, Palus CJ. Developing the theory and practice of leadership development: A relational view. Leadersh Q. 2021;32(5):101456.
28. Bowdish D, Desai TA, DePace A, Haswell ES, Baltrus D, García AJ, Deans T, Lage K, Wittkopp P, Leadership. Cell Syst. 2021;12(1):1–4.
29. McCallin A, Frankson C. The role of the charge nurse manager: a descriptive exploratory study. J Nurs Adm Manag. 2010;18(3):319–25.
30. Cummings GG, Tate K, Lee S, Wong CA, Paananen T, Micaroni SP, Chatterjee GE. Leadership styles and outcome patterns for the nursing workforce and work environment: A systematic review. Int J Nurs Stud. 2018;85:19–60.
31. Salas-Vallina A, Alegre J, Lopez-Cabrales A. The challenge of increasing employees' well-being and performance: how human resource managementpractices and engaging leadership work together toward reaching this goal. Hum Resour Manag. 2021;60(3):333–47.
32. Einarsen S, Aasland MS, Skogstad A. Destructive leadership behaviour: A definition and conceptual model. Leadersh Quart. 2007;18(3):207–16.
33. Tummers LG, Bakker AB. Leadership and job Demands-Resources theory: A systematic review. Front Psychol. 2021;12:722080.
34. Miller M, Hemberg J. Nurse leaders' perceptions of workload and task distribution in public healthcare: A qualitative explorative study. J Clin Nurs. 2023;32(13–14):3557–67.
35. Zhang S, Liu Y, Li G, Zhang Z, Fa T. Chinese nurses' innovation capacity: the influence of inclusive leadership, empowering leadership and psychological empowerment. J Nurs Adm Manag. 2022;30(6):1990–9.
36. Abadi MBH, Taban E, Khanjani N, Konjin ZN, Khajehnasiri F, Samaei SE. Relationships between job satisfaction and job demand, job control, social support, and depression in Iranian nurses. J Nurs Res. 2021;29(2):e143.
37. Türkmen Keskin S, Özduyan Kiliç M. Investigation of the relationship between nurses' perception of toxic leadership and their organizational trust levels and turnover intentions. J Adv Nurs. 2024;80(5):1859–67.
38. Labrague LJ, Lorica J, Nwafor CE, Cummings GG. Predictors of toxic leadership behaviour among nurse managers: A cross-sectional study. J Nurs Manag. 2021;29(2):165–76.
39. Chunmei H. zhixian. F, Ying. H: test the reliability and validity of the head nurse leadership evaluation questionnaire. Chin Nurs Res. 2017;17(10):1335–9.
40. Chaoping L, Kan S, Zhengxue. L, Li. L, Yue Y. Survey on burnout among healthcare workers. Chin J Clin Psychol. 2003;03:170–2.
41. Shah MK, Gandrakota N, Cimiotti JP, Ghose N, Moore M, Ali MK. Prevalence of and factors associated with nurse burnout in the US. JAMA Netw Open. 2021;4(2):e203646.
42. Kim LY, Rose DE, Ganz DA, Giannitrapani KF, Yano EM, Rubenstein LV, Stockdale SE. Elements of the healthy work environment associated with lower primary care nurse burnout. Nurs Outlook. 2020;68(1):14–25.
43. Dyrbye LN, Major-Elechi B, Hays JT, Fraser CH, Buskirk SJ, West CP. Relationship between organizational leadership and health care employee burnout and satisfaction. Mayo Clin Proc. 2020;95(4):698–708.
44. Cummings GG, Tate K, Lee S, Wong CA, Paananen T, Micaroni SPM, Chatterjee GE. Leadership styles and outcome patterns for the nursing workforce and work environment: A systematic review. Int J Nurs Stud. 2018;85:19–60.
45. Boamah SA. The impact of transformational leadership on nurse faculty satisfaction and burnout during the COVID-19 pandemic: A moderated mediated analysis. J Adv Nurs. 2022;78(9):2815–26.
46. Specchia ML, Cozzolino MR, Carini E, Di Pilla A, Galletti C, Ricciardi W, Damiani G. Leadership styles and nurses' job satisfaction. Results of a systematic review. Int J Environ Res Public Health. 2021;18(4):1552.
47. Guo YF, Fan JY, Lam L, Plummer V, Cross W, Ma YZ, Wang YF, Jia YN. Associations between perceived overqualification, transformational leadership and burnout in nurses from intensive care units: A multicentre survey. J Nurs Adm Manag. 2022;30(7):3330–9.
48. Lin X, Luan Y, Zhao K, Zhao G. A meta-analysis of the relationship between leadership styles and employee creative performance: A self-determination perspective. Adv Psychol Sci. 2022;30(4):781–801.
49. Dolce V, Vayre E, Molino M, Ghislieri C. Far away, so close? The role of destructive leadership in the job demands–resources and recovery model in emergency telework. Social Sci. 2020;9(11):196.
50. Hentrich S, Zimber A, Garbade SF, Gregersen S, Nienhaus A, Petermann F. Relationships between transformational leadership and health: the mediating role of perceived job demands and occupational self-efficacy. Int J Stress Manage. 2017;24(1):34–61.
51. Zhao Y, Ma D, Wan Z, Sun D, Li H, Sun J. Associations between work environment and implicit rationing of nursing care: A systematic review. J Nurs Adm Manag. 2020;28(8):1841–50.
52. Mullarkey S, Wall TD. Measures of job satisfaction, mental health and job-related well-being: A bench-marking manual. University of Sheffield; 1999.
53. Labrague LJ, Nwafor CE, Tsaras K. Influence of toxic and transformational leadership practices on nurses' job satisfaction, job stress, absenteeism and turnover intention: A cross-sectional study. J Nurs Adm Manag. 2020;28(5):1104–13.

54. Rudman A, Arborelius L, Dahlgren A, Finnes A, Gustavsson P. Consequences of early career nurse burnout: a prospective long-term follow-up on cognitive functions, depressive symptoms, and insomnia. EClinicalMedicine. 2020;27:100565.
55. Girotti M, Bulin SE, Carreno FR. Effects of chronic stress on cognitive function–from neurobiology to intervention. Neurobiol Stress. 2024;33:100670.
56. Girotti M, Adler SM, Bulin SE, Fucich EA, Paredes D, Morilak DA. Prefrontal cortex executive processes affected by stress in health and disease. Prog Neuro-psychopharmacol Biol Psychiatry. 2018;85:161–79.
57. Bai C, Bai B. Control beliefs about stress and post-traumatic growth in nurses during the COVID-19 pandemic: the mediating roles of basic psychological needs satisfaction and optimism. Int J Ment Health Nurs. 2024;33(4):949–56.
58. Galura SJ, Parchment J. Role-Related value conflicts: A qualitative study of the experiences of perianesthesia nurse managers. J PeriAnesthesia Nurs. 2024;39(2):279–87.
59. Otto MC, Van Ruysseveldt J, Hoefsmit N, Van Dam K. Examining the mediating role of resources in the Temporal relationship between proactive burnout prevention and burnout. BMC Public Health. 2021;21:1–15.
60. Al Sabei S, AbuAlRub R, Al Yahyaei A, Al-Rawajfah OM, Labrague LJ, Burney IA, Al-Maqbali M. The influence of nurse managers' authentic leadership style and work environment characteristics on job burnout among emergency nurses. Int Emerg Nurs. 2023;70:101321.
61. Chen SC, Chen CF. Antecedents and consequences of nurses' burnout: leadership effectiveness and emotional intelligence as moderators. Manag Decis. 2018;56(4):777–92.

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