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Authors

Rostam Menati
Psychosocial Injuries Research Center, Ilam University of Medical Sciences, Ilam, Iran

Nabi Omidi
Department of Management, Payame Noor University, Tehran, Iran

Yousef Fakour
Vice Chancellery for Research and Technology, Iran Ministry of Health and Medical Education, Tehran, Iran

Mohammadreza Omidi
Psychosocial Injuries Research Center, Ilam University of Medical Sciences,, Ilam, Iran

Hojatollah Kakaei
Department of Occupational Health Engineering, School of Public Health, Ilam University of Medical Sciences,, Ilam, Iran

Corresponding author

Mohammadreza Omidi
Psychosocial Injuries Research Center, Ilam University of Medical Sciences, Ilam, Iran

Identification and prioritisation of ergonomic and psychological factors influencing the performance of operating room nurses: A mixed methods study

Abstract

Introduction: Operating room nurses worldwide face combined ergonomic and psychological challenges that can compromise their performance and job satisfaction, as well as patient safety. While numerous studies have examined these issues separately, little is known about their integrated effects, particularly in resource-constrained healthcare systems.

Objective: This mixed methods study aimed to identify and prioritise psychological and ergonomic factors affecting the performance of operating room nurses in public hospitals in Ilam, Iran, and propose actionable strategies to improve their working conditions.

Methods: The study involved three participant groups in two sequential phases. In the qualitative phase, semi-structured interviews were conducted with 20 participants (nursing managers, clinical psychologists and experienced operating room nurses), followed by thematic analysis using MAXQDA 2020. Findings were refined through a Delphi panel of 15 experts. In the quantitative phase, 169 operating room nurses were selected from a population of 300 via stratified random sampling, and factors were ranked using the Friedman test. The study was approved by the Ethics Committee of Ilam University of Medical Sciences (IR.MEDILAM.REC.1404.119) in accordance with the Declaration of Helsinki.

Results: Qualitative analysis revealed five major thematic categories (psychological, organisational, supportive, ergonomic, technological) and 32 sub-themes, narrowed to 22 factors after screening. Ergonomic priorities included 'workplace design' (mean rank = 18.25±1.85), 'ergonomic equipment' (17.80±1.82) and 'body posture' (16.45±1.78). Key organisational and psychological factors were 'supportive leadership style' (16.20±2.01) and 'occupational self-efficacy' (15.90±1.97), respectively.

Conclusion: Enhancing operating room nurses' performance requires addressing both ergonomic and psychological dimensions. Redesigning workspaces, providing ergonomic tools and implementing psychological training programs are critical for improving workplace conditions. These findings offer actionable insights for hospital management to optimise nurse performance and wellbeing.

Keywords: ergonomics, operating room nursing, occupational stress, work performance

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Introduction

Operating room nurses are among the most critical components of the healthcare system, facing unique workplace challenges that impact both their physical and psychological wellbeing[1]. In public hospitals in Ilam, these challenges become even more complex due to resource constraints and high patient loads[2]. Research demonstrates that the intricate interplay between psychological factors (e.g. occupational stress, emotional exhaustion and job satisfaction) and ergonomic factors (e.g. workspace design, improper postures and substandard equipment) directly influences nurses' professional performance[3,4]. Given the global nursing shortage crisis, identifying these factors and prioritising the development of targeted interventions is essential to safeguard nurses' occupational health while improving hospital service quality[5].

In Ilam, where geographical and economic conditions are particularly challenging, operating room nurses contend not only with typical professional stressors but also with systemic issues such as understaffing, inadequate resources and excessive workloads[6]. These conditions have contributed to declining job satisfaction and rising burnout rates among this workforce[7]. Compounding these problems are poorly designed operating rooms, outdated equipment and non-ergonomic work environments. While prior studies have separately investigated psychological or ergonomic influences on nursing performance[8–10], few have examined their combined effects in localised contexts, especially in underserved regions like Ilam. Understanding these interactions would enable hospital administrators to prioritise evidence-based interventions, optimising limited resources for maximal impact on nurses' working conditions.

The concurrent influence of psychological and ergonomic factors on operating room nurses' performance is critically important, as these elements interact dynamically in high-pressure hospital settings. Psychological factors – such as self-efficacy, emotional regulation and job resilience – underpin nurses' cognitive and emotional capacities, which are vital for managing operating room crises[11]. Conversely, ergonomic factors – including workspace layout, medical equipment design and environmental conditions – establish the physical foundation for safe and efficient performance[12]. An integrated approach addressing both dimensions represents an innovative strategy in healthcare human resource management, potentially yielding more holistic and effective solutions.

Evidence confirms that enhancing operating room nurses' working conditions not only boosts job satisfaction and reduces attrition but also directly improves patient safety and surgical outcomes[13–15]. Thus, identifying and ranking key psychological and ergonomic factors affecting nurses' performance in Ilam's public hospitals can inform data-driven management decisions. By employing mixed methods and addressing gaps in existing literature (which often examines these factors in isolation), this study provides deeper insights into the mechanisms influencing nurse performance and satisfaction. It also establishes a scientific basis for large-scale policymaking in hospital staff occupational health. This study aims to answer a pivotal question: Which psychological and ergonomic factors most significantly impact operating room nurses' performance in Ilam's unique context, and how can they be strategically prioritised to develop actionable improvements? The findings may also serve as a replicable model for comparable healthcare settings nationwide.

Materials and methods

This mixed methods study was conducted in two phases (qualitative and quantitative) to investigate psychological and ergonomic factors influencing the performance of operating room nurses in public hospitals of Ilam, Iran.

In the qualitative phase, participants were drawn from diverse professional backgrounds – including operating room nurses, nursing managers and clinical psychologists – to ensure a broad exploration of ergonomic and psychological factors from multiple perspectives. This approach enhanced thematic richness and validity. However, the quantitative phase focused exclusively on operating room nurses because the aim was to statistically prioritise factors directly influencing this specific workforce's performance. Other professional groups were not included in the survey phase as the interventions derived from the results were intended to be implemented primarily within the nursing workforce in operating rooms.

Qualitative phase

Semi-structured interviews were conducted with 20 participants, including industrial psychologists, nursing administrators and nurses with more than or equal to five years of operating room experience. The qualitative sample size (n = 20) was determined by the principle of data saturation, whereby no new themes emerged from additional interviews. Purposive sampling continued until theoretical saturation was reached.

Interview transcripts were analysed via thematic analysis using MAXQDA2020 software. Thematic analysis was conducted following Braun and Clarke's six-phase approach:

1. familiarisation with the data through repeated reading of transcripts
2. generating initial codes to identify meaningful data segments
3. searching for candidate themes by grouping related codes
4. reviewing themes to ensure internal coherence and distinctiveness
5. defining and naming each theme
6. producing the final report.

MAXQDA2020 software was employed to organise and manage the qualitative data systematically, facilitate coding, compare data segments and maintain an audit trail, thereby enhancing the rigor and transparency of the analysis. Identified factors were then evaluated by a Delphi panel of 15 experts (five industrial psychologists, five nursing managers, five senior operating room nurses) using a 5-point Likert scale. Purposive sampling continued until theoretical saturation was reached. The Delphi panel size (n = 15) ensured balanced representation across key professional domains and is consistent with methodological recommendations for achieving consensus reliability.

Table 1: Demographic characteristics of study participants

	Interviewees (n=20)	Delphi panel (n=15)	Study population (n=169)
Gender	male: 12 (60%) female: 8 (40%)	male: 9 (60%) female: 6 (40%)	male: 92 (54.4%) female: 77 (45.6%)
Age in years (mean±SD)	37.5±4.8	42.3±5.7	34.8±6.9
Years of work experience (mean±SD)	8.9±2.1	12.1±3.5	6.8±2.8
Education level	Master's: 14 (70%) PhD: 6 (30%)	Master's: 7 (46.7%) PhD: 8 (53.3%)	Bachelor's: 115 (68%) Master's: 54 (32%)
Position/role	Nursing managers: 6 (30%) Psychologists: 5 (25%) Senior nurses: 9 (45%)	Faculty members: 7 (46.7%) Administrators: 5 (33.3%) Psychologists: 3 (20%)	Operating room nurses: 169 (100%)

Quantitative phase

The target population comprised operating room nurses in Ilam's public hospitals (N = 300). The quantitative sample (n = 169) was calculated using Cochran's formula with a 95 per cent confidence level and a five per cent margin of error, based on the total operating room nurse population. Stratified random sampling was employed. Data were collected via a validated questionnaire with two sections:

1. demographic characteristics
2. specialised questions assessing psychological and ergonomic factors (5-point Likert scale).

Questionnaire validity was confirmed by ten experts in psychology and healthcare management; reliability was high (Cronbach's α = 0.89).

Data analysis

The data were analysed using both descriptive and inferential statistical methods. For descriptive analysis, means and standard deviations (mean±SD) were calculated to summarise the data. Inferential analysis employed the Friedman test to rank the identified factors, with a predetermined significance level of $p<0.05$. All statistical analyses were conducted using SPSS version 26 software.

Ethical considerations

The study protocol was reviewed and approved by the Ethics Committee of Ilam University of Medical Sciences, Iran (Approval code: IR.MEDILAM.REC.1404.119). Participation was voluntary, and all participants provided informed consent in writing prior to data collection. The research adhered to the principles of the Declaration of Helsinki and ensured confidentiality and anonymity of participant information.

Reporting of the qualitative phase followed the Standards for Reporting Qualitative Research (SRQR), and the quantitative phase adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

Results

This study incorporated three distinct participant groups: interviewees and Delphi panel in the qualitative phase, and the study population in the quantitative phase. Table 1 shows the demographic characteristics of each participant group.

The thematic analysis was conducted systematically through six sequential stages. The process commenced with comprehensive data immersion, involving iterative review of interview transcripts. During the second phase, open coding was implemented, yielding 380 primary codes. The third phase involved the development of basic themes, with codes being systematically organised into 58 sub-themes. Following meticulous review and consolidation of related themes, these were refined to 32 organising themes. Ultimately, the data were classified into five principal thematic categories: psychological, organisational, supportive, ergonomic and technological. The identified factors and their corresponding sub-factors are comprehensively detailed in Table 2.

The screening phase employed a three-round Delphi methodology with evaluation of proposed factors after each round. After Round 1, factors with scores below seven were eliminated unless deemed to be essential requirements for operating room design and safety; this resulted in elimination of eight factors. Round 2 evaluation of the remaining 24 factors led to further consolidation, with two additional factors removed due to thematic overlap. The final round achieved consensus with a Kendall's coefficient of concordance of 0.87, confirming 22 definitive factors. The complete Delphi process outcomes are presented in Table 3.

The prioritised ranking of influential factors (Table 4) revealed ergonomic considerations as predominant. Workspace design emerged as the most critical factor (mean rank 18.25), underscoring the fundamental importance of optimal spatial design and operational standards in surgical environments. Ergonomic equipment ranked second (mean rank 17.80), emphasising the necessity of purpose-designed surgical tools and apparatus. Body posture during procedures ranked third (mean rank 16.45), highlighting the imperative of proper biomechanical practices and postural education.

Environmental factors demonstrated significant influence, with noise

Table 2: Comprehensive list of factors and sub-factors influencing operating room nurses' performance

	Thematic categories				
	Psychological	Organisational	Supportive	Ergonomic	Technological
Sub-themes (32 factors)	1. Occupational self-efficacy 2. Emotional regulation 3. Cognitive flexibility 4. Problem-solving skills 5. Occupational resilience 6. Compensation system 7. Organisational commitment	8. Supportive leadership style 9. Organisational justice 10. Participation in decision-making 11. Training programs 12. Incentive systems 13. Organisational culture 14. Organisational communication	15. Peer support 16. Social networks 17. Counselling services 18. Skills development workshops 19. Mentoring programs 20. Managerial support	21. Workspace design 22. Ergonomic equipment 23. Body posture 24. Lighting conditions 25. Noise control 26. Ambient temperature 27. Rest-space design	28. Information systems 29. Medical equipment 30. Assistive technologies 31. Clinical support systems 32. Communication infrastructure

control (mean rank 15.30) and lighting conditions (mean rank 12.10) ranking sixth and tenth respectively. Notably, among psychological and organisational dimensions, supportive leadership style (mean rank 16.20) and occupational self-efficacy (mean rank 15.90) were identified as particularly impactful.

The Friedman test confirmed statistically significant differences in factor rankings ($p < 0.05$), supported by a Kendall's W coefficient of 0.82, indicating strong respondent consensus in factor prioritisation. These findings collectively emphasise the critical interdependence between physical ergonomic parameters and psychological factors in high-acuity operating room environments, providing an empirical foundation for developing targeted interventions to enhance clinical working conditions.

Discussion

Factors influencing the performance of operating room nurses

The present study has contributed significant findings to the existing literature by identifying and prioritising factors affecting the performance of operating room nurses. Quantitive results revealed that physical ergonomic factors of workspace design, ergonomic equipment and body posture had the highest impact on job performance.

Qualitative findings supported this ranking, with several nurses describing the current operating room layout as 'forcing us to bend or twist unnaturally for long periods' and noting that 'proper instrument placement could save time and prevent fatigue.' Participants emphasised that poorly designed equipment often compelled them to improvise, increasing both mental load and physical strain.

These ergonomic priorities can be directly translated into clinical interventions such as implementing standardised workspace layouts, procuring height-adjustable surgical tables and establishing protocols for intra-operative posture correction to minimise musculoskeletal strain. This finding aligns closely with the work of Lee et al.[4] who demonstrated the positive effect of ergonomic interventions on reducing musculoskeletal disorders. However, unlike previous studies, the current research measured the influence of these factors on overall job performance rather than solely on physical health.

The organisational factor of supportive leadership style was identified as the fourth most influential factor on performance. This finding aligns with the results reported by Chang et al.[1] on the role of organisational culture while also indicating that in high-stress environments, like operating rooms, leadership style may have a greater impact than cultural variables – a point overlooked in previous studies, such as Paarima et al.[8]. Qualitative data reinforced this, as nurses frequently mentioned that 'approachable managers who listen without judgment' created a sense of psychological safety. This, in turn, encouraged staff to share concerns early, preventing small issues from escalating into errors.

Two key psychological factors – occupational self-efficacy and emotional regulation – ranked as the fifth and eighth most influential factors on the professional performance of operating room nurses. These results are significant for several reasons: first, they are consistent with a study by Wong et al.[9] which found that experienced nurses rely more on individual competencies, whereas novice nurses depend on organisational support. Second, unlike conventional research which only examined superficial relationships between performance and motivation[16], this study provides a deeper understanding of performance determinants by focusing on underlying psychological mechanisms. Interview narratives revealed that high self-efficacy meant 'feeling in control even when unexpected complications arise', while emotional regulation was linked to 'remaining calm so the team doesn't panic'. Such insights underscore that these competencies are not abstract

Table 3. Results of fuzzy Delphi stages

Thematic category	Factor	Round 1 score	Round 2 score	Round 3 score	Final status	Reason for elimination
Psychological	1. Occupational self-efficacy	8.7	9.1	9.5	retained	-
	2. Emotional regulation	8.3	8.7	9.0	retained	-
	3. Cognitive flexibility	8.0	8.4	8.8	retained	-
	4. Problem-solving skills	7.8	8.2	8.6	retained	-
	5. Occupational resilience	7.5	7.9	8.3	retained	-
	6. Compensation system	7.2	7.6	-	eliminated (Round 2)	thematic overlap
	7. Organisational commitment	6.8	-	-	eliminated (Round 1)	score < 7
Organisational	8. Supportive leadership style	9.1	9.5	9.9	retained	-
	9. Organisational justice	8.9	9.3	9.7	retained	-
	10. Participation in decision-making	7.4	7.8	8.2	retained	-
	11. Training programs	8.2	8.6	9.0	retained	-
	12. Incentive systems	6.9	-	-	eliminated (Round 1)	score < 7
	13. Organisational culture	6.5	-	-	eliminated (Round 1)	score < 7
	14. Organisational communication	6.7	-	-	eliminated (Round 1)	score < 7
Supportive	15. Peer support	9.0	9.4	9.8	retained	-
	16. Social networks	7.6	8.0	8.4	retained	-
	17. Counselling services	7.3	7.7	8.1	retained	-
	18. Skills development workshops	6.4	-	-	eliminated (Round 1)	score < 7
	19. Mentoring programs	6.2	-	-	eliminated (Round 1)	score < 7
	20. Managerial support	7.1	7.5	7.9	retained	-
Ergonomic	21. Workspace design	8.5	8.9	9.3	retained	-
	22. Ergonomic equipment	7.9	8.3	8.7	retained	-
	23. Body posture	7.0	7.4	7.8	retained	-
	24. Lighting conditions	6.6	8.4	8.9	retained	-
	25. Noise control	6.3	8.8	9.2	retained	-
	26. Ambient temperature	6.1	-	-	eliminated (Round 1)	score < 7
	27. Rest-space design	6.0	-	-	eliminated (Round 1)	score < 7
Technological	28. Information systems	8.4	8.8	9.2	retained	-
	29. Medical equipment	8.1	8.5	8.9	retained	-
	30. Assistive technologies	7.7	8.1	8.5	retained	-
	31. Clinical support systems	7.2	7.6	8.0	retained	-
	32. Communication infrastructure	6.8	7.6	-	eliminated (Round 2)	thematic overlap

Table 4: Factors in order of ranking

Factor (thematic category)	Mean rank	Standard deviation	Significance level (p-value)
Workspace design (Ergonomic)	18.25	1.85	0.010
Ergonomic equipment (Ergonomic)	17.80	1.82	0.012
Body posture (Ergonomic)	16.45	1.78	0.015
Supportive leadership style (Organisational)	16.20	2.01	0.016
Occupational self-efficacy (Psychological)	15.90	1.97	0.018
Noise control (Ergonomic)	15.30	1.75	0.020
Peer support (Supportive)	14.60	1.94	0.022
Emotional regulation (Psychological)	13.75	1.89	0.025
Organisational justice (Organisational)	12.40	1.82	0.028
Lighting conditions (Ergonomic)	12.10	1.68	0.030
Counselling services (Supportive)	11.25	1.78	0.032
Cognitive flexibility (Psychological)	10.70	1.75	0.035
Problem-solving skills (Psychological)	9.80	1.72	0.038
Information systems (Technological)	9.05	1.68	0.041
Occupational resilience (Psychological)	8.60	1.65	0.044
Participation in decision-making (Organisational)	8.25	1.62	0.047
Training programs (Organisational)	7.90	1.59	0.050
Medical equipment (Technological)	7.55	1.56	0.053
Assistive technologies (Technological)	7.20	1.53	0.056
Managerial support (Supportive)	6.85	1.50	0.059
Social networks (Supportive)	6.50	1.47	0.062
Clinical support systems (Technological)	6.15	1.44	0.065

constructs but daily survival skills in the high-pressure operating room.

These findings suggest that training interventions should emphasise strengthening professional competence beliefs and emotion management skills rather than merely improving environmental conditions. This perspective represents a fundamental shift in human resource development programs for nursing, as it demonstrates that self-efficacy and emotional regulation act as key mediators in translating favourable environmental conditions into effective job performance. From a clinical perspective, these findings support interventions such as structured resilience-building workshops, simulation-based training for emotional regulation during surgical crises and mentorship programs that reinforce self-efficacy in high-stress scenarios.

Regarding technological factors, user-friendly information systems ranked 14th showing a moderate yet notable effect on job satisfaction and performance. This is consistent with Li et al.[13], who demonstrated the role of tailored digital platforms, such as clinical support portals and internal communication tools, in enhancing coordination and efficiency among nursing staff. However, in the context of highly specialised environments like operating rooms – where rapid decision-making and immediate access to accurate information are critical – efficiency gains appear to be most pronounced when technology is explicitly aligned with clinical tasks. For instance, integrating surgical equipment tracking systems and real-time patient monitoring dashboards can directly reduce procedural delays and cognitive load. While Wei et al.[17] emphasised broader workplace environmental factors, the current findings suggest that technological solutions can serve as an essential environmental enhancers when they streamline task flows and support ergonomic principles. Moreover, by improving access to procedural guidelines and reducing reliance on manual documentation, such tools may indirectly bolster psychological factors, like self-efficacy, and reduce burnout risk thus serving as a bridge between

environmental and personal performance determinants.

A noteworthy aspect of this research is the complex interplay between different factors. For instance, while Liu et al.[14] emphasised the role of social networks, the current study found that in operating room settings, physical and individual factors have a more direct impact. This discrepancy likely stems from the unique nature of work in this department, which demands high concentration and precise coordination.

Methodological considerations

From a methodological standpoint, this study offers a more comprehensive approach than previous research by integrating in-depth qualitative analysis with advanced quantitative prioritisation techniques. A study by Yeo and Ha[18] applied a limited cross-sectional design to examine workplace factors, while the present research employed a sequential exploratory mixed methods approach – first identifying a broad range of factors through diverse professional perspectives, followed by systematic Delphi screening and statistical ranking using the Friedman test.

This methodological rigor allowed for a convergence of expert consensus with empirical validation, thereby increasing both the internal validity and practical relevance of the findings. Furthermore, the integration of Braun and Clarke's thematic analysis framework within MAXQDA2020 added transparency and replicability to the qualitative phase, aligning with best-practice recommendations for qualitative rigor. By prioritising factors in a resource-limited provincial context, this approach advances methodological adaptability, demonstrating that robust and replicable prioritisation studies can be performed even in settings with logistical constraints. This dual-phase design also provides a transferable blueprint for future nursing and health workforce research seeking to bridge exploratory insights with actionable, evidence-based rankings.

Compared to a systematic review by Zhao et al.[19] which identified 65 factors influencing nurses' performance and job satisfaction, the present study goes a step further by precisely prioritising these factors and focusing on the specialised operating room environment, thereby providing more practical guidance for administrators. Overall, the integration of qualitative insights with quantitative rankings illustrates how these prioritised factors are experienced in the lived reality of operating room nurses, providing contextual depth to the statistical findings.

National and international perspectives

In the national context, the prioritisation of ergonomic interventions and psychological competencies directly addresses well-documented occupational health challenges for perioperative nurses in Iran. For example, Abbasi et al.[2] highlight the broader relationship between lifestyle factors and health-related quality of life among healthcare professionals, while Akbari et al.[6] illustrate the psychological strain and resource limitations faced by nurses during high-stress crises in Ilam.

The high rankings of workspace design and ergonomic equipment in this study echo the systemic issues of poorly designed facilities and outdated tools observed in public hospitals, indicating that ergonomic upgrading is not merely an operational improvement but a core occupational health necessity. Similarly, the emphasis on self-efficacy and emotional regulation complements national discussions on retention strategies, demonstrating the need for integrated interventions that combine physical environment improvements with workforce resilience training.

From an international perspective, the findings demonstrate strong alignment with established evidence and guidelines in perioperative nursing. For instance, Lee et al.[4] showed that targeted ergonomic training and equipment adjustment significantly reduced musculoskeletal disorders among nurses, a result consistent with the current study's ranking of workspace design as the top factor.

Psychological dimensions such as self-efficacy and emotional regulation also parallel the trends identified by Wei et al.[17] who linked enhanced work engagement to improved job satisfaction and care quality in hospitals in the USA. This convergence suggests that the fundamental determinants of perioperative nursing performance – ergonomically supportive environments and strengthened psychological capacity – transcend regional differences, making the present results relevant for both national policy development and international benchmarking.

Strengths and limitations

The limitations of this study, including its geographic focus and reliance on self-reporting methods, mirror challenges noted in prior research. Nevertheless, due to its robust methodology and comprehensive examination of multiple factors, the findings make a valuable contribution to the literature and can serve as a foundation for future studies in other specialised nursing environments.

Conclusion

This study, adopting a comprehensive and multidimensional approach, demonstrated that the performance of operating room nurses is influenced by the dynamic interplay of ergonomic, psychological and organisational factors. Among these, optimal physical workspace design and access to ergonomic equipment were identified as the most influential variables, underscoring the importance of human-centered engineering principles in high-stress hospital settings. Additionally, psychological components such as self-efficacy and emotional regulation, along with supportive leadership at the organisational level, were confirmed as essential prerequisites for optimal nursing performance.

The findings highlight the necessity of an integrated human resource management approach that simultaneously enhances physical work conditions, develops nurses' psychological skills and improves managerial practices. These insights can serve as a scientific basis for designing targeted interventions aimed at improving nursing care quality and occupational wellbeing in critical hospital departments. In practical terms, these results provide a roadmap for hospital administrators to implement targeted clinical interventions – ranging from ergonomic workspace redesign to psychological skills training and adaptive leadership programs – that are tailored to the unique demands of operating rooms.

Implications

This study provides critical insights with far-reaching implications for nursing practice, research, healthcare policy and education.

Nursing practice

The findings underscore the urgent need for ergonomic interventions in operating rooms, including workspace redesign and provision of ergonomic equipment, to alleviate physical strain and enhance efficiency. Simultaneously, fostering supportive leadership and implementing psychological resilience training can significantly improve nurses' emotional regulation and occupational self-efficacy, leading to better performance and reduced burnout. Hospitals should integrate these evidence-based strategies into staff development programs to cultivate a healthier and more productive work environment.

Nursing research

From a research perspective, this study opens several avenues for future investigation. Longitudinal studies are needed to assess the long-term impact of ergonomic and psychological interventions on nurse retention and patient outcomes. Comparative analyses across different hospital settings would help validate the generalisability of these findings, while mixed methods research could explore how emerging technologies, such as AI-assisted ergonomic tools, might further optimise nurse performance. Additionally, qualitative studies could delve deeper into the lived experiences of nurses navigating these challenges.

Healthcare policy

At the policy level, the results call for concrete actions from healthcare administrators and policymakers. Allocating dedicated funding for ergonomic upgrades in operating rooms should be a priority, with a focus on workspace design and equipment modernisation. Developing national guidelines on nurse wellbeing that incorporate psychological support programs and leadership training is essential. Policymakers must also address systemic issues like nurse-to-patient ratios in high-stress environments to mitigate excessive workloads and improve patient safety. These measures would not only enhance working conditions but also contribute to broader healthcare system resilience.

Nursing education

The findings highlight the need for curriculum enhancements. Integrating ergonomic training into nursing programs can equip future nurses with knowledge about proper posture, equipment use and injury prevention. Strengthening psychological resilience components in curricula, with emphasis on emotional regulation, self-efficacy and stress management techniques, is equally crucial. Furthermore, fostering interdisciplinary collaboration with industrial psychologists and ergonomics experts during training can better prepare nurses for real-world challenges. By embedding these elements into education, nursing schools can produce graduates who are both clinically proficient and resilient in demanding healthcare environments.

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