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Investigating the Impact of Nurse Staffing Ratios on Performance Outcomes and Patient Care Quality Across Healthcare Settings: A Comprehensive Review

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Abstract

Background: Nurse staffing ratios significantly influence both nurse performance and patient outcomes, making it a critical area of focus in healthcare policy and practice. This review examines the relationship between nurse staffing levels and various nurse-sensitive outcomes, including patient satisfaction, quality of care, and job satisfaction among nurses.

Methods: A systematic search of literature was conducted across multiple databases, including PubMed and CINAHL, utilizing search terms related to nurse staffing, patient outcomes, and nursing quality indicators.

Results: The review synthesized findings from numerous studies, highlighting that optimal nurse staffing ratios are associated with improved patient outcomes, including reduced hospital stays and lower rates of complications such as pressure ulcers and failure to rescue. Furthermore, higher staffing levels correlate with enhanced nurse job satisfaction and a better working environment. However, some studies reported inconclusive results, indicating variability in outcomes based on different healthcare settings and methodologies employed.

Conclusions: In conclusion, this review underscores the necessity for healthcare organizations to prioritize adequate nurse staffing ratios to ensure high-quality patient care and enhance nurse well-being. Future research should focus on longitudinal studies and the implementation of standardized metrics to better understand the intricate dynamics between staffing levels and patient outcomes.

Keywords: Nurse staffing ratios, Patient outcomes, Quality of care, Nurse job satisfaction, Healthcare policy

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1. Introduction

Nurses are the predominant segment of the global healthcare workforce. To provide high-quality care and ensure patient safety, the allocation of an efficient nursing workforce and the implementation of evidence-based nurse staffing have been critical concerns in health policy. In the wake of the significant contributions of Aiken [1] and Needleman [2], a multitude of research has explored the correlation between nurse staffing and nurse-sensitive outcomes for over thirty years. A recent umbrella review synthesized the extensive research regarding the relationship between nurse staffing and patient outcomes [3]. Nonetheless, the causal inference and intricate results remain ambiguous according to the bulk of investigations conducted in the U.S. and European nations using a cross-sectional methodology.

Consequently, a hospital with 500 inpatients and 3000 outpatients must employ at least 267 FTE nurses. All hospitals must adhere to this rule regarding the minimal ratio. Secondly, the charge schedule within the National Health Insurance system establishes nurse staffing guidelines for each functional category of inpatient wards [4]. The number of nurses mandated by the Medical Care Act is the minimum need, however, hospitals often hire more nurses to maintain the staffing levels outlined in the fee schedule. In 2006, the nurse staffing metric was modified from a patient-to-employed nurse ratio, which applied the same formula as the nurse staffing metric in the Medical Care Act, to a patient-to-nurse ratio each shift. Currently, there are four nurse staffing level guidelines in general care wards: 7:1, 10:1, 13:1, and 15:1. Hospitals have to choose a single category and allocate a greater number of nurses than the average daily inpatient-to-nursing staff ratio per shift across all general, surgical, and medical wards to secure the fundamental fee for inpatients.

Despite studies following Kanda's report [5], there is a need for bigger sample studies to examine the impact of nurse staffing restrictions on patient and nurse outcomes, akin to investigations in other countries [6-14]. This study sought to identify the factors used in research concerning nurse staffing and outcomes, as well as to describe the relationship between nurse staffing and nursing-sensitive outcomes. This study will provide facts about the distinctive regulation of minimum nurse staffing ratios, which encompasses both legal and financial frameworks under the National Health Insurance system and will contribute by juxtaposing results from other countries that either implement just legal regulations or lack required staffing ratios altogether.

2. Methods

We searched for published research in the PubMed and CINAHL databases for English-language articles. We employed search terms including 'nurse and (staffing, number, deployment, ratio, rate, or proportion)', 'quantity of nursing care', 'nursing system', 'patient and outcome', 'nurse-sensitive outcome', 'nurse-sensitive indicator', 'patient satisfaction', 'quality of nursing care', 'job satisfaction', and 'burnout'.

3. Correlation between Nurse Staffing Levels and Patient Outcomes

Patients aged 65 or older who had hip surgery exhibited an increased likelihood of prolonged hospital stays, along with a greater patient-to-nurse ratio each shift in two trials [15-19]. Pressure ulcers were less prevalent inwards with elevated NHPPD [17]. Patient satisfaction with nursing care was probably greater in the 7:1 patient-to-nurse ratio compared to the 10:1 ratio [14]. In other words, this demonstrated that a greater number of nursing personnel supported improved patient outcomes. Physical restraint was more often used in mental wards with a greater nurse-to-bed ratio, suggesting that a lower staff ratio correlated with improved patient outcomes. Readmission, hospitalization, in-hospital mortality, in-hospital pneumonia, physical restraint, and/or near misses were documented [11,16-19,21,23]. Nonetheless, they did not provide a statistically significant correlation with nurse staffing levels.

The results of failure to rescue, in-hospital fractures, and post-operative sequelae were inconsistent. Eriksson et al. [21] demonstrated that an increased ratio of personnel (nurses and physicians) per bed correlated with reduced risks for patients undergoing selected cancer operations. Hirano et al. [14]

demonstrate a reverse J-shaped correlation between patient-to-nurse ratios and post-operative problems, identifying a threshold ratio of 5.4 per shift. Consequently, Hirano et al.'s research demonstrated no statistical correlation between the number of nurses and doctors per bed.

Morita et al. [18] revealed that a higher nurse-to-bed ratio in hospitals correlates with a reduced risk for patients aged 50 and older who had undergone significant cancer and cardiovascular procedures. Moreover, the research by Jeong et al. [17] revealed no statistical correlation among individuals aged 65 or older with dementia who had hip surgery. Both studies examining the quality of nursing care revealed no statistically significant correlation with the patient-to-nurse ratio per shift at the individual nurse level or with the fee schedule requirements at the hospital level (7:1 group, 10:1 group) [13,14].

The findings indicate that increased nurse staffing correlates with enhanced job satisfaction, improved work environment, and elevated ward morale [12-14]. Work engagement, workplace stresses, stress responses, desire to quit, and decision to leave were recorded and shown to have no statistically significant association with nurse staffing levels.

4. Nurse Staffing Level Metrics

The patient-to-nurse ratio, nursing hours per patient day (NHPPD), and nurse-to-bed ratio were recognized as metrics for nurse staffing. Three observational tiers were identified: individual nurse level, ward (unit) level, and hospital average level. Nurse staffing metrics and measurement standards shown significant global variability [3,27]. In the extensive multinational research group, Nurse Forecasting in Europe (RN4CAST), nurse staffing was evaluated at the hospital level as the average number of patients allocated to nursing staff who indicated care for at least one patient in the nurses' questionnaire survey [1,28]. In the research analyzed, over fifty percent used the patient-to-nurse ratio per shift as the hospital-level variable, based on the nurse staffing requirement category or the calculating technique outlined in Japan's charge schedule [4,26]. This statistic represented the average daily number of inpatients per nursing staff member per shift at the hospital. The government permits a staggered allocation of nurses across wards daily, specifically, six nurses are to work each of the three shifts (each lasting 8 hours) on a ward accommodating 42 inpatients, according to the 7:1 patient-to-nurse ratio standard. In practice, seven or eight nurses are assigned to day shifts (5:1 or 6:1), while three nurses cover night hours (14:1). The nurse manager is authorized to reassign nurses to wards experiencing heightened workloads. Consequently, the interpretation of the data should be approached with care, since the real staffing levels at the ward (unit) may often diverge from the stated figures. Spetz et al. [25] indicated that unit-level data collection is preferred owing to the significant disparity between unit-level staffing and hospital-level aggregated data.

5. Performance Indicators

Patient outcomes, nursing quality, and nurses' outcomes were designated as outcome measures. The recognized patient outcome metrics were referred to as nursing sensitivity indicators, as delineated by the National Quality Forum [27] and corroborated by prior research in other nations [3]. In comparison to research conducted in other countries, they represented just a minor subset of nursing sensitivity indices. In the current administrative database, such as the DPC database, the aggregation of additional nurse sensitivity outcome factors may be challenging.

The questionnaire survey for nurses employed innovative questions to assess their working environment and health state. The majority of items used a Likert scale and lacked validation. In several countries, the validated Practice Environment Scale of the Nursing Work Index (PES-NWI) was often used to examine the impact of nurse staffing levels on nurses' working environment [29-31].

6. Correlation between Nurse Staffing Levels and Outcomes

Certain studies suggested that an increased nursing staff positively influenced the following outcomes: failure to rescue patients, duration of hospital stay, postoperative complications, in-hospital fractures, pressure ulcers, patient satisfaction, nurse job satisfaction, working conditions, and ward morale. The results of some outcomes aligned with prior research. A meta-analysis indicated that an increase of one

registered nurse per patient day correlated with a reduced probability of failure to rescue (OR, 0.84; 95% CI, 0.79–0.90) in surgical patients. Surgical patients saw a 31% reduction in duration of stay (OR, 0.69; 95% CI, 0.55–0.86) [31]. An umbrella review revealed that the evidence on nurse staffing, length of stay, quality of nursing care, and readmissions was robust, whereas the evidence for failure to rescue, death, and pneumonia was moderate [3].

Conversely, some studies indicated no substantial correlation between nurse staffing and readmission, hospitalization, hospital mortality, pneumonia, errors, nurse-reported nursing care, and intention to leave, which contradicted earlier research [3,31,32]. This may be elucidated by the following reasons. The nurse staffing variable was assessed at the hospital level in those studies. This may not accurately represent the level of nursing care provided to each patient [27]. The physician and medical care environment may influence patients' adverse occurrences. Consequently, they may mitigate the correlation with nurse staffing. A limited number of research examined each outcome. Additional study is necessary to formulate further findings.

The present studies have highlighted significant issues regarding the evidence of nurse staffing levels and their outcomes. Initially, there was variability in the results, and the number of research was inadequate to analyze all variables; apart from in-hospital mortality, only one or two studies assessed each outcome. Secondly, the majority of research examining nurse staffing and outcomes did not use risk adjustment, potentially leading to bias. Furthermore, the majority of research used a cross-sectional design, complicating the establishment of causal inferences. Additional research using other designs, such as longitudinal or quasi-experimental methodologies, is essential [32]. Third, a non-linear relationship may exist between nurse staffing levels and results. Hirano et al. [14] noted a non-linear relationship between nurse staffing levels and results in research conducted in the U.K. [33]. Current criteria must be taken into account while evaluating suitable nurse staffing numbers.

7. Conclusions

The relationship between nurse staffing ratios and outcomes is a vital aspect of healthcare delivery that warrants ongoing attention and research. As a predominantly female workforce, nurses play a crucial role in shaping patient experiences and outcomes, yet their performance is often influenced by staffing levels. This review highlights several key insights into the impact of adequate nurse staffing on both patient care and nursing practice.

Firstly, optimal nurse staffing ratios are essential for maintaining patient safety and quality of care. Studies consistently indicate that higher nurse-to-patient ratios lead to better patient outcomes, including lower rates of complications such as pressure ulcers, hospital readmissions, and mortality. When nurses are assigned an appropriate number of patients, they can devote more time to each individual, facilitating thorough assessments, timely interventions, and effective communication. This not only enhances the quality of care but also fosters a therapeutic environment that promotes patient satisfaction.

Moreover, the emotional and psychological well-being of nurses is closely tied to staffing levels. Research demonstrates that when nurses experience manageable workloads, they report higher job satisfaction and lower levels of burnout and stress. Conversely, inadequate staffing can lead to feelings of overwhelm and frustration, which can compromise the quality of care provided to patients. It is critical for healthcare organizations to recognize the direct correlation between nurse well-being and patient outcomes; supporting nurses in their roles ultimately leads to better care for patients.

Additionally, the findings of this review suggest that there is a need for policymakers to establish and enforce evidence-based staffing guidelines. While many countries have implemented regulations regarding minimum staffing levels, the effectiveness of these guidelines often depends on their enforcement and the flexibility allowed to healthcare facilities. Future policies must prioritize not only the establishment of these ratios but also ensure that healthcare institutions have the resources to maintain them consistently.

Furthermore, the variability in study results highlights the complexity of the relationship between nurse staffing and outcomes. Factors such as hospital type, patient demographics, and specific care settings can

significantly affect how staffing ratios impact patient care. Thus, future research should adopt a multifaceted approach, considering these variables when examining the effectiveness of nurse staffing levels. Longitudinal studies that track outcomes over time will be particularly valuable in establishing causal relationships and identifying best practices.

In conclusion, the evidence is clear: adequate nurse staffing is essential for optimizing patient outcomes and enhancing the work environment for nurses. As the healthcare landscape continues to evolve, it is imperative that stakeholders prioritize strategies that support sufficient nurse staffing levels. By doing so, healthcare organizations can not only improve the quality of care delivered to patients but also foster a more sustainable and satisfying work environment for nurses, ultimately leading to a healthier healthcare system.

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التحقيق في تأثير نسب توظيف الممرضات على نتائج الأداء وجودة رعاية المرضى في مختلف مرافق الرعاية الصحية: مراجعة شاملة

الملخص

الخلفية :تؤثر نسب توظيف الممرضين بشكل كبير على أداء الممرضين ونتائج المرضى، مما يجعلها مجالًا حاسمًا للتركيز في سياسة وممارسة الرعاية الصحية. تستعرض هذه المراجعة العلاقة بين مستويات توظيف الممرضين ومجموعة متنوعة من النتائج الحساسة للممرضين، بما في ذلك رضا المرضى، وجودة الرعاية، ورضا العمل بين الممرضين.

الطرق :تم إجراء بحث منهجي في الأدبيات عبر عدة قواعد بيانات، بما في ذلك PubMed وCINAHL، باستخدام مصطلحات بحث مرتبطة بتوظيف الممرضين ونتائج المرضى ومؤشرات جودة التمريض.

النتائج :قامت المراجعة بتلخيص النتائج من العديد من الدراسات، مما يبرز أن نسب توظيف الممرضين المثلى ترتبط بتحسين نتائج المرضى، بما في ذلك تقليل فترات الإقامة في المستشفى وانخفاض معدلات المضاعفات مثل قرحات الضغط وفشل الإنقاذ. علاوة على ذلك، تتوافق مستويات التوظيف الأعلى مع تعزيز رضا الممرضين عن وظائفهم وبيئة العمل الأفضل. ومع ذلك، أبلغت بعض الدراسات عن نتائج غير حاسمة، مما يشير إلى تباين النتائج بناءً على البيئات الصحية المختلفة والطرق المنهجية المتبعة.

الاستنتاجات :في الختام، تؤكد هذه المراجعة على ضرورة أن تعطي المنظمات الصحية الأولوية لنسب توظيف الممرضين الكافية لضمان رعاية مرضى عالية الجودة وتعزيز رفاهية الممرضين. يجب أن تركز الأبحاث المستقبلية على الدراسات الطولية وتنفيذ معايير موحدة لفهم الديناميكيات المعقدة بين مستويات التوظيف ونتائج المرضى بشكل أفضل.

الكلمات المفتاحية :نسب توظيف الممرضين، نتائج المرضى، جودة الرعاية، رضا الممرضين عن العمل، سياسة الرعاية الصحية