Review Article

DOI: https://doi.org/10.64573/torgj2507004

The Operating Room Global Journal (TORGJ)

https://torgjournal.org/

ISSN: 3105-3262

The Impact of Nurse Workforce Levels on Patient Outcomes in the UK Hospitals: A Systematic Review

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Declaration:
Authors' Contribution: All authors equally contributed to the study and approved the final manuscript.
Conflict of Interest: No conflict of interest
Funding: No funding received by the authors

Article History:
Received: 12-07-2025
Accepted: 05-10-2025
Available Online : 17-10-2025
QR access this Article

ABSTRACT

Background: This study investigates how nurse staffing levels influence patient outcomes in UK hospitals, with particular emphasis on how increased workloads affect the quality and safety of patient care.
Aim: To evaluate the relationship between nurse-to-patient ratios, workload pressures, human factors, and patient outcomes, and to explore potential strategies to improve staffing efficiency and service quality.
Methods: A systematic review was conducted using the PRISMA framework to identify, screen, and select relevant studies. Databases including CINAHL and EMBASE were searched extensively. Only studies examining the association between nurse staffing levels and patient outcomes in UK hospitals were included. From 1,065 records screened, 14 studies met the inclusion and exclusion criteria. The Critical Appraisal Skills Programme (CASP) tool was used to assess methodological quality and relevance.
Results: Findings indicate that high nurse workloads are consistently associated with increased medication errors, higher patient mortality, reduced patient safety, and increased nurse fatigue and burnout. Optimal staffing ratios and human factors engineering approaches were identified as potential solutions to improve care delivery.
Discussion: The review highlights the importance of aligning healthcare workforce planning with the UN Sustainable Development Goal 3 (Good Health and Well-Being), ensuring that healthcare services remain accessible and sustainable.
Conclusion: Improving nurse-to-patient ratios, integrating human factors principles, and supporting ethical workforce management practices can enhance patient safety and care outcomes across UK hospitals.
Keywords: Healthcare Workforce, Nurse Staffing, Nurse Burnout, Patient Outcomes, SDG-3, Workload

INTRODUCTION

The healthcare workforce is crucial to reaching Sustainable Development Goal (SDG) 3, which focuses on ensuring healthy lives and fostering well-being for everybody [1]. In the UK, the rising demand for healthcare services has placed enormous strain on nurses, resulting to high workloads that negatively affect both patient outcomes and nurse well-being [2]. High nurse workloads have been associated to many undesirable consequences, including inadequate oversight in care, prescription mistakes, and higher death rates [3]. Furthermore, heavy workloads can affect decision-making, impede collaboration with other healthcare professionals, and lead to burnout, which further deteriorates the quality of treatment offered [4]. This systematic analysis intends to evaluate the influence of nurse workforce levels on patient outcomes in the UK hospitals and offer measures for boosting nurse staffing, in line with SDG-3.

METHODOLOGY

This systematic review follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria [5]. The study focuses on studies undertaken in the UK hospitals, exploring the link between nurse staffing levels and patient outcomes. Electronic databases such as PubMed, CINAHL, and Embase were searched using keywords like "nurse staffing," "patient outcomes," "workload," and "UK hospitals." Studies were considered if they offered empirical data on nurse staffing levels and patient outcomes, and if they were published in peer-reviewed publications. The inclusion criteria utilized were papers published in English from 2010 onwards and concentrating on the UK hospitals. Any papers published before 2010 and not concentrating on the UK hospitals were omitted. The systematic search method involves employing Boolean operators such as AND and OR to combine important phrases including "nurse staffing," "patient outcomes," "workload," and "UK hospitals." This analysis employs the Systems Engineering Initiative for Patient Safety (SEIPS) paradigm to stress how work system factors including staffing, workflow, and the environment impact nurse performance and patient outcomes [6]. By optimizing these factors, the model indicates that excessive nurse workloads may be lowered, leading to better patient care and improved results (Figure 1). The study selection procedure involves a two-tiered method. Initial screening of titles and abstracts helped discover relevant research, followed by a rigorous full-text review to determine eligibility. A PRISMA flow diagram was utilized to publicly document the research selection process, providing clarity on the inclusion and exclusion of studies.

In the identification phase of this systematic review, an initial search was undertaken across numerous databases, including PubMed, CINAHL, Embase, and the Cochrane Library, generating a total of one thousand, nine hundred and sixty records (Figure 1 - PRISMA Flow Diagram). After deleting duplicates, the dataset was reduced to one thousand and sixty-five entries, which were evaluated for relevance based on title and abstract. During this screening procedure, eight hundred and ninety-five records were reviewed for eligibility. Of these, five hundred and forty-five records were removed because they were not relevant to the study topic, lacked adequate data on nurse staffing levels, or reported outcomes irrelevant to the scope of this review. This left three hundred and fifty full-text papers for further examination in the eligibility phase, a total of three hundred publications were removed mostly because they lacked empirical data relevant to the study issue or were done outside the UK. Since this evaluation focuses on the influence of nurse staffing levels in UK hospitals, studies that did not give data on UK settings or lacked empirical evidence were eliminated to ensure the study remained focused and relevant.

Twenty-six research were omitted owing to inadequate study design, meaning they lacked rigorous methodological techniques or did not match the inclusion criteria laid out in this review. Six studies were omitted because they provided insufficient criteria for measuring outcomes, failing to offer acceptable data or metrics on the patient outcomes connected to nurse staffing levels. Four research were eliminated due of language constraints, since these investigations were not available in English and translation was not practicable.

As a consequence, fourteen publications were selected for the final evaluation, all of which fulfilled the stringent design and relevance requirements essential to answer the study issue. This meticulous selection process, which followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, ensured that only high-

quality studies were included, enabling a focused and reliable examination of the influence of nurse staffing levels on patient outcomes in UK hospitals.

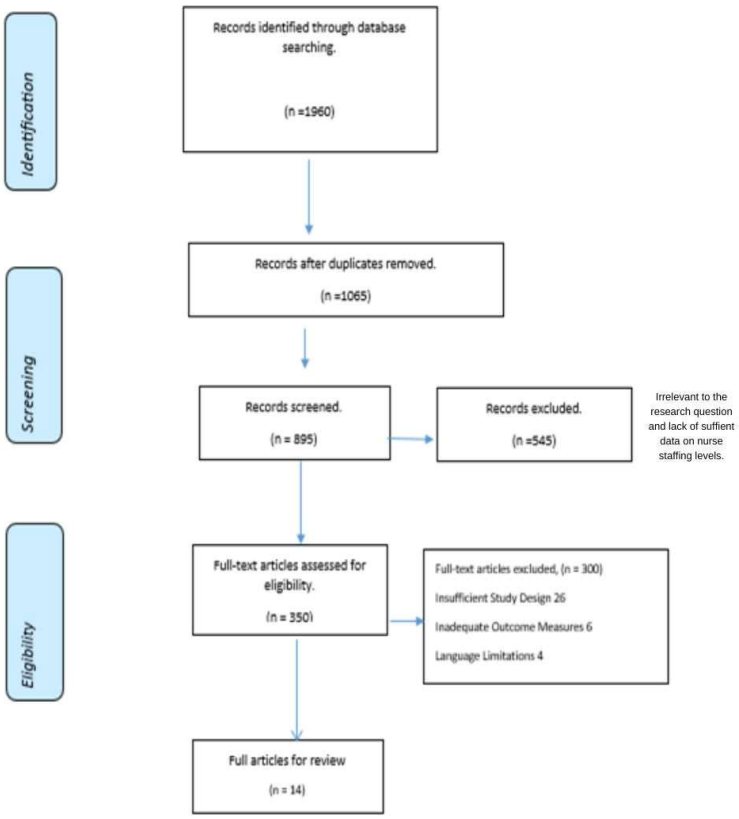

Figure 1: *PRISMA Flow Diagram*

For the critical assessment of included studies, the Critical assessment Skills Programme (CASP) checklist was applied. This tool was used to evaluate the quality, relevance, and methodological rigor of the studies included in this systematic review. The CASP checklist guarantees that each study was critically reviewed for features such as clarity of research questions, suitability of research design, dependability of the results, and relevance of the findings to the review topic as indicated in Table 1 below.

Table 1: *Summary of CASP Checklist Evaluation*

CASP Criteria	Evaluation
Clear Research Question	**All included studies provided clear research questions relevant to the review focus.**
Appropriate Research Design	**The majority of studies utilized suitable designs to answer their research questions.**
Recruitment Strategy	**Studies outlined their recruitment processes, though a few lacked details on sampling methods.**
Data Collection	**Most studies provided a clear description of data collection methods, ensuring consistency.**
Consideration of Ethical Issues	**All studies included ethical considerations, with clear statements of ethics approval.**

Data Analysis	**The data analysis methods were appropriate, though the depth of analysis varied between studies.**
Clear Statement of Findings	**Most studies presented their findings clearly, though a few lacked details on statistical significance.**
Validity and Reliability	**Studies demonstrated good reliability and validity, with a few studies needing more robust validation.**
Importance of Results	**The results of most studies were important and relevant to healthcare workforce and patient outcomes.**
Implications and Future Research	**Most studies highlighted the implications of their findings, though only a few provided recommendations for future research.**

Using the CASP framework, the evaluation showed that most studies satisfied high criteria of scientific rigor, with defined research questions, acceptable designs, and dependable findings. However, other studies have limits in recruiting techniques and depth of data analysis, stressing the need for more robust sampling methods and detailed analyses in future research.

Theoretical Foundation

The theoretical basis for this research is based on the Systems Engineering Initiative for Patient Safety (SEIPS) model, which highlights the role of work system factors such as staffing, workflow, and environment in impacting nurse performance and patient outcomes. This approach is particularly useful in healthcare, as the interplay between multiple system parts may considerably alter the quality of service given. The SEIPS model implies that modifying work environments and processes might offset the negative consequences of high nurse workloads, hence improving patient outcomes.

RESULTS

Themes have been found as a consequence of the critical appraisal and systematic assessment of the included publications. Thematic analysis was used to discover patterns and insights linked to nurse staffing levels and their influence on patient outcomes, nurse burnout, and work satisfaction. Each subject illustrates essential components of the nursing workforce's effect on healthcare delivery in UK hospitals.

Patient Outcomes

The analysis indicated a robust link between nurse staffing levels and patient outcomes. Studies repeatedly indicated that hospitals with greater nurse-to-patient ratios reported reduced death rates, fewer prescription mistakes, and increased patient satisfaction. For example, Olley et al. (2019) emphasized that introducing a minimal nurse-to-patient ratio, as witnessed in California and Queensland, resulted to considerable gains in patient safety and care quality. In accordance with SDG 3 (Good Health and Well-being), this study suggests that UK hospitals implement evidence-based staffing models, including minimum nurse-to-patient ratios, to increase patient outcomes, minimize needless death, and assure the provision of safe, high-quality care.

Nurse Burnout and Job Satisfaction

High workloads were consistently associated with nurse burnout, leading to decreased job satisfaction and higher turnover rates. Burnout was also linked to poorer patient outcomes, suggesting that improving nurse staffing levels could enhance both nurse well-being and patient care. Burnout among nurses is not only a personal issue but also a systemic one, affecting the entire healthcare delivery process. In alignment with SDG 3 (Good Health and Well-being), this study recommends implementing sustainable staffing practices, providing adequate support, and promoting

workforce development programmes to reduce nurse burnout. These measures are essential for maintaining nurse well-being, improving job satisfaction, and ensuring high-quality patient care.

Barriers to Optimal Nurse Staffing

The analysis revealed various challenges to reaching ideal nurse staffing levels, including budget limits, an aging workforce, and the rising demand for healthcare services. These issues are worsened by the lack of consistent staffing rules across the UK, resulting to heterogeneity in care quality. Additionally, environmental problems such as chaotic workstations and poor equipment add to the inefficiency of care delivery.

In connection with SDG 3 (Good Health and Well-being), this study suggests that the UK healthcare system invest in uniform nurse staffing norms, infrastructure upgrades, and resource allocation. Addressing these hurdles is critical for boosting service quality, eliminating inequities in patient outcomes, and guaranteeing the sustainability of the healthcare workforce.

DISCUSSION

The findings underline the important need to address nurse staffing challenges as part of larger healthcare workforce planning. Aligning nurse staffing plans with SDG 3 is vital to improve patient outcomes and protecting the well-being of healthcare workers, preserving excellent treatment. As stated by Waterfield and Barnason (2022), high workloads impair nurses' capacity to cooperate with other healthcare professionals, which is vital for patient-centred care.[8] To solve these difficulties, the paper advises that hospitals apply human factors engineering (HFE) methodologies to rethink work systems. HFE focuses on enhancing the interaction between healthcare workers and their work settings to promote safety and efficiency. By implementing HFE principles, hospitals may systematically identify and fix the aspects contributing to high workloads, such as inefficient processes, poor communication, and inadequate resources. For instance, incorporating digital patient engagement technologies might assist minimize nursing workloads by automating mundane chores, allowing nurses to focus more on direct patient care and decision-making. These technologies allow better communication between healthcare practitioners and patients, enhancing the overall quality of care and patient satisfaction.

Moreover, setting minimum nurse-to-patient ratios can assist standardize staffing levels, equitable distribution guaranteeing that nurses are not overloaded and can offer the essential care to each patient. Implementing these ideas would not only reduce the demands experienced by nurses but also build an environment where patient safety and quality of care are paramount. Ultimately, these measures contribute to a healthier workforce and improved patient outcomes, aligned with the aims of SDG 3.

CONCLUSION

This systematic research reveals the considerable influence of nurse staffing levels on patient outcomes in UK hospitals. Addressing nurse workloads via strategic workforce planning and policy interventions is critical for enhancing patient care and reaching SDG 3. The findings suggest the necessity for continual research and the deployment of evidence-based staffing strategies that fit with global health goals.

Recommendations

1. Implementing Minimum Nurse-to-Patient Ratios: To standardize treatment and decrease the danger of burnout, it is necessary to set minimum nurse-to-patient ratios throughout UK hospitals. This plan connects with SDG 3 by improving excellent health and well-being via enhanced patient care.
2. Adopting Human Factors Engineering Approaches: Hospitals should invest in revamping work systems to optimize nursing processes and minimize workloads. This may be done by incorporating digital solutions that

simplify mundane processes and promote patient interaction, contributing to better patient outcomes and aligned with SDG 3.

3. Continuous Workforce Development and Training: Regular training and development programs should be undertaken to provide nurses with the required skills to manage heavy workloads successfully. This method guarantees that the healthcare staff stays resilient and capable of providing high-quality treatment, in line with SDG 3.

Policy Advocacy and Research: Ongoing research and policy advocacy are needed to establish and adopt evidence-
structural challenges contributing to nurse fatigue and poor patient outcomes, eventually promoting SDG 3.

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Cite:

- **APA (7th edition)**: Owokole, A. A., & Sanaullah, A. (2025). *The impact of nurse workforce levels on patient outcomes in the UK hospitals: A systematic review.* *The Operating Room Global Journal (TORGJ), 1*(1). https://doi.org/10.64573/torgj2507004

- **Harvard**: Owokole, A.A. and Sanaullah, A., 2025. The impact of nurse workforce levels on patient outcomes in the UK hospitals: A systematic review. *The Operating Room Global Journal (TORGJ)*, **1**(1). Available at: https://doi.org/10.64573/torgj2507004

- **Vancouver**: Owokole AA, Sanaullah A. The impact of nurse workforce levels on patient outcomes in the UK hospitals: A systematic review. *The Operating Room Global Journal (TORGJ).* 2025;1(1). https://doi.org/10.64573/torgj2507004

- **MLA (9th edition)**: Owokole, Adebusola Adenike, and Asjed Sanaullah. "The Impact of Nurse Workforce Levels on Patient Outcomes in the UK Hospitals: A Systematic Review." *The Operating Room Global Journal (TORGJ)*, vol. 1, no. 1, 2025, https://doi.org/10.64573/torgj2507004

- **Chicago (Author–Date)**: Owokole, Adebusola Adenike, and Asjed Sanaullah. 2025. "The Impact of Nurse Workforce Levels on Patient Outcomes in the UK Hospitals: A Systematic Review." *The Operating Room Global Journal (TORGJ)* 1 (1). https://doi.org/10.64573/torgj2507004