



OPTIMIZING PATIENT DISTRIBUTION THROUGH THE ADAPTATION OF THE RAFAELA SYSTEM BY STRENGTHENING THE ROLE OF NURSE UNIT MANAGERS TO ACHIEVE EQUITABLE NURSING WORKLOAD DISTRIBUTION

Mikha Arisia Helen^{1*}, Tuti Afriani², Hening Pujasari²

¹Master's Program in Nursing Science, Faculty of Nursing, Universitas Indonesia, Jl. Prof. DR. Sudjono D. Pusponogoro, Pondok Cina, Kecamatan Beji, Depok, Jawa Barat 16424, Indonesia

²Faculty of Nursing, Universitas Indonesia, Jl. Prof. DR. Sudjono D. Pusponogoro, Pondok Cina, Beji, Depok, Jawa Barat 16424, Indonesia

*mikha.helen14@gmail.com

ABSTRACT

Increasing patient complexity and Bed Occupancy Rate (BOR) have contributed to higher nursing workload at X hospital. These conditions potentially lead to imbalanced workload distribution, nurse fatigue, and decreased quality of care and patient safety. This study aimed to optimize competency-based nurse staffing through the role of Nurse Unit Managers (NUMs) in managing nursing workload at X hospital. This study used a project improvement approach conducted during nursing management residency activities in inpatient units on the 5th, 10th, 11th, 12th, and 13th floors of X hospital from April to May 2026. Data were collected through observations, semi-structured interviews, and document reviews. Problem analysis was conducted using the POSAC approach and fishbone analysis. The intervention was implemented through competency-based staffing using the RAFAELA System as a nursing intensity measurement tool. Most patients had partial to total dependency levels with high clinical complexity. The nurse-to-patient ratio increased to 1:9–11 during full BOR conditions. Patient assignment was previously based on room location rather than patient complexity and nurses' competency levels, resulting in workload imbalance. The implementation of competency-based staffing assisted NUMs in distributing patients more objectively according to patient complexity and nurses' competencies. Competency-based nurse staffing optimization through strengthening the role of NUMs and utilization of the RAFAELA System has the potential to improve nursing service effectiveness, support patient safety, and create more proportional workload distribution.

Keywords: competency level; nurse staffing; nursing workload; nurse unit manager; RAFAELA system

How to cite (in APA style)

Helen, M. A., Afriani, T., & Pujasari, H. (2026). Optimizing Patient Distribution Through the Adaptation of the RAFAELA System by Strengthening the Role of Nurse Unit Managers to Achieve Equitable Nursing Workload Distribution. *Indonesian Journal of Global Health Research*, 8(5), 127–138. <https://doi.org/10.37287/ijghr.v8i5.2434>.

INTRODUCTION

Nursing services are a fundamental component of healthcare quality and patient safety in hospitals. Nurses have the highest frequency of direct patient contact over a 24-hour period, making the quality of nursing care a critical determinant of patient outcomes. However, increasing patient complexity and growing healthcare demands present significant challenges in nursing workforce management, particularly in relation to nurse staffing (World Health Organization [WHO], 2020). Nurse staffing refers to the process of determining the appropriate number, distribution, and competency mix of nurses according to patients' care needs (Aiken et al., 2014). Previous studies have demonstrated that a mismatch between patient care requirements and nursing workforce capacity increases nurses' workload, compromises the quality of care, and elevates the risk of patient safety incidents (Griffiths et al., 2019). Therefore, staffing decisions should consider not only the number of nursing personnel but also nurses' competencies and the complexity of patients' care needs.

Competency-based staffing has been developed to ensure an appropriate match between nurses' competencies and patients' care requirements. Griffiths et al. (2020) emphasized that contemporary staffing systems should incorporate patient acuity and nursing care needs because healthcare

demands cannot be accurately determined solely by patient numbers. Similarly, Allen et al. (2023) highlighted that staffing decisions require the professional judgment of nurses and Nurse Unit Managers (NUMs) to respond effectively to the dynamic nature of clinical practice.

In modern healthcare settings, nursing workload measurement has evolved beyond traditional nurse-to-patient ratios to include nursing intensity as a more comprehensive indicator of care demands (Fagerström et al., 2014). One widely recognized approach is the RAFAELA System, which supports objective staffing decisions based on the complexity of patients' nursing care needs. Previous studies have demonstrated that the RAFAELA System facilitates more accurate workload measurement and staffing planning aligned with patient care requirements (Fagerström et al., 2018). In Indonesia, nursing staffing management continues to rely primarily on nurse-to-patient ratios and workforce numbers. Although a national professional nursing career ladder has been established under the Regulation of the Minister of Health of the Republic of Indonesia No. 40 of 2017, competency levels have not been optimally integrated into patient allocation and staffing decisions. Consequently, patient assignment often fails to consider the alignment between patient complexity and nurses' professional competencies.

Hospital X, a tertiary teaching hospital, manages patients with a high level of clinical complexity. Preliminary assessments revealed that patient allocation in inpatient wards is primarily based on ward location rather than patient complexity and nurses' competencies. Furthermore, high Bed Occupancy Rates (BOR) frequently result in nurse-to-patient ratios ranging from 1:9 to 1:11, potentially leading to substantial disparities in nursing workload among staff. Given these challenges, optimizing competency-based nurse staffing through strengthening the role of Nurse Unit Managers is essential to achieve more objective patient allocation based on patient complexity and nurses' competencies. The adaptation of the RAFAELA System is expected to support evidence-informed staffing decisions, promote equitable patient distribution, improve workload balance among nurses, and ultimately enhance the quality of nursing care and patient safety. Therefore, this study aimed to evaluate the implementation of a competency-based nurse staffing model through strengthening the role of Nurse Unit Managers using an adapted RAFAELA System in a tertiary teaching hospital.

METHOD

This nursing management implementation project employed a quality improvement approach and was conducted between April and May 2026 in the inpatient wards on the 5th, 10th, 11th, 12th, and 13th floors of Hospital X. The implementation involved Nurse Unit Managers (NUMs), staff nurses, and inpatient data used to assess patients' nursing intensity. Data were collected through direct observation of patient allocation and nurses' workload, semi-structured interviews with Nurse Unit Managers and staff nurses, and document reviews of Bed Occupancy Rate (BOR), nursing workforce composition, patient dependency levels, and the existing patient allocation system. Root cause analysis was conducted using the POSAC management approach and fishbone analysis to identify factors contributing to workload imbalance among nurses.

The intervention consisted of implementing an adapted RAFAELA System using Activities of Daily Living (ADL), Early Warning Score (EWS), and fall risk as indicators of patient complexity. Each indicator was assigned a predefined score, and the total score was calculated to generate an OPCq score representing the patient's nursing intensity. Nurse Unit Managers used these scores to allocate patients so that the total workload assigned to each nurse did not exceed 15 points. This approach aimed to achieve a more equitable distribution of nursing workload based on patients' nursing care requirements. The implementation was evaluated by observing changes in patient allocation patterns and the balance of nurses' workload following the intervention. This project received institutional approval for nursing management residency activities and implementation from Hospital X. Data were analyzed descriptively using comparative before-and-after analysis.

Observation, interview, and document review data were synthesized to evaluate changes in patient allocation patterns and nursing workload following implementation of the adapted RAFAELA System. Qualitative findings from interviews were analyzed using thematic content analysis, while quantitative data were summarized using frequencies, percentages, means, and ranges.

RESULT

The baseline assessment demonstrated that nursing workload increased in parallel with rising Bed Occupancy Rates and greater patient complexity. Most hospitalized patients required partial to total nursing assistance, accompanied by intensive monitoring and nursing interventions. During periods of full bed occupancy, the nurse-to-patient ratio increased to approximately 1:9–11. Patient allocation was primarily determined by ward location rather than patient complexity and nurses' competencies, resulting in considerable variation in workload among nurses. The implementation of competency-based staffing using the adapted RAFAELA System enabled Nurse Unit Managers to assess patients' nursing intensity more objectively. Consequently, patient allocation became more proportional, reflecting both patient care complexity and nurses' competencies. Following implementation, nursing workload was distributed more equitably across staff compared with the pre-intervention condition, indicating an improvement in workload balance.

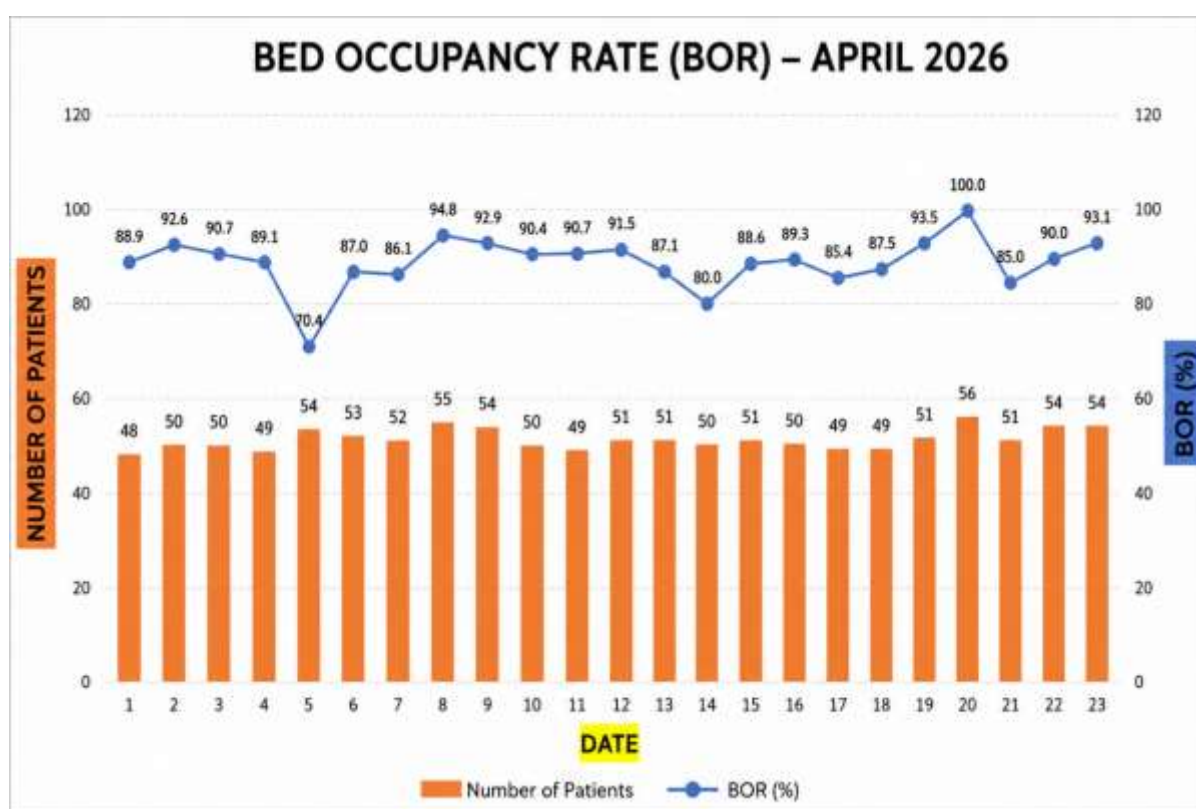


Figure 1. Bed Occupancy Rate (BOR) in the 11th Floor Inpatient Ward, April 2026

Monitoring of the Bed Occupancy Rate (BOR) during April 2026 revealed occupancy levels ranging from 79% to 98%, with bed occupancy exceeding 90% on the majority of days. The persistently high BOR reflects substantial inpatient service utilization, resulting in increased nursing care demands and a corresponding rise in nurses' workload.

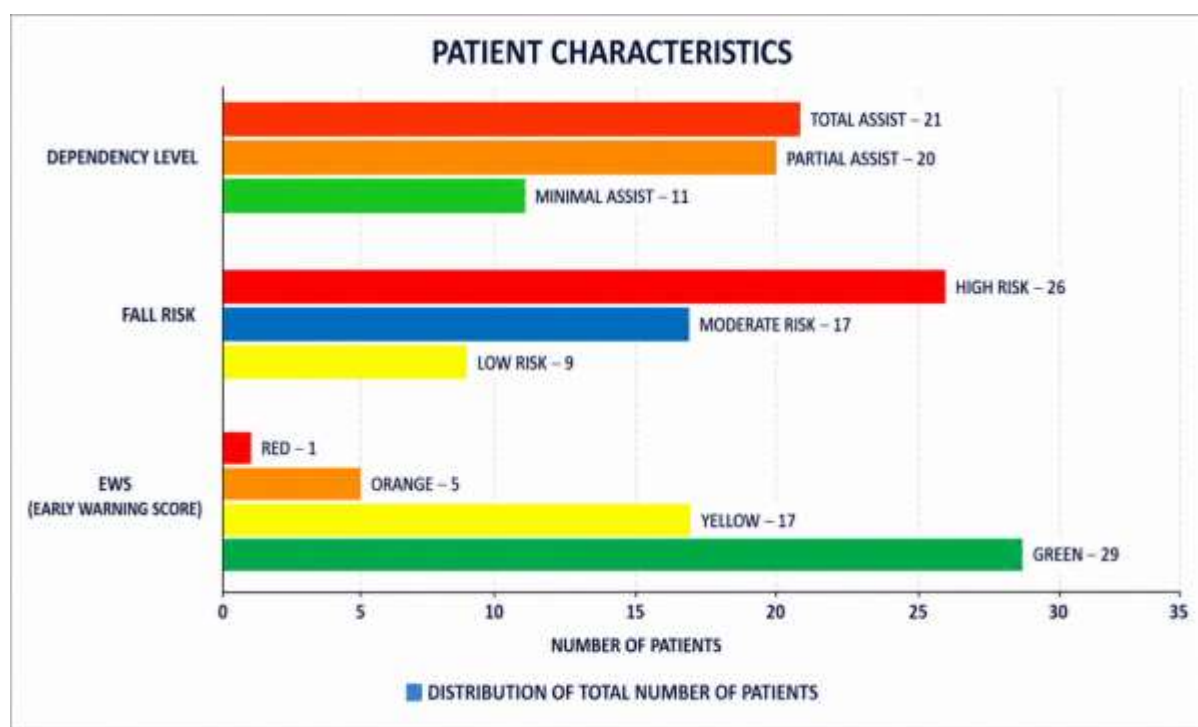


Figure 2. Patient Characteristics in the 11th Floor Inpatient Ward

The assessment of patient characteristics revealed that the majority of patients required total assistance ($n = 21$), followed by partial assistance ($n = 20$), whereas 11 patients required minimal assistance. Based on fall risk assessment, most patients were classified as being at high risk of falls ($n = 26$). According to the Early Warning Score (EWS), 29 patients were categorized as green, 17 as yellow, 4 as orange, and 1 as red. Overall, these findings demonstrate that the inpatient units cared predominantly for patients with moderate to high levels of dependency and clinical complexity, underscoring the need for a more adaptive and competency-based staffing model to ensure equitable workload distribution and appropriate allocation of nursing resources.

Table 1.
Nursing Staff Composition by Shift in the 11th Floor Inpatient Ward

Tanggal	Shift Pagi	Shift Siang	Shift Malam	Jumlah Pasien
21 April 2026	3PN; 3AN	1PN; 5AN	2PN; 4AN	50
22 April 2026	1PN; 5AN	1PN; 5AN	1PN; 4AN	54
23 April 2026	3PN; 3AN	2PN; 5AN	3PN; 4AN	54
24 April 2026	3PN; 5AN	3PN; 4AN	2PN; 5AN	51
25 April 2026	2PN; 5AN	2PN; 3AN	2PN; 5AN	50

The nursing staff composition across shifts ranged from 5 to 8 nurses, providing care for approximately 50–54 inpatients per day. Under peak occupancy conditions, the nurse-to-patient ratio reached approximately 1:9 to 1:11, potentially increasing nurses' workload and contributing to an unequal distribution of patient assignments.

Table 2.

Distribution of Nurses' Clinical Career Levels in the 11th Floor Inpatient Ward

Inpatient Unit	PK IIA	PK IIB	PK IIIA	PK IIIB	PK IIIC	Not Yet Credentialed	Planned for Recredentialing	No Updated Career Level Recorded	Educational Level (Ns)	Educational Level (Diploma/D3)	Primary Nurse (PN)	Associate Nurse (AN)
11th Floor Inpatient Ward	5	0	16	0	0	10	3	0	32	0	11	21

Based on the nurses' clinical career level data, the majority of nurses were classified as Clinical Nurse Level IIIA (PK IIIA; n = 16), followed by Clinical Nurse Level IIA (PK IIA; n = 5). However, 10 nurses had not yet completed the credentialing process, while 3 nurses were scheduled for recredentialing. These findings indicate that nurses' competency levels were not evenly distributed across the unit and should therefore be considered when allocating patients to ensure that patient care complexity is appropriately matched with nurses' clinical competencies.



Figure 1. Ishikawa (Fishbone) Diagram Of Root Cause Analysis

Based on the implementation findings, a patient allocation model was developed by adapting the RAFAELA System to the specific context of the inpatient wards. The model incorporates the assessment of Activities of Daily Living (ADL), Early Warning Score (EWS), and fall risk as indicators for measuring patients' nursing intensity, which are subsequently converted into an Optimal Nursing Care Intensity Level (OPCq) score. The resulting OPCq scores serve as the basis for patient allocation by Nurse Unit Managers (NUMs), enabling a more equitable distribution of nursing workload among staff nurses.

Table 3.
Problem Prioritization Using The POSAC Approach

ASPEK	OBSERVASI	WAWANCARA	DATA/DOKUMEN	MASALAH
PLANNING	SOP Sudah Ada Namun Belum Spesifik, Belum Ada Pengelompokan Pasien Berbasis Kompleksitas	Pembagian Pasien Belum Mempertimbangkan Kompetensi & Kompleksitas	BOR Tinggi (90– 100%)	Belum Optimalnya Perencanaan Distribusi Pasien Berbasis Kompleksitas & Beban Kerja
ORGANIZING	Pembagian Pasien Berbasis Lokasi (Cluster)	Risiko Satu Area Berisi Pasien Kompleks Tinggi	N/A	Ketidakseimbangan Distribusi Pasien
STAFFING	Rasio Perawat 1:7–8, Bisa 1:9–11 Saat BOR Tinggi	Tenaga Belum Mencukupi, Kelelahan Perawat, Tingginya Turnover Perawat	N/A	Ketidakseimbangan Jumlah Tenaga Dengan Beban Kerja Tinggi
ACTUATING	Banyak Pasien Dengan Kondisi Cepat Memburuk	Perawat Mengalami Kelelahan, Risiko Insiden Meningkat	Dominasi Pasien Partial–Total Care	Pelaksanaan Asuhan Tidak Optimal Akibat Beban Kerja Tinggi
CONTROLLING	N/A	Belum Mengatur Pembagian Pasien Berbasis Kompetensi (PK)	Kompetensi Perawat Belum Merata	Pengawasan & Sistem Belum Optimal Dalam Mendukung Distribusi Berbasis Kompetensi

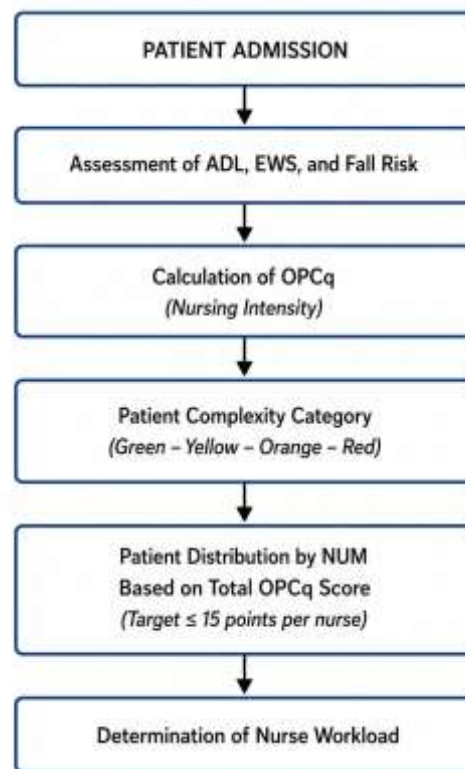


Figure 3. Patient Allocation Model Based on OPCq Scoring Using an Adapted RAFAELA System

In this implementation, Nurse Unit Managers (NUMs) allocated patients based on the total workload score derived from the Optimal Nursing Care Intensity Level (OPCq) assessment. Patient assignments were distributed by maintaining a target maximum workload score of 15 points per nurse, resulting in a more balanced and equitable allocation of patients. This approach helped reduce disparities in workload among nurses while supporting more efficient nursing care delivery.

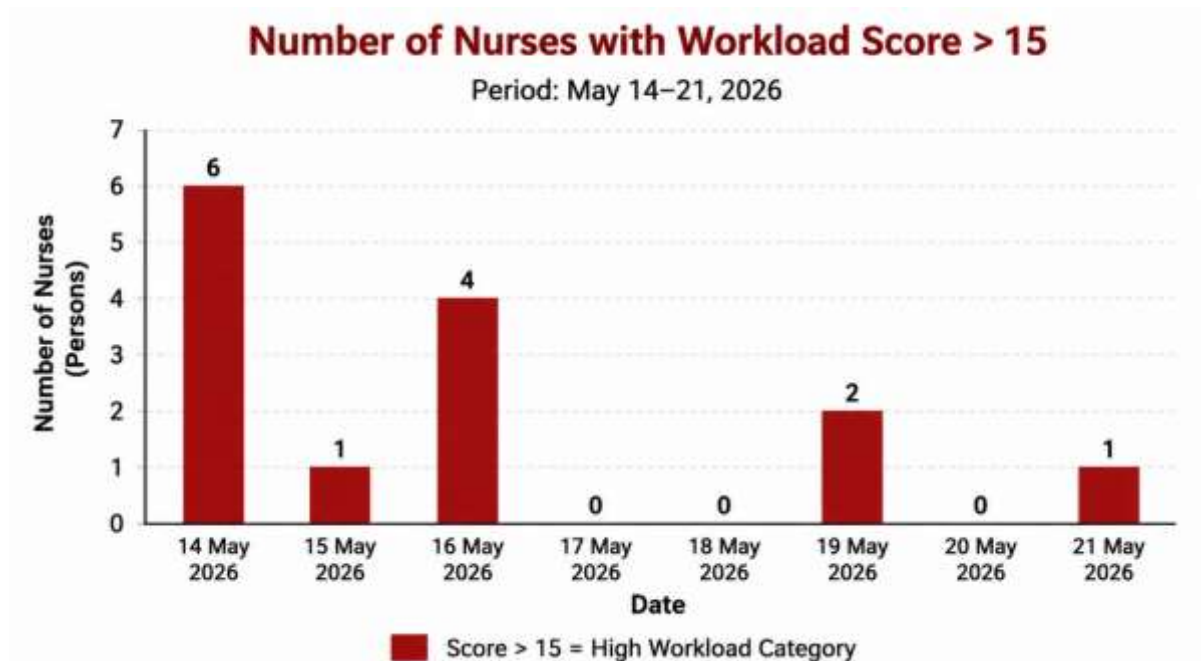


Figure 4. Observation Results Following the Implementation of OPCq Scoring and Nursing Workload Scores

The implementation of the OPCq scoring system during the observation period from 14 to 21 May 2026 demonstrated a progressive reduction in the number of nurses experiencing high workload scores (>15 points). At the beginning of the implementation, six nurses were categorized as having a high workload. However, this number gradually declined over the subsequent observation days, and on several days no nurses exceeded the workload threshold of 15 points. These findings suggest that the use of OPCq scoring combined with competency-based patient allocation contributed to a more balanced distribution of nursing workload.

DISCUSSION

Throughout the eight-day implementation period, the distribution of nurses' workload was predominantly classified as moderate. This finding indicates that the adapted RAFAELA approach functioned effectively as a practical tool for measuring and managing nursing workload. Nevertheless, a small number of nurses continued to experience workload scores exceeding 15 points on certain days, reflecting fluctuations in patient care demands and variations in patient complexity.

The implementation findings also demonstrated that increasing patient complexity and high Bed Occupancy Rates (BOR) substantially influenced nurses' workload in the inpatient wards. Higher patient occupancy resulted in increased nurse-to-patient ratios, thereby increasing the likelihood of workload imbalance and potentially compromising the quality of nursing care if staffing decisions were not appropriately adjusted. Conventional patient allocation practices, which primarily relied on ward location rather than patient care needs, were insufficient to reflect the actual complexity of nursing care requirements. These findings are consistent with those reported by Aiken et al. (2014), who demonstrated that inappropriate staffing increases the risk of nurse burnout and compromises patient safety. Similarly, Griffiths et al. (2018) concluded that staffing models based on patients' care needs are more effective than conventional staffing approaches.

In the present implementation, the RAFAELA System was not applied in its complete original form, which consists of the Optimal Nursing Care Intensity Level (OPCq), Daily Nursing Resources, and the Professional Assessment of Optimal Nursing Care Intensity Level (PAONCIL). Instead, an adapted version of the OPCq component was implemented using three patient

complexity indicators: Activities of Daily Living (ADL), Early Warning Score (EWS), and fall risk. This simplified approach was considered more compatible with the operational context and available resources of the inpatient wards while still providing an objective estimation of patients' nursing care intensity and workload (Fagerström et al., 2022; Griffiths et al., 2020).

The adapted RAFAELA System enabled Nurse Unit Managers (NUMs) to assess nursing intensity more objectively and to allocate patients according to both patient complexity and nurses' competencies. Consequently, patient assignments became more balanced, promoting equitable workload distribution and improving the efficiency of nursing service delivery (Allen et al., 2023; Fagerström et al., 2022).

The role of the Nurse Unit Manager was fundamental to the successful implementation of competency-based staffing. As frontline nursing leaders, NUMs were responsible for patient allocation, clinical supervision, and staffing decisions at the unit level. Strengthening their role facilitated more effective coordination of nursing services and improved responsiveness to changing patient care demands (Allen et al., 2023; WHO, 2020).

Despite these positive outcomes, several limitations should be acknowledged. First, this implementation employed a simplified version of the RAFAELA System, focusing exclusively on the adapted OPCq component based on ADL, EWS, and fall risk. Other essential components of the original RAFAELA System, including Daily Nursing Resources and the Professional Assessment of Optimal Nursing Care Intensity Level (PAONCIL), were not incorporated. Consequently, the objective evaluation of optimal nursing staffing requirements could not be performed comprehensively (Fagerström et al., 2022).

Second, patients' clinical conditions occasionally changed rapidly during nursing shifts, meaning that the initial nursing intensity score did not always reflect patients' conditions throughout the entire shift. These fluctuations may have influenced both nursing intensity measurements and patient allocation decisions during implementation (Allen et al., 2023).

Third, the implementation was conducted under routine clinical conditions with limited human resources while the hospital was undergoing organizational changes in its nursing staffing system. According to data obtained from the Nursing Subcommittee and Nurse Unit Managers, the hospital was in the process of implementing a revised professional career pathway and transitioning toward a Primary Nurse (PN) assignment model with a more equitable distribution of Clinical Nurse Level IIIB (PK IIIB) nurses among both permanent and contract staff. Consequently, the allocation of Associate Nurses (ANs) and Primary Nurses (PNs) had not yet reached a stable configuration during the implementation period, which may have affected workload distribution (Allen et al., 2023).

Furthermore, this implementation did not account for several non-clinical factors known to influence nurses' workload, including administrative responsibilities, family support activities, multidisciplinary coordination, patients' emotional needs, and nursing documentation. These factors represent important contributors to nurses' perceived workload in routine clinical practice and should be considered in future workload measurement models (Griffiths et al., 2020; Saville et al., 2021).

Another limitation was the relatively short observation period, which may not have fully captured the long-term effects of the intervention. During the implementation period, the Bed Occupancy Rate (BOR) did not consistently reach full capacity (100%), limiting the evaluation of the adapted RAFAELA System under conditions of maximum service demand. In addition, both Nurse Unit Managers and staff nurses were still adapting to the nursing intensity measurement system.

Therefore, longer implementation and monitoring periods are required to comprehensively evaluate the intervention's impact on workload balance, patient allocation, staffing efficiency, and nursing care quality (Allen et al., 2023; Fagerström et al., 2022).

Overall, although the adapted RAFAELA System demonstrated promising results in promoting competency-based patient allocation and more equitable nursing workload distribution, further refinement and evaluation are required before wider implementation. Future developments should incorporate all components of the original RAFAELA System while considering organizational factors, staffing resources, and non-clinical workload determinants. Continuous monitoring and evaluation are also essential to ensure the sustainability and effectiveness of competency-based staffing strategies in hospital settings (Fagerström et al., 2022; Griffiths et al., 2020; Allen et al., 2023).

CONCLUSION

The implementation of the adapted RAFAELA System for optimizing nurse staffing facilitated a more objective patient allocation process by considering both patient care complexity and nurses' competencies. This competency-based staffing approach, supported by the strengthened role of Nurse Unit Managers (NUMs), has the potential to improve the efficiency of nursing care delivery, enhance patient safety, and promote a more equitable distribution of nursing workload in inpatient wards.

The findings suggest that integrating patient-centered workload assessment into staffing decisions can support more effective workforce management and contribute to higher-quality nursing care. Further refinement of the adapted RAFAELA System, including the incorporation of additional nursing intensity indicators.

REFERENCES

- Aiken, L. H., Sloane, D. M., Bruyneel, L., Van den Heede, K., Griffiths, P., Busse, R., Diomidous, M., Kinnunen, J., Kozka, M., Lesaffre, E., McHugh, M. D., Moreno-Casbas, M. T., Rafferty, A. M., Schwendimann, R., Scott, A., Tishelman, C., van Achterberg, T., & Sermeus, W. (2014). Nurse staffing and education and hospital mortality in nine European countries: A retrospective observational study. *The Lancet*, 383(9931), 1824–1830. [https://doi.org/10.1016/S0140-6736\(13\)62631-8](https://doi.org/10.1016/S0140-6736(13)62631-8)
- Aiken, L. H., et al. (2018). Nurse staffing and patient outcomes in acute care hospitals. *Journal of Nursing Administration*.
- Allen, D., et al. (2023). Professional judgement and nurse staffing decision-making in hospital settings. *International Journal of Nursing Studies*.
- Allen, D., Jacob, N., Strange, H., Jones, A., Burton, C., & Rafferty, A. M. (2023). “It’s not just about the numbers”: Inside the black box of nurses’ professional judgement in nurse staffing systems in England and Wales: Insights from a qualitative cross-case comparative study. *International Journal of Nursing Studies*, 147, 104586. <https://doi.org/10.1016/j.ijnurstu.2023.104586>
- American Nurses Association. (2021). Principles for nurse staffing. <https://www.nursingworld.org/practice-policy/nurse-staffing/>
- Benjamin, E., Romain, S., Vital, C., Blake, C., Peterson, C., & Chung, J. (2025). “They don’t know what it’s really like:” qualitative insights into inpatient cardiac nurses’ perceived workload. *BMC Nursing*, 24(1), 1083. <https://doi.org/10.1186/s12912-025-03723-4>
- Brady, N., O’Connell, S., Gilligan, D., Madden, C., Gannon, L., Howson, V., Ball, J. E., Murphy, A., Griffiths, P., Duffield, C., Scott, P. A., Carthy, V. J. C. M., & Drennan, J. (2025). Planned changes to nurse leadership, staffing and Skill-Mix: impact on the working environment, job

- satisfaction and intention to leave. *Journal of Advanced Nursing*, 81(9), 5973–5983. <https://doi.org/10.1111/jan.16752>
- Bvumbwe, T., & Mtshali, N. G. (2018). Transforming nursing education to strengthen health system in Malawi: an exploratory study. *The Open Nursing Journal*, 12(1), 93–105. <https://doi.org/10.2174/1874434601812010093>
- Carayon, P., & Gürses, A. P. (2008). Nursing workload and patient safety—A human factors engineering perspective. Dalam R. G. Hughes (Ed.), *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. Agency for Healthcare Research and Quality. <https://www.ncbi.nlm.nih.gov/books/NBK2657/>
- Dall’Ora, C., et al. (2022). Nurse staffing and patient safety outcomes: Recent evidence and implications. *International Journal of Nursing Studies*.
- Dall’Ora, C., Saville, C., Rubbo, B., Turner, L., Jones, J., & Griffiths, P. (2022b). Nurse staffing levels and patient outcomes: A systematic review of longitudinal studies. *International Journal of Nursing Studies*, 134, 104311. <https://doi.org/10.1016/j.ijnurstu.2022.104311>
- Dillner, P., Göransson, K. E., Norman, M., Unbeck, M., & Förberg, U. (2025). Nurse staffing skill mix and acuity-adjusted provision ratios in Swedish neonatal care: A cohort benchmark study. *International Journal of Nursing Studies Advances*, 10, 100471. <https://doi.org/10.1016/j.ijnsa.2025.100471>
- Duffield, C., et al. (2010). Nursing staffing, nursing workload, the work environment and patient outcomes. *Applied Nursing Research*, 24(4), 244–255. <https://doi.org/10.1016/j.apnr.2009.12.004>
- Drennan, J., Murphy, A., McCarthy, V. J., Ball, J., Duffield, C., Crouch, R., Kelly, G., Loughnane, C., Murphy, A., Hegarty, J., Brady, N., Scott, A., & Griffiths, P. (2024). The association between nurse staffing and quality of care in emergency departments: A systematic review. *International Journal of Nursing Studies*, 153, 104706. <https://doi.org/10.1016/j.ijnurstu.2024.104706>
- Fagerström, L., et al. (2000). Professional assessment of optimal nursing care intensity level (PAONCIL) as a part of the RAFAELA system.
- Fagerström, L., & Vainikainen, P. (2014). Nursing intensity and workload measurement using the RAFAELA system.
- Fagerström, L., et al. (2014). RAFAELA patient classification system as a tool for nurse staffing and workload measurement.
- Fagerström, L., et al. (2018). Nursing workload, patient safety incidents, and mortality using the RAFAELA system.
- Fagerström, L., Kinnunen, M., & Saarela, J. (2018). Nursing workload, patient safety incidents and mortality: an observational study from Finland. *BMJ Open*, 8(4), e016367. <https://doi.org/10.1136/bmjopen-2017-016367>
- Griffiths, P., et al. (2018). Nurse staffing, nursing workload, and patient outcomes: A review of evidence. *International Journal of Nursing Studies*. <https://doi.org/10.1016/j.ijnurstu.2018.04.016>
- Griffiths, P., et al. (2019). Nurse staffing levels and patient mortality in acute hospital settings. *BMJ Quality & Safety*. <https://doi.org/10.1136/bmjqs-2018-008043>
- Griffiths, P., Saville, C., Ball, J., Jones, J., Pattison, N., & Monks, T. (2019). Nursing workload, nurse staffing methodologies and tools: A systematic scoping review and discussion. *International Journal of Nursing Studies*, 103, 103487. <https://doi.org/10.1016/j.ijnurstu.2019.103487>
- Griffiths, P., et al. (2020). Patient acuity, skill mix, and nurse staffing approaches in modern healthcare systems.

- Griffiths, P., Maruotti, A., Saucedo, A. R., Redfern, O. C., Ball, J. E., Briggs, J., Dall'Ora, C., Schmidt, P. E., & Smith, G. B. (2018). Nurse staffing, nursing assistants and hospital mortality: retrospective longitudinal cohort study. *BMJ Quality & Safety*, 28(8), 609–617. <https://doi.org/10.1136/bmjqs-2018-008043>
- Haryati, T. S. (2018). *Manajemen Keperawatan: Pendekatan Praktis*. Jakarta: Penerbit Buku Kedokteran EGC.
- Huber, D. (2018). *Leadership and Nursing Care Management* (6th ed.). Elsevier.
- International Council of Nurses. (2021). The global nursing shortage and nurse retention. <https://www.icn.ch>
- Kalisch, B. J., et al. (2009). Missed nursing care: A concept analysis. *Journal of Advanced Nursing*, 65(7), 1509–1517. <https://doi.org/10.1111/j.1365-2648.2009.05027.x>
- Ladd, M., et al. (2020). SWOT analysis in healthcare strategic planning.
- Lewin, K. (1951). *Field Theory in Social Science: Selected Theoretical Papers*. Harper & Row.
- Lillehol, B. M., et al. (2018). Experiences of using the RAFAELA system in nurse staffing and workload management.
- Marquis, B. L., & Huston, C. J. (2012). *Leadership Roles and Management Functions in Nursing: Theory and Application*. Lippincott Williams & Wilkins.
- Marquis, B. L., & Huston, C. J. (2017). *Leadership Roles and Management Functions in Nursing: Theory and Application* (9th ed.). Wolters Kluwer.
- Malatji, M., Ally, H., & Makhene, A. (2017). Nurses experiences regarding staffing patterns in the surgical wards of a private hospital in Gauteng South Africa. *Health SA Gesondheid*, 22, 325–332. <https://doi.org/10.1016/j.hsag.2017.04.002>
- Musy, S. N., et al. (2021). Registered nurse staffing and inpatient mortality: A systematic review and meta-analysis. <https://doi.org/10.1111/jonm.13316>
- Musy, S. N., Endrich, O., Leichtle, A. B., Griffiths, P., Nakas, C. T., & Simon, M. (2021). The association between nurse staffing and inpatient mortality: A shift-level retrospective longitudinal study. *International Journal of Nursing Studies*, 120, 103950. <https://doi.org/10.1016/j.ijnurstu.2021.103950>
- Peraturan Menteri Kesehatan Republik Indonesia Nomor 40 Tahun 2017 tentang Pengembangan Jenjang Karir Profesional Perawat Klinis. <https://peraturan.bpk.go.id>
- Rauhala, A., & Fagerström, L. (2004). Determining optimal nursing intensity: The RAFAELA method.
- Robbins, S. P., & Judge, T. A. (2017). *Organizational Behavior*. Pearson.
- Shin, S., Park, J. D., & Shin, J. H. (2020). Improvement plan of nurse staffing standards in Korea. *Asian Nursing Research*, 14(2), 57–65. <https://doi.org/10.1016/j.anr.2020.03.004>
- Stanley, D. (2016). *Clinical Leadership in Nursing and Healthcare: Values into Action*. Wiley Blackwell.
- Whiting, L. S. (2008). Semi-structured interviews: guidance for novice researchers. *Nursing Standard*, 22(23), 35–40. <https://doi.org/10.7748/ns2008.02.22.23.35.c6420>
- Ware, A., Blumke, T., Hoover, P., & Arreola, D. (2024). Calculating Optimal patient to nursing Capacity: Comparative analysis of traditional and new methods. *JMIR Nursing*, 7, e59619. <https://doi.org/10.2196/59619>
- West, E., Barron, D. N., Harrison, D., Rafferty, A. M., Rowan, K., & Sanderson, C. (2014). Nurse staffing, medical staffing and mortality in Intensive Care: An observational study. *International Journal of Nursing Studies*, 51(5), 781–794. <https://doi.org/10.1016/j.ijnurstu.2014.02.007>
- World Health Organization. (2020). *State of the World's Nursing 2020: Investing in Education, Jobs and Leadership*. <https://www.who.int/publications/i/item/9789240003279>

- Yeşilyurt, T., Baykal, Ü., & Göktepe, N. (2021). Nurse managers' views on why nurses leave their jobs: A qualitative study. *Collegian Journal of the Royal College of Nursing Australia*, 28(6), 720–728. <https://doi.org/10.1016/j.colegn.2021.08.002>
- Zainal, N. H., Rasudin, N. S., & Musa, K. I. (2026). Factors influencing clinical decision-making skills among nurses in Malaysia: A three-level general linear mixed-effects analysis. *International Journal of Nursing Studies Advances*, 10, 100493. <https://doi.org/10.1016/j.ijnsa.2026.100493>