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Review Article

Relationship between workload and nurses response time in the emergency room: A Literature Review

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Abstract

Background
The Emergency Department (ED) is a critical hospital unit that requires nurses to provide fast and accurate responses to life-threatening conditions. Nurse response time is a key quality indicator, yet delays often occur due to excessive workload. Studies suggest that high workload negatively affects response time, but a comprehensive review in the Indonesian context remains limited.

Objective
This study aimed to critically review existing literature on the relationship between nurses' workload and response time in emergency care settings in Indonesia.

Methods
A systematic literature review was conducted using Google Scholar and PubMed databases. Articles published between 2019 and 2025 were screened based on inclusion criteria: studies conducted in Indonesian EDs, discussing both workload and response time, available in full-text, and written in English or Indonesian. Quality appraisal was performed using the JBI Critical Appraisal Tools, resulting in 8 eligible articles out of 360 initially identified.

Results
Most of the reviewed studies found a significant relationship between high workload and delayed nurse response time. Nurses with lower workload were more likely to meet the ≤5-minute standard. Other influencing factors included training, years of experience, facility infrastructure, and patient condition. Variations in study design, data collection methods, and perspectives (nurses vs. patients) contributed to inconsistent findings across studies.

Conclusion
Nurse workload significantly influences response time in emergency settings. However, this relationship is affected by multiple interacting factors such as work environment, professional competency, and support systems. It is recommended to implement real-time workload assessment tools, enhance training programs, and conduct mixed-method studies that differentiate physical, mental, and emotional workload dimensions to improve emergency response performance and patient safety.

Background

The emergency department (ED) is a hospital unit that operates 24 hours a day and serves as the first point of contact in managing various medical emergencies. Services in the ED must be provided swiftly, accurately, and precisely to prevent patient mortality and morbidity. One of the key indicators of ED service quality is response time, or the promptness with which nurses provide initial assistance to arriving patients (Ningsih et al., 2019; Purwanti, 2022). According to the Indonesian Ministry of Health Regulation No. 129/Menkes/SK/II/2008, the standard response time in the ED is set at ≤5 minutes from patient arrival.

However, in practice, delays in response time are frequently reported. A study by Ningsih et al. (2019) found that for triage category priority 1, there is a significant relationship between nurses' workload and response time, where nurses experiencing a heavy workload tend to delay emergency interventions. This phenomenon highlights a clear discrepancy between national standards and field conditions: ED nurses often face excessive workloads that hinder timely emergency care delivery.

International observational studies have also emphasized similar concerns. In the United States, the patient-to-nurse ratio and patient acuity index showed a strong correlation (r = 0.98) with registered nurses' task distribution in the ED, where substantial time was spent on indirect rather than direct patient care (Hobgood et al., 2005). Patient visits to emergency departments have also shown a significant year-on-year increase. According to

the Indonesian Ministry of Health, more than 27 million ED visits were recorded nationally in 2022, with 3,452,186 visits reported in West Java Province alone (Kemenkes RI, 2023).

A high volume of patient visits without a proportional increase in nursing staff contributes to heavier workloads and negatively impacts both the speed and quality of care. Excessive workload not only results in physical and mental fatigue among nurses but also threatens patient safety. Previous studies have identified that high workloads can lead to occupational stress, impaired decision-making, delayed interventions, and even nurse burnout (Afifah et al., 2022; Muti & Dwilingga, 2023; Rilla, 2025). Additionally, time-and-motion analyses conducted in U.S. hospitals indicated that increased mental demand due to electronic documentation further prolongs nurses' response times (Bakhoum et al., 2021).

When nurses' response time is suboptimal, the risk of patient mortality rises, particularly among those categorized under triage priority 1, who require immediate life-saving interventions (i.e., within zero minutes). Research by Dareda et al. (2021) emphasizes that delays in emergency interventions can lead to deterioration in clinical conditions, including sudden cardiac arrest or loss of consciousness. Several studies have even linked such delays to increased mortality rates among ED patients.

Although both local and international studies have identified associations between nurse workload and response time, most existing research has been limited to specific aspects such as physical workload or task allocation. To date, no comprehensive study has explored the multidimensional nature of workload—encompassing physical, mental, emotional, and systemic/technological demands—and its influence on ED nurses' response time in the Indonesian context.

Therefore, it is crucial to understand how nurses' workload affects response time in emergency settings. This literature review aims to critically examine existing studies addressing the relationship between nurses' workload and response time, thereby providing evidence-based recommendations for improving work systems in emergency departments.

Methods

Study Design

This study utilized a systematic literature review design to explore the relationship between nurse workload and response time in emergency departments (EDs). The aim was to critically summarize and synthesize relevant research findings to provide evidence-based recommendations for improving emergency nursing services.

Research Question

The main research question guiding this review was: "What is the relationship between nurse workload and response time in emergency departments?".

Inclusion and Exclusion Criteria

The inclusion criteria comprised: (a) articles discussing the topics of workload and nurse response time; (b) studies conducted specifically in emergency department settings; (c) research carried out in Indonesia; (d) relevant quantitative and qualitative study designs; (e) articles published between 2019 and 2025; and (f) articles available in full text, open access, and written in either Indonesian or English. The exclusion criteria included: (a) review articles, editorials, commentaries, or abstracts without full text; (b) studies not explicitly addressing both workload and response time; and (c) studies conducted outside of Indonesia.

Search Strategy

Literature was sourced from two main databases: Google Scholar and PubMed. The search employed combinations of keywords such as "Workload" AND "Response Time" OR "Waiting Time" AND "Emergency Unit" OR "Emergency Departments". Boolean operators (AND, OR) were used to enhance search relevance, and search terms were adjusted accordingly for each database. The search was conducted between March and April 2025.

Study Selection Process

The study selection process consisted of four stages. In the identification phase, a total of 360 articles were retrieved from the initial search. During the screening stage, irrelevant titles and abstracts were excluded based on the

predefined criteria. Next, the remaining articles were assessed for full-text availability and alignment with the study objectives. In the final selection stage, 13 articles met all inclusion criteria and were included for data synthesis.

Quality Appraisal

The methodological quality of the 13 selected studies was assessed using the JBI Critical Appraisal Tools developed by the Joanna Briggs Institute, adapted for various study types (cross-sectional, cohort, or qualitative). The appraisal examined aspects such as methodological validity, clarity of objectives, variable measurement, and consistency of results. Five studies were excluded due to low quality, resulting in eight high-quality studies being included in the final analysis.

Data Extraction and Synthesis

Data were manually extracted into an extraction table that included the following: study identity (author, year, and location), study design, population and sample, methodology, and key findings on the relationship between workload and response time. Given the heterogeneity in study designs and measurement tools, a narrative synthesis approach was adopted rather than a quantitative meta-analysis. The findings were analyzed thematically by identifying similarities and differences across studies.

Results

Following the application of the search strategy and selection criteria, eight articles were found to be relevant and met all inclusion parameters for further analysis in this review (see Table 1).

The eight studies examining the relationship between workload and nurse response time were predominantly conducted in hospital settings, particularly in Emergency Departments (EDs), such as those in Tangerang District General Hospital, Bitung General Hospital, Maria Walanda Maramis Regional Hospital, Dr. Abdul Rivai Regional Hospital, Banggai Laut Hospital, and PKU Muhammadiyah Bantul Hospital. However, one study was conducted in a primary healthcare facility, namely Tarogong Kaler Public Health Center in Garut, which provides an important perspective on emergency care services at the primary care level. This inclusion enriches the understanding of workload and response time dynamics not only in busy hospital environments but also in resource-limited primary care settings.

In terms of methodology, most of the studies adopted a quantitative, cross-sectional design, employing either descriptive or correlational analytic approaches. Sampling techniques were primarily total sampling, with sample sizes ranging from 13 to 44 nurses. This reflects the limited number of nurses available in EDs, yet still provides a representative overview of the reality of workload and response time in such settings.

Regarding statistical analysis, the majority of studies utilized the Chi-Square test—as seen in the studies by Risa Afifah (Tangerang General Hospital), Sri Wahyuni (Bitung Hospital), and Sugianto (Banggai Laut Hospital). Other studies employed the Spearman Rank correlation test, such as those conducted at RSI Banjarnegara, Tarogong Kaler Public Health Center, and Dr. Abdul Rivai Hospital. The study by Kristine Dareda at Maria Walanda Maramis Hospital applied Fisher's Exact Test, which is appropriate for small samples with specific data distributions. Notably, one study analyzed response time based on triage categories, as conducted by Purwanti Ningsih at Ratu Zalecha Martapura Hospital, which found significant results in priority 1 cases but not in priority 2 or 3 categories.

The study populations generally consisted of nurses working in EDs, aged between 25–40 years, with a minimum educational background of a diploma in nursing (D3), and work experience ranging from less than 5 years to more than 10 years. Most respondents had undergone emergency care training such as Basic Trauma and Cardiac Life Support (BTCLS), which theoretically enhances their ability to provide prompt care.

From the comparative analysis of the studies, the majority indicated a significant relationship between nurse workload and response time. For instance, studies conducted in Bitung Hospital, Tarogong Kaler Public Health Center, Banggai Laut Hospital, and Maria Walanda Maramis Hospital concluded that high workload significantly delays nurse response time. Conversely, the study by Risa Afifah in Tangerang District Hospital found no significant relationship, which may be attributed to other

moderating factors such as effective management systems and better availability of medical equipment, which may have mitigated the impact of workload. Additionally, variations in perceived response time were observed. For example, the study in Banggai Laut Hospital, which assessed patients' perceptions, suggested that subjective views on response time can be influenced by workforce availability and operational systems.

Table 1. Article Search Results

Author(s) and year	Methodology	Population and Sample	Key findings and clinical explanation
Afifah et al., 2022	Quantitative, cross-sectional, Chi-Square test	44 nurses, total sampling	No significant relationship (p=0.606); however, clinically, workload still affects the accuracy of service.
Muti & Dwilingga, 2023	Correlational descriptive, cross-sectional, Spearman Rank test	13 nurses, total sampling	Significant relationship (p=0.022). Nurses with lighter workloads had faster response times (≤5 minutes).
Wahyuni & Latjui, 2020	Descriptive, cross-sectional, Chi-Square test	31 nurses, total sampling	Significant relationship (p=0.008). Heavy workload slows down response, increasing patient mortality risk.
Rilla, 2025	Quantitative, cross-sectional, Spearman Rank test	30 nurses, total sampling	Significant relationship (p=0.004). Quick response decreased among nurses with moderate to high workloads.
Sugianto et al., 2023	Quantitative analytic, cross-sectional, Chi-Square test	32 patients, purposive sampling	Significant relationship (p=0.000). Patients perceived that nurses with heavy workloads responded more slowly.
Bahriadi et al., 2023	Correlational quantitative, cross-sectional, Spearman Rho test	25 nurses, total sampling	Significant relationship (p=0.001). Average response time was 212 seconds (3.53 minutes). Lighter workload contributed to faster responses.
Dareda et al., 2021	Descriptive-analytic quantitative, cross-sectional, Fisher's exact test	30 nurses, total sampling	Significant relationship (p=0.002). Heavy workload increased delays in emergency patient handling.
Ningsih et al., 2019	Cross-sectional, Fisher's Exact test	23 nurses, total sampling	Significant relationship in triage priority 1 (p=0.046). Delayed responses can be fatal in critical cases.

Discussion

The Emergency Department (ED) is a healthcare unit that demands prompt and accurate responses in managing critically ill patients. Nurse response time is a critical indicator for assessing service quality in the ED. Among the key influencing factors is nurse workload. Of the eight articles analyzed in this review, the majority indicated a significant relationship between nurse workload and response time in emergency settings. For instance, a study by Rilla (2025) conducted at Tarogong Kaler Primary Health Center found that most nurses with moderate workloads were able to respond to patients within ≤5 minutes, meeting the national ED response time standard. Statistical analysis using the Spearman Rank test revealed a significant association (p=0.004) between workload and nurse response time.

Similar findings were reported by Onibala (2021) at Bhayangkara Hospital Manado, where a Chi-Square test demonstrated a significant relationship (p=0.000) between workload and response time. However, not all studies yielded consistent results. Afifah et al. (2022) at Tangerang District General Hospital found no significant association (p=0.606) between the two variables. This variation may be attributed to differences in research design, sample characteristics, or workplace conditions. Meanwhile, a study by Sugianto et al. (2023) at Banggai Laut Hospital, using patient perception,

reported that 40.6% of respondents perceived nurse response time to be slow, particularly under high workload conditions. This suggests that patient perception serves as an important parameter in evaluating service outcomes. The study measured workload as a combination of physical and administrative demands.

The synthesis of the eight studies reveals a general trend in which physical workload—such as patient transfers and direct nursing interventions—was more frequently examined than mental or emotional burdens. However, most studies did not clearly distinguish among these workload dimensions, creating a gap in identifying which type of workload most significantly impacts response time. For example, in the study by Dareda et al. (2021), workload was treated as a holistic construct encompassing physical, mental, and administrative pressure without differentiation. Heterogeneity was observed across studies in terms of settings (regional hospitals, private hospitals, and primary health centers) and perspectives used (healthcare provider vs. patient). This is noteworthy because patient perspectives tend to be more subjective and influenced by service expectations, whereas healthcare providers assess based on actual working conditions. Such variations should be considered when interpreting the effect of workload on response time.

Additional factors influencing nurse response time in the ED include emergency care training, years of service, educational background, availability of facilities and equipment, patient conditions, and staffing adequacy. Emergency training equips nurses with up-to-date knowledge and techniques essential for rapid and accurate response (Pangalila et al., 2020). Longer work experience has also been shown to enhance nurses' competence in handling emergency cases (Yulia, 2022), while higher educational attainment may positively impact care delivery in emergency settings (Absari, 2024).

Adequate infrastructure, availability of medical tools and medications, and sufficient staffing levels are also crucial in improving nurse response time (Absari, 2024; Adril & Ilyas, 2024). Furthermore, external factors such as the severity of the patient's condition influence response urgency—more severe cases demand more immediate interventions (Absari, 2024). Norhidayat et al. (2023) confirmed a significant association between patient condition and nurse response time in the ED (p=0.002).

In the context of emergency care, nurse workload has a significant effect on response time. Marota et al. (2024) found at Bhayangkara Hospital Makassar that nurses with lighter workloads responded more quickly, whereas those with heavier workloads experienced delays due to divided attention and multiple patient responsibilities. Such conditions hinder the ability of nurses to efficiently manage critical cases, directly impacting patient safety and prognosis. In the high-pressure and fast-paced environment of the ED, delays in response may have serious consequences. Therefore, effective workload management is vital to ensure quality of care and patient safety (Tampubolon et al., 2024).

Excessive workload also affects nurses' physical and psychological well-being. Kusuma (2021) noted that high workloads may lead to both physical and mental fatigue, emotional disturbances such as irritability, headaches, and digestive issues. Accumulated stress may impair nurses' focus and responsiveness, exacerbating response delays. Over time, this can decrease work performance, increase clinical errors, and affect job satisfaction and retention (Junaidah et al., 2023). Managerial interventions such as equitable shift scheduling, increasing nursing staff, and implementing efficient triage systems are therefore essential for reducing workload and improving response time.

Policy implications drawn from this review include the importance of setting ideal patient-to-nurse ratios in EDs, particularly during peak hours and night shifts. Strategic interventions such as technology-based triage systems, real-time monitoring of response time, and incentive programs for top-performing nurses can effectively enhance service efficiency. A study by Cho et al. (2022) demonstrated that implementing AI-based electronic triage

systems reduced average response times by 18% within three months of use.

Overall, the findings of this literature review underscore the significant impact of nurse workload on response time in the ED. However, it is important to recognize that response time is also influenced by other internal and external factors (Absari, 2024). Thus, efforts to improve response time must take into account workload, training, work experience, education, infrastructure, and patient-related factors (Adril & Ilyas, 2024). Enhancing emergency service quality requires a holistic approach that includes effective workload management, continuous professional development, adequate resources, and efficient organizational systems. Ultimately, improving nurse response time in the ED will positively affect both patient safety and satisfaction.

Conclusion and Recommendation

This study highlights that nurse workload has a substantial impact on their ability to respond promptly to patients in Emergency Departments (EDs). Of the eight articles analyzed, the majority revealed a significant relationship between workload and response time. Nurses with lighter workloads tend to respond more quickly and efficiently—an essential factor in emergency situations. Delayed responses are not merely statistical figures but have direct clinical implications for patient safety and survival outcomes.

Scientifically, these findings support the workload theory in ergonomics and occupational psychology, which posits that excessive task loads diminish cognitive and motor effectiveness. In the context of emergency nursing, high workload not only reduces response time but also increases the risk of clinical errors, chronic occupational stress, and burnout. However, it is crucial to recognize that nurse response time is not solely determined by workload. Other influencing factors such as professional experience, emergency training, educational background, the availability of infrastructure, and patient condition also play important roles. This underscores the complexity of emergency healthcare delivery, where multiple interacting determinants are at play.

The limitations of this study include the use of open-access databases only, which may have excluded relevant studies not publicly available. Additionally, most of the included studies employed cross-sectional quantitative designs, limiting the ability to establish causal relationships. The heterogeneity in study designs, settings (hospitals vs. primary care), and perspectives (patient vs. healthcare provider) also poses challenges to generalizing the findings.

Strategic recommendations include the implementation of real-time workload assessment tools such as NASA-TLX or the Workload Indicator of Staffing Need (WISN), which can help dynamically allocate nursing staff during peak hours. Future research should explore the differential impact of physical and emotional workload components using mixed-methods approaches, and evaluate the effectiveness of managerial interventions aimed at reducing time-based workload. With a more comprehensive and evidence-based approach, Indonesia's emergency care system can sustainably improve nurse response time, ensure patient safety, and enhance the well-being of nurses as frontline providers in emergency services.

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Declaration on the Use of AI
No AI tools were used in the preparation of this manuscript.

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