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The Benefits, Factors, and Barriers Faced in the Implementation of Digital National Early Warning Score in Hospitals: A Scoping Review

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ABSTRACT

Background: Digital National Early Warning Score (NEWS) is a system designed to detect early clinical deterioration in patients by monitoring vital parameters using digital technology. The implementation of Digital NEWS in hospitals is increasingly gaining attention because of its ability to improve patient safety, efficiency in clinical decision-making, and reduce the workload of health workers. However, although many benefits have been identified, implementing Digital NEWS is open to various challenges and obstacles.
Purpose: This study aimed to explore the benefits, factors, and obstacles faced in implementing digital NEWS in Hospitals.
Methods: This scoping review used the Arksey and O'Malley framework following the PRISMA for Scoping Review. Literature searches used three main databases: EbscoHost: Medline Ultimate, Pubmed, and Scopus, and also one search engine, Google Scholar.
Results: Ten relevant articles were analyzed in this study. Implementation of digital NEWS can improve early detection of deteriorating patient conditions, reduce medical response time, and improve communication between health teams. However, the success of its implementation is influenced by several factors, such as the availability of technological infrastructure, adequate training, and technological literacy among health staff. The main challenges include lack of resources, alarm fatigue, and cultural resistance to technological change.
Conclusion: This review concludes that implementing digital NEWS has many benefits, but health workers still face many challenges and barriers. A comprehensive approach is needed to optimize the benefits of digital NEWS implementation, including investment in infrastructure, training, and managerial support.

Keywords: barriers, benefits, challenges, digital news, factors

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BACKGROUND

Clinical deterioration is characterized by periods of clinical instability that can occur at any time, after a patient's emergency hospital admission, after surgery, and during recovery from critical illness (Albutt et al., 2017). Untreated in-hospital clinical deterioration can lead to a range of serious consequences for patients, including increased length of hospital stay, cardiac arrest, admission to the intensive care unit (ICU), and increased morbidity and mortality (Albutt et al., 2017). Such serious adverse events can be prevented by detecting and managing early signs of clinical deterioration. To prevent or reduce the clinical decline of patients in hospitals, a well-designed response system is needed to manage deterioration (Wu et al., 2021). Several studies have shown that implementing EWS decreases clinical declines (Mathukia et al., 2015; Nishijima et al., 2016; Wu et al., 2021).

Electronic Digital Early Warning Score (E-NEWS) is a healthcare facility-based disease surveillance system that uses electronic devices and platforms for effective data collection, management, analysis, and visualization using dashboards (Dureab et al., 2020). The system was established to strengthen routine disease surveillance systems, especially in the early detection of diseases prone to becoming epidemics, and thus facilitate rapid response (Ahmed et al., 2019; Dureab et al., 2020). EWS is usually manually calculated, which is repetitive and time-consuming and may need to be more accurate. By integrating the Electronic Medical Record (EMR), continuous risk assessment curves can be used to monitor vital signs and predict clinical decline (Ghosh et al., 2018; Wu et al., 2021).

An automated NEWS calculation system based on EMR data is needed to ease the workload of healthcare staff, enable early detection of clinical decline, and reduce false alarms and human error in a busy hospital environment (Ahmed et al., 2019; Mathukia et al., 2015; Wu et al., 2021). With a technology-based system, the risk of human error in identifying critical conditions can be reduced with digital NEWS in a busy and stressful hospital environment where errors in judgment can be fatal (Dureab et al., 2020; Subbe & Bramley, 2022).

Several factors support the successful implementation of digital NEWS in hospitals. One of the factors that support the implementation of digital NEWS is effective leadership, which is essential for promoting a culture of data-driven decision-making (Gonem et al., 2022). This includes providing the necessary resources and support for integrating digital NEWS into daily clinical practice (Gonem et al., 2022). Technological factors are also very important to consider, especially in integrating digital NEWS with EMR, as this can increase the speed and accuracy of data collection and analysis. This integration ensures that all relevant information is easily available, thus facilitating timely intervention (Gonem et al., 2022; Wu et al., 2021). Based on research from Alhmoud et al. (2023) found that the supporting factors in the process of implementing digital NEWS integrated into RME in hospitals are hospital organizational support through guidance and monitoring of nurse management in supervision and training (Alhmoud et al., 2023).

In addition, other factors become obstacles and challenges in implementing digital NEWS in hospitals. Previous studies reported that lack of technological literacy, lack of resources, lack of experience using technology, making it difficult to audit NEWS features, and difficulty adopting digital NEWS could affect the implementation of digital NEWS implementation (Downey et al., 2017; Petersen et al., 2017; Russell et al., 2020). In addition, many hospitals, especially in resource-limited settings, may need more technological infrastructure to support a digital NEWS system that operates in real-time (Gonem et al., 2022; Petersen et al., 2017). Therefore, knowing the benefits, supporting factors, and barriers

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to implementing digital NEWS in hospitals is essential to ensure that the system functions optimally and improves the quality of patient care.

Based on the literature review, no study specifically reviews the potential of digital NEWS in hospitals from various aspects, such as benefits, influencing factors, barriers, and challenges. Existing review studies focus more on traditional NEWS, which is done manually rather than using digital technology (Astuti et al., 2023). Therefore, this review focuses on digital NEWS to deepen the understanding of how these systems can improve early detection of clinical decline, reduce medical staff workload, and minimize human error.

The main focus of this review is to evaluate the benefits of digital NEWS implementation, including improved clinical efficiency, patient safety, and faster decision-making. In addition, this review will also identify various factors that influence the implementation of digital NEWS. An analysis of the barriers and challenges faced in implementing digital NEWS will also be an important part of this discussion. With this more comprehensive understanding, more appropriate and effective recommendations will emerge to optimize the use of digital NEWS in the hospital environment, thereby improving the overall quality of healthcare.

OBJECTIVE

This review aimed to identify the benefits, factors and barriers faced in implementing digital NEWS in hospitals.

METHODS

Design

The authors used a scoping review design to review nurses' implementation of the digital early warning score. This scoping review has a clear conceptual range to explore findings in line with the research objectives (Arksey & O'Malley, 2005). This design is a flexible methodological approach to exploring new and rapidly evolving topics (Peterson et al., 2017). The authors used Arksey and O'Malley's framework, which defines a scoping review as a method of synthesizing the literature used to present and identify the scope of research on a particular topic (Arksey & O'Malley, 2005). The authors used Arksey and O'Malley's framework, which defines a scoping review as a method of synthesizing the literature used to present and identify the scope of research on a particular topic (Arksey & O'Malley, 2005).

Search Methods

Article identification was conducted systematically using three main databases: EbscoHost: Medline Ultimate, Pubmed, Scopus, and one search engine, Google Scholar. The keywords used were "news2 or national early warning system AND nurses or nursing or nursing staff AND health care provider AND digital or online or electronic or technology AND implementation AND barriers or obstacles or challenges". The author used the Boolean operators "AND" and "OR" to prune or expand the search results for different forms of words.

Inclusion and Exclusion Criteria

All authors were involved in the selection process of articles analyzed in this review. The article selection process was based on the PRISMA Extension for Scoping Review (PRISMA-ScR) (see Figure 1)(Page, Moher, et al., 2021). PRISMA-ScR is used by researchers as a guide developed to provide systematic guidance in reporting the results of scoping reviews (Page, Moher, et al., 2021). The main function of PRISMA-ScR is to improve the transparency and quality of reporting in scoping reviews. The research questions

ISSN: 2614-3488 (print); 2614-3496 (online) Vol.8 No.4. July 2025. Page.926-942

and eligibility criteria for research articles use the PCC (Population, Concept, and Context) approach.

P (Population) : Nurse or Health Care Provider
C (Concept) : Digital National Early Warning System
C (Context) : Barriers or challenges or Factors

In this review, inaccessible full-text articles, publications not in English and Indonesian were excluded. The inclusion criteria in this review were accessible full-text articles and studies that discussed the Implementation of the Digital National Early Warning Score. Furthermore, this review does not have a limitation criterion of publication year because it identifies relevant studies comprehensively.

Data Extraction

In this review, data from the analyzed studies were extracted using tables that, in detail, describe all results relevant to the topic discussed. The information in the extraction table includes study characteristics, such as Author and Year, Country, Design, Sample, and Results. This study involved experts in the relevant fields to ensure the accuracy and relevance of the extracted data. If there were differences of opinion among the researchers, they held discussions and deliberations to reach an agreement. If the debate could not be resolved through these means, a third researcher was engaged to conduct the data extraction. This third researcher was asked to provide additional judgment in order to reach an agreed decision in the data extraction process.

Data Analysis

Data analysis was conducted thematically with an exploratory descriptive approach. The data analysis process began by identifying and presenting the data obtained in tabular form based on the articles reviewed. Once the data was collected, all authors analyzed and explained each finding based on the extraction results. Finally, the authors double-checked the included studies to ensure accuracy and reduce possible errors in the extraction stage.

RESULTS

Study Selection

Figure 1 shows the process of identification, screening, and selection of articles used in this review. The process began with the identification of articles through various databases and search engines, where a total of 692 articles were found 75 from EBSCO-hosted Medline, 99 from PubMed, 18 from Scopus, and 500 from Google Scholar. Of these, 34 articles were removed because they were duplicates, leaving 658 articles for further screening. At the screening stage, these articles were assessed based on their titles and abstracts, which resulted in the removal of 643 articles for not meeting the criteria, leaving 15 articles for further evaluation.

Next, the eligibility stage was conducted, and the remaining 15 articles were screened based on completeness and inclusion criteria that included population, intervention, and language aspects. At this stage, 5 articles were removed because they were not published in English or Indonesian, and 4 others because they did not discuss the implementation of Digital NEWS. Finally, after going through all these rigorous selection stages, 10 articles were selected for analysis and inclusion in the manuscript of the review. This diagram shows how the selection process was carried out to ensure that only relevant articles that fit the research criteria were analyzed in this review.

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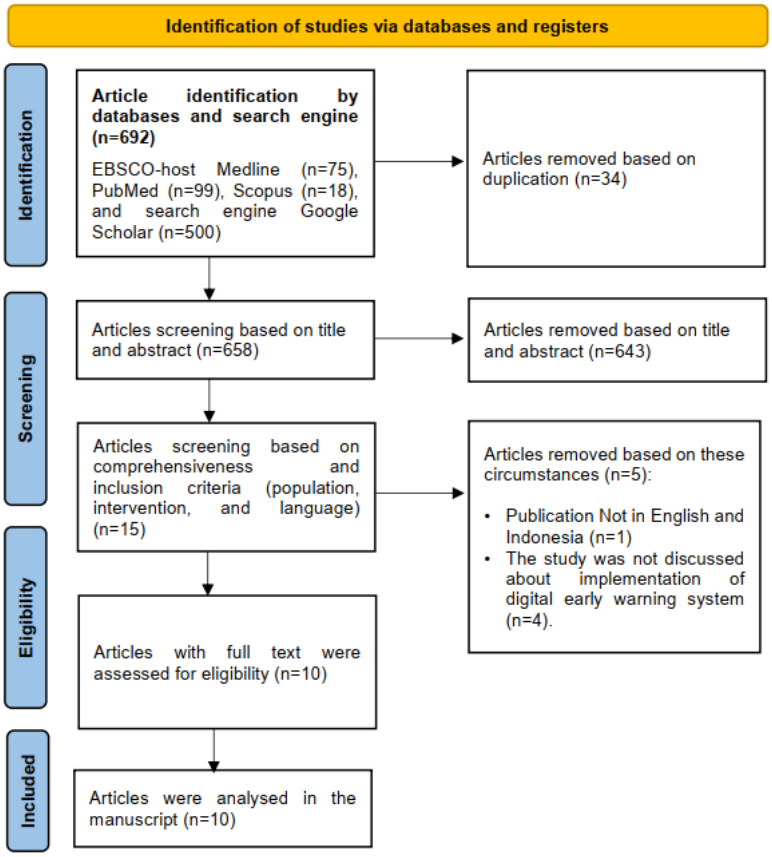

Figure 1. PRISMA Flow Diagram

Notes: The PRISMA figure was adapted from Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021; 372: n71. Creative Commons (Page, McKenzie, et al., 2021).

Study Characteristics

The summarized studies involved developed countries such as the United Kingdom, the United States, Germany and Taiwan, which have more advanced healthcare infrastructure and technology. On the other hand, studies were also conducted in developing countries such as Indonesia and Yemen, which face different challenges but are working to implement health technology systems to improve the quality of health care and management. In addition, this review includes studies conducted in different countries with varied research designs, ranging from qualitative studies and R&D to prospective studies. The data and samples in these studies are diverse, involving nurses, hospital managers, and patients, as well as the use of electronic monitoring systems to monitor patients' health conditions.

Table 1. Characteristics of Included Studies

Author and Year	Country	Design	Data, Sample and Setting	Results		
				Benefit	Factors, Challenges, and Barriers	Implementation
(Alhmoud et al.,	United	Qualitative Study	11 nurses and	The obvious advantage	1. The value of	1. Changes in

Author and Year	Country	Design	Data, Sample and Setting	Results		
				Benefit	Factors, Challenges, and Barriers	Implementation
2023)	Kingdom		managers from cardiology, cardiac surgery, oncology and intensive care wards and medical, haematology and intensive care wards were interviewed, and 67 were surveyed online.	of NEWS2 is seen in recognizing response to treatment, the need to move to a ward or ICU or just an impression of the patient's status.	NEWS2 is partially positive in escalation, but there are concerns by nurses who underestimate NEWS2, especially in cardiac care. 2. Challenges, such as physician behaviour, lack of resources and training, and the perceived value of NEWS2, limited the success of this implementation. 3. Barriers or delays in learning led to errors in documentation and hindered escalation.	guidelines during the pandemic have led to NEWS2 being overlooked. 2. EHR integration and automated monitoring are improvement solutions that have not been fully utilized. 3. Information technology literacy and differences in interest among staff led to gaps in the implementation of NEWS2 in EHRs in both hospitals.
(Wahyudi et al., 2023)	Indonesia	Research and Development (R&D) Studies	4 respondents to test the success of the web-based NEWS2 application.	No Information	No Information	1. The results of the trial of the web-based NEWS application were successfully used on 4 respondents with acute illness.

Author and Year	Country	Design	Data, Sample and Setting	Results		
				Benefit	Factors, Challenges, and Barriers	Implementation
						2. All respondents successfully measured the level of worsening of the disease.
(Subbe & Bramley, 2022)	United Kingdom	Review Analysis of literature-based policies and recommendations	Hospital	1. Automation and Error Minimization 2. Time Efficiency 3. Enhanced Compliance and Monitoring 4. Clinical Decision Support 5. Remote Monitoring 6. Enhanced Communication	1. Availability and use of remote monitoring devices that can automatically record vital signs. 2. Integrity and standardization of NEWS score display in various electronic medical record systems. 3. Failure in proper escalation due to alarm fatigue or lack of responsiveness to changes in the patient's condition. 4. Technical limitations in the software that prevent the implementation of the NEWS score display	No Information

ISSN: 2614-3488 (print); 2614-3496 (online) Vol.8 No.4. July 2025. Page.926-942

Author and Year	Country	Design	Data, Sample and Setting	Results		
				Benefit	Factors, Challenges, and Barriers	Implementation
					standard. 5. Managerial support and resource allocation to ensure effective implementation.	
(Wu et al., 2021)	Taiwan	Prospective study	39,161 patients with a total of 73,674 hospitalizations under E-NEWS surveillance.	1. The implementation of E-NEWS was associated with a reduction in adverse events, especially CPR inwards and transfer to ICU from regular wards. 2. Nurses can obtain all important information related to the severity and urgency of all patients at a glance on the E-NEWS dashboard. 3. Nurses are more confident in discussing treatment	The busy schedule of health workers (nurses and doctors) and the lack of a reminder system.	1. This study successfully developed the E-NEWS system, which automatically provides information on the patient's clinical deterioration status every hour. 2. Based on the experience in implementing E-NEWS, this early warning system appears to be an effective communication platform among healthcare team members.

Author and Year	Country	Design	Data, Sample and Setting	Results		
				Benefit	Factors, Challenges, and Barriers	Implementation
				plans with doctors.		
(Dureab et al., 2020)	Yemen	Mixed methods study	1. The quantitative part is mainly taken from weekly epidemiological bulletins (2013-2017) 2. The qualitative part involved individual interviews with 11 key informants.	No Information	Quality and timeliness of response are key challenges for the national electronic Disease Early Warning System (DWS) functionality.	The findings of this assessment show that eDIGITAL NEWS is a resilient and reliable system, and despite the conflict in Yemen, it is still functioning and growing.
(Mau et al., 2019)	United States	A comparative design using retrospective	Three medical/surgical units and one cardiac telemetry unit	Electronic-based EWS can be utilized to support nursing practice and clinical decision-making around the management of clinical deterioration.	1. Implementation and use of electronic EWS by health workers are still lacking. 2. Nurses and staff may not realize the importance of EWS, or they may be reluctant to adopt new technology. 3. Techni	The electronic implementation of EWS in this study showed a significant reduction in the time spent by patients with moderate or high-risk EWS scores and the time for reassessment after

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Author and Year	Country	Design	Data, Sample and Setting	Results		
				Benefit	Factors, Challenges, and Barriers	Implementation
					cal issues such as slow systems, downtime, or ineffective use may hinder implementation. 4. Training nurses in using electronic EWS	moderate or high-risk alerts following the implementation of enhanced EWS in the EMR.
(Sunardi & Sukaedah, 2018)	Indonesia	Quasi Experiment	35 respondents as an initial trial, and in 2018, as many as 127 clients	This NEWSS-Stroke application can detect the risk of stroke clients being treated in a regular room.	No Information	1. NEWS users with Online/TI-based stated that, in general, the system used or tested 100% facilitates scoring, and the process is fast and can be monitored in real-time. 2. The data elements/components entered into the NEWSS application are valid and reliable with the r value of the results greater than the r value in the table 0.869, from 35 total

Author and Year	Country	Design	Data, Sample and Setting	Results		
				Benefit	Factors, Challenges, and Barriers	Implementation
						samples.
(Wong et al., 2024)	England	Natural experiment using a nonrandomized stepped wedge trial design.	4 Hospitals in 1 UK hospital trust.	The introduction of highly beneficial electronic systems can be achieved without impacting on clinical care.	The system was effective in reminding nurses to double-check observations more frequently, but reminders alone were not enough to trigger behaviour change.	1. The system usability score is 77.6, which indicates good usability. 2. The introduction of the digital vital signs charting system had no effect on the frequency of vital signs observation or ICU admission time, hospital LOS, and in-hospital mortality in patients with high EWS.
(Brimblecombe et al., 2019)	United Kingdom	A mixed methods study	82 staff and 26 inpatients	No Information	1. Patients expressed concerns about data confidentiality. 2. Staff concerns: There was also concern that the additional health checks associated with NEWS would interfere with their time off.	1. Most staff were neutral or positive about the planned changes but raised the possibility of safety risks and the risk of electronic records being misinterpreted by patients.

Author and Year	Country	Design	Data, Sample and Setting	Results		
				Benefit	Factors, Challenges, and Barriers	Implementation
(Lim et al., 2022)	Germany	Prospective cohort study	459 patients	1. The CDEW system significantly reduced COVID-19 mortality and hospitalization duration and can be applied to future pandemic management. 2. This CDEW system effectively combines several aspects, such as remote monitoring, medical care delivery, and triage of patients for hospital admission, which is very suitable for dealing with infectious patients.	There are additional barriers to accessing CDEW related to age, migrant status and socio-economic conditions.	1. The implementation of Coronataxi digital early warning (CDEW) was successfully used and had very good efficacy and benefit for patient outcome and prognosis. 2. Patient compliance was high without prompting, as 94.4% also reported feeling calm when using the app.

DISCUSSION

The implementation of digital NEWS in the hospital environment has been a significant advancement in identifying and managing patient deterioration. This scoping review aims to explore the benefits, factors, and barriers associated with the implementation

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of digital EWS in hospitals. This review synthesizes findings from various studies to provide a thorough understanding of the current evidence and future direction of digital EWS in healthcare.

The Implementation of Digital NEWS

The implementation of digital NEWS focuses on real-time monitoring of patient conditions and detecting signs of health deterioration. For example, a study conducted by Wu et al. (2021) in Taiwan developed a digital NEWS system that is able to provide information about the patient's deterioration every hour. This increased nurses' confidence in communicating with doctors about treatment plans while making it easier for nurses to monitor the status of all patients through the dashboard available on digital NEWS. This implementation proved effective in reducing adverse events such as cardiopulmonary resuscitation (CPR) on the ward and sudden transfer of patients to the ICU.

The implementation of digital NEWS in various countries highlights the use of technology to monitor patient conditions more efficiently. In Taiwan, the implementation of a computerized digital NEWS system enables automatic hourly monitoring of patient status, with information available through a digital dashboard. This makes it easier for nurses to get a complete picture of the severity and urgency of patients' conditions, allowing them to be more responsive to changes in clinical conditions (Wu et al., 2021).

In the UK, the implementation of NEWS2 involves integration with EHR systems to ensure that information on patient conditions can be accessed in real time by the entire healthcare team (Alhmoud et al., 2023). However, this integration still requires further customization to function optimally. In addition, automation in the collection of patient vitals helps in reducing the time spent by healthcare workers on manual documentation, allowing them to focus more on appropriate clinical interventions (Alhmoud et al., 2023).

The application of digital NEWS also involves the use of remote monitoring devices that can automatically record patient vital signs (Subbe & Bramley, 2022). In hospitals in the UK, for example, these devices are combined with alarm systems to give medical staff early warning of any deterioration in a patient's condition. This is an important step in ensuring that intervention measures can be taken quickly before the patient's condition deteriorates further. This process, while requiring initial training and adjustment for staff, aims to improve efficiency and effectiveness in the ongoing monitoring of patient conditions (Subbe & Bramley, 2022).

Benefits of Using Digital NEWS

The digital NEWS has shown several benefits in the clinical setting. It improves the ability to recognize response to treatment and the need to transfer to a ward or ICU (Alhmoud et al., 2023). Other studies have also reported that digital NEWS can predict patient deterioration, improve the accuracy and timeliness of risk assessment, and provide dynamic and real-time risk estimation and efficiency (Lim et al., 2022; Mau et al., 2019; Subbe & Bramley, 2022; Wong et al., 2024; Wu et al., 2021). In addition, digital EWS facilitates better communication among healthcare teams, leading to more timely and appropriate clinical responses (Mau et al., 2019; Subbe & Bramley, 2022).

Based Wong et al. (2024), digital NEWS secara signifikan meningkatkan kecepatan dan efektivitas respons tenaga medis terhadap pasien yang memburuk (Wong et al., 2024). The system enables continuous monitoring and early detection of clinical risks by real-time monitoring of vital signs such as blood pressure, heart rate, and respiratory rate (Alhmoud et al., 2023; Wahyudi et al., 2023; Wu et al., 2021). digital NEWS enables early detection of changes in a patient's condition, which are often difficult to detect through manual observation.

ISSN: 2614-3488 (print); 2614-3496 (online) Vol.8 No.4. July 2025. Page.926-942

The digital NEWS system issues automated alerts when a patient's risk score reaches a certain threshold, ensuring that medical personnel are immediately notified of conditions that require prompt attention (NICE, 2020). This reduces the risk of delays in responding to emergency situations and enables faster medical intervention before the patient's condition becomes critical (Wong et al., 2024). This integration of technology and standardized protocols ultimately leads to faster and more accurate decision-making, which in turn improves patient outcomes by ensuring timely intervention in cases of clinical deterioration (Ahmed et al., 2019; Subbe & Bramley, 2022; Wong et al., 2024; Wu et al., 2021).

Factors, Barriers and Challenges in the Implementation of Digital NEWS

Despite the many benefits of implementing digital NEWS, there are significant barriers and challenges to the implementation of digital NEWS. Cultural and system-related challenges, such as physician behaviour and the low valuation of NEWS by some healthcare professionals, may hinder its implementation (Alhmoud et al., 2023; Brimblecombe et al., 2019). In addition, lack of resources, inadequate training and potential alarm fatigue are also barriers that need to be addressed to ensure that digital NEWS can be integrated smoothly and function optimally in the hospital environment (Alhmoud et al., 2023; Mau et al., 2019; Subbe & Bramley, 2022).

The low implementation of digital NEWS has been reported to be due to several factors. Lack of knowledge is a factor that hinders the implementation of digital NEWS2 documentation (Alhmoud et al., 2023; Downey et al., 2017). Health professionals who have insufficient knowledge will experience a sense of insecurity in determining the scoring of digital NEWS, and lack of experience accompanied by a lack of skills makes it difficult to audit the NEWS feature (Alhmoud et al., 2023; Downey et al., 2017). In addition, nurses' attitudes greatly influence the implementation of NEWS, and interpersonal interactions play an important role in conveying information about patients' clinical conditions. A positive attitude will help reduce the potential for errors in the implementation of NEWS documentation (Karlotte et al., 2019; Russell et al., 2020). Another influencing factor in the implementation of digital NEWS is that providing sufficient education and training on the use of digital NEWS can help medical staff understand and implement this system effectively (Petersen et al., 2017; Russell et al., 2020). A combination of these factors is needed to ensure that the system can be adopted effectively and provide maximum benefit in detecting patients' clinical conditions early.

Other barriers and challenges are related to the use of technology systems. Health professionals' lack of technological literacy, resources and experience in using technology can make it difficult for them to audit NEWS features, as well as difficult to adopt digital NEWS (Downey et al., 2017; Petersen et al., 2017; Russell et al., 2020). In addition, the implementation of digital NEWS requires sophisticated technological infrastructure, including hardware such as vital signs monitors, reliable servers and stable networks (Petersen et al., 2017). The successful implementation of digital NEWS depends not only on the technology itself but also on adequate training support, proper resource allocation and improved technological literacy among health workers.

Limitations of The Study

Many hospitals, especially in resource-constrained areas, may not have sufficient technological infrastructure to support a digital NEWS system that operates in real-time (Gonem et al., 2022; Petersen et al., 2017). In addition, the implementation of digital NEWS also requires a significant initial investment including costs for the hardware, software and technology infrastructure required to procure these systems. If these cost challenges are not overcome, the implementation of digital NEWS will not be optimal (Neill et al., 2021).

There are several limitations to this scoping review. First, primary studies exploring the topic of digital NEWS are still very limited, which makes the findings in this review less comprehensive. However, the authors have explored several databases and search engines to increase the coverage of relevant studies. Secondly, most of the studies analyzed were conducted in developed countries, which may limit the generalization aspect of the findings of this review. Findings applicable in developed countries may not be fully applicable to the context of developing countries or countries with different health systems. Therefore, further research covering different geographical contexts and health systems is needed to strengthen the generalizability and validity of the findings related to the use of digital NEWS. This will help broaden the understanding of the application and effectiveness of digital NEWS globally.

CONCLUSION

Ten studies were analyzed in this review to explore the benefits, factors and barriers of Digital NEWS implementation in hospitals. The implementation of digital NEWS in hospitals provides significant benefits in detecting patients' clinical deterioration early. The use of this digital system has been shown to increase patient safety, speed up clinical response, and improve communication between healthcare teams. However, successful implementation depends on several important factors, such as the availability of adequate technology infrastructure, comprehensive training, and technology literacy among health workers.

However, the challenges faced in implementing digital NEWS should not be overlooked. Obstacles such as lack of resources, alarm fatigue, and cultural resistance to technological change are major hindering factors. Therefore, continuous efforts to improve managerial support, technology investment, and skill development of health staff are essential. With this approach, it is expected that the implementation of digital NEWS can be optimized to improve the quality of care and patient safety in the hospital environment.

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CONFLICTS OF INTEREST

The authors had no conflicts of interest in this research.

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