

## CHALLENGES IN THE IMPLEMENTATION OF EARLY WARNING SCORING SYSTEM (EWSS) BY NURSES IN DEVELOPED AND DEVELOPING COUNTRIES: SCOPING REVIEW

*Tantangan Penerapan Early Warning Scoring System (EWSS) oleh Perawat di Negara Maju dan Negara Berkembang: Scoping Review*

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### ABSTRAK

*Early Warning Scoring System (EWSS) digunakan secara luas untuk mendeteksi dini perburukan kondisi pasien dan mendukung eskalasi klinis secara tepat waktu. Namun, penerapannya oleh perawat di berbagai negara masih menghadapi sejumlah kendala, seperti kurangnya pelatihan, keterbatasan sumber daya, dan persepsi negatif terhadap efektivitas sistem. Artikel ini bertujuan memetakan tantangan yang dihadapi perawat dalam menerapkan EWSS, baik dalam aspek praktik klinis maupun faktor kontekstual di negara maju dan berkembang. Scoping review ini mengikuti kerangka Arksey & O'Malley serta panduan Joanna Briggs Institute (JBI). Pencarian dilakukan di ProQuest, PubMed, Google Scholar, dan repositori lokal (2017–2024, Bahasa Indonesia dan Inggris). Dari 22.103 artikel, 24 studi primer dengan desain kualitatif, kuantitatif, dan campuran memenuhi kriteria inklusi. Delapan tantangan utama yang teridentifikasi meliputi: kurangnya pelatihan dan pengetahuan, kepatuhan rendah terhadap dokumentasi dan eskalasi, beban kerja tinggi, keterbatasan staf, komunikasi dan kolaborasi antarprofesi yang belum optimal, hambatan budaya organisasi, rendahnya efikasi diri perawat, serta minimnya dukungan teknologi digital. Temuan ini memberikan dasar bagi pengembangan kebijakan dan pelatihan yang disesuaikan dengan konteks masing-masing layanan kesehatan.*

**Kata kunci:** EWSS, sistem skor peringatan dini, perawat darurat

### ABSTRACT

The Early Warning Scoring System (EWSS) is widely used to detect early deterioration of patients' conditions and support timely clinical escalation. However, its implementation by nurses in various countries still faces a number of obstacles, such as lack of training, limited resources, and negative perceptions of the effectiveness of the system. This article aims to map the challenges faced by nurses in implementing EWSS, both in terms of clinical practice and contextual factors in developed and developing countries. This scoping review follows the framework of Arksey & O'Malley as well as the guidance of the Joanna Briggs Institute (JBI). Searches were conducted on ProQuest, PubMed, Google Scholar, and local repositories (2017–2024, Indonesian and English). Of the 22,103 articles, 24 primary studies with qualitative, quantitative, and mixed designs met the inclusion criteria. The eight main challenges identified include: lack of training and knowledge, low compliance with documentation and escalation, high workload, limited staff, sub-optimal interprofessional communication and collaboration, organizational culture barriers, low self-efficacy of nurses, and lack of digital technology support. These findings provide the basis for policy development and training tailored to the context of individual health services.

**Keywords:** EWSS, Early Warning Score System, nurse emergency

### INTRODUCTION

*Early Warning Scoring System (EWSS)* is a clinical tool designed to detect early deterioration in a patient's clinical

condition in the hospital and support rapid and structured decision-making.<sup>1–6</sup> While triage systems have long been used as the primary approach to prioritizing patient

care in the emergency department (ED) based on severity upon arrival, these systems are static and not designed for continuous monitoring. In contrast, one of the key advantages of EWSS is its ability to provide continuous monitoring after the initial assessment.<sup>7</sup> Thus, EWSS enables healthcare workers—especially nurses—to recognize early signs of a patient's clinical deterioration earlier during the observation period, both in the emergency room and in the inpatient ward.<sup>8–10</sup>

Evidence shows that EWSS effectively reduces patient deterioration. Meta-analyses in emergency departments demonstrated that MEWS and NEWS significantly predict ICU admission and mortality risk. Specifically, MEWS  $\geq 3$  yielded a diagnostic odds ratio (DOR) of 5.54 (95% CI: 2.02–15.21) for ICU admission, while NEWS  $\geq 7$  had a DOR of 4.74 (95% CI: 4.08–5.50) for predicting 30-day mortality.<sup>11</sup> Empirical studies confirm that EWSS reduces patient deterioration and mortality in hospitalized settings. A retrospective observational study demonstrated that combining EWSS implementation with an intensive education program reduced mortality by 44% over two years.<sup>12</sup> Meanwhile, a real-time EWSS model validated on 54,246 inpatient visits in the United States recorded an area under the curve of 0.884 for mortality prediction, with 69% of high-risk patients dying within 7 days—providing an average intervention window of 40 hours before the event.<sup>13</sup> A local study in Indonesia supports these findings. Previous findings reported a significant association ( $p = 0.031$ ) between NEWS scores and patient mortality rates in the emergency department of Wolter Monginsidi Hospital, confirming that the EWSS is a reliable predictive tool for detecting worsening conditions and supporting rapid and accurate clinical decision-making.<sup>2</sup> These facts underscore that the EWSS is not only theoretically valid but also has significant practical relevance in improving patient safety. This system is also capable of complementing the weaknesses of the triage system in

terms of early detection of clinical deterioration that may occur after the initial assessment.<sup>2,14,15</sup> Several studies have shown that implementing EWSS can improve the ability to predict worsening conditions, reduce delays in care escalation, and improve patient safety.<sup>11</sup>

EWSS has been widely implemented and consistently demonstrated a positive impact on clinical outcomes.<sup>2,4</sup> Recent research also highlights the importance of integrating EWSS with mobile-based digital technologies to support early detection and rapid response to deteriorating conditions.<sup>16</sup> However, despite its proven effectiveness, systematic reviews of the challenges of EWSS implementation from a nurses' perspective—especially in comparisons between developed and developing countries—remain limited. Nurses are the primary users of these systems in daily clinical practice.<sup>17</sup> Suboptimal implementation of EWSS increases the risk of permanent deterioration of patient condition and has serious impacts on patient safety and prognosis.<sup>18</sup> Therefore, this system needs to be implemented routinely, both in stable and critical patients, to prevent undetected deterioration.<sup>17</sup> Optimal implementation can also increase the overall effectiveness of health services.<sup>19</sup>

Globally, various studies support that EWSS is able to reduce adverse clinical incidents,<sup>13</sup> including reducing hospital mortality rates and sudden cardiac arrest events.<sup>13,20</sup> In Indonesia, EWSS was also shown to have a significant correlation with patient mortality prediction, indicating its potential and relevance in health systems in developing countries.<sup>21</sup> In developed countries, the integration of triage systems and EWSS has begun to be implemented to improve overall patient safety. However, in developing countries like Indonesia, implementation still faces several obstacles, including nurses' low understanding of these systems, limited training, inadequate technological infrastructure, and barriers to interprofessional communication.<sup>2,4,8–10,17</sup>

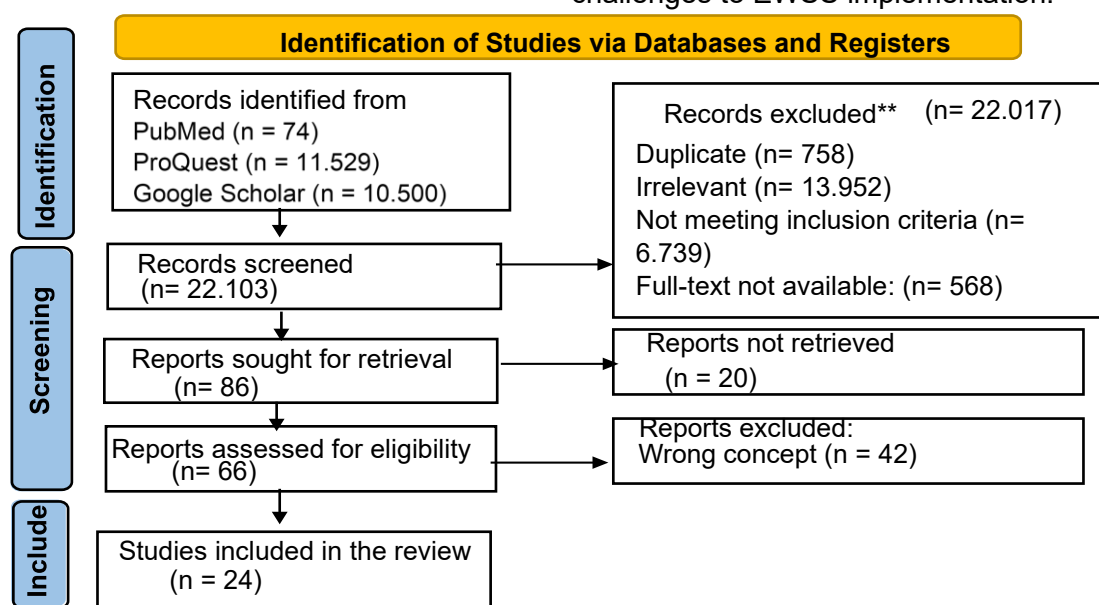
Comparing EWSS with triage is crucial to emphasize its novelty and implementation challenges, particularly from nurses' perspectives as primary users. This review maps clinical and contextual barriers in both developed and developing countries, addressing gaps in research on nurses' roles. The findings provide a foundation for improving practice and policy to enhance EWSS effectiveness globally.

## METHODS

This study applied the methodological framework of Arksey and O'Malley (2005), adapted to the latest Joanna Briggs Institute reporting guidelines.<sup>22</sup> The review followed six stages: (1) defining the research question, (2) identifying relevant studies, (3) screening and selecting articles, (4) data extraction and coding, (5) analyzing findings, and (6) synthesizing and reporting results. The guiding

question was: *"What challenges do nurses face in implementing the Early Warning Scoring System (EWSS) in developed and developing countries?"* Searches were conducted in ProQuest, PubMed, Google Scholar, and local repositories (2017–2024; English/Indonesian) using Boolean terms. From 22,103 articles identified, 66 met eligibility criteria, and 24 were included in the final analysis following PRISMA guidelines (Figure 1).

Inclusion criteria were primary studies (qualitative, quantitative, or mixed-method) focusing on nurses as EWSS implementers in clinical settings (ER, inpatient, ICU). Exclusion criteria were narrative reviews, unavailable full texts, non-nursing professions, and non-clinical contexts. Data extraction and open coding captured study characteristics (author, design, setting, results, country). The synthesis of findings identified eight key challenges to EWSS implementation.



**Figure 1. Prisma Study Flow Diagrams Depicting the Article Search and Selection Stages in this Scoping Review**

**Table 1. PICO (Population, Intervention, Comparison, Outcome)**

| Component        | Description                                                                                         |
|------------------|-----------------------------------------------------------------------------------------------------|
| P (Population)   | Nurses who implement EWSS                                                                           |
| I (Intervention) | Implementation of the Early Warning Scoring System (EWSS) in detecting worsening patient conditions |
| C (Comparison)   | There is no explicit comparison group (non-comparative design)                                      |
| O (Outcome)      | Identification of challenges in implementing EWSS by nurses                                         |

**Table 2. Summary of Studies Analyzed in the Scoping Review**

| No | Title/ Author/<br>Country                                                                                                                                                                           | Research Design                                                                                                                                                                                                  | Samples/<br>Sampling<br>Technique                                                                                                     | Conclusion Results                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | <i>Understanding nurses experience perception about the implementation of emergency monitoring:</i><br>4<br>Indonesia                                                                               | A qualitative descriptive study was conducted through in-depth interviews with six head nurses from hospitals in East Java. Data were analyzed thematically following Flick's method                             | nurse team leaders, with a mean age of 35.3 years and an average of 11.3 years of work experience, selected using purposive sampling. | The research found three main themes: (1) Personal themes: Subthemes: nurses' understanding, responsibilities, care, workload, motivation, and nurse characteristics. (2) Environmental themes: Subthemes: SOP, algorithms, socialization, training, and supervision. (3) Patient themes: Subthemes: patient response, disease process, and patient safety.                                                                                                                    |
| 2  | Hubungan Penerapan Sistem National Early Warning Score Newss) Dengan Penilaian Mortalitas Pasien di Instalasi Gawat Darurat di Rumah Sakit TK.II Robert Wolter Mongisidi. <sup>2</sup><br>Indonesia | Descriptive analytical with a cross-sectional approach. Data were collected using observation sheets and analyzed using the Chi-Square statistical test.                                                         | 20 nurses. selected through purposive sampling technique.                                                                             | Most respondents had a D3 nursing background, with NEWS knowledge obtained from formal education. A Chi-Square test showed a significant relationship between NEWS implementation and patient mortality ( $p = 0.031 < 0.05$ ), particularly in trauma cases. NEWS proved effective for detecting critical conditions, predicting mortality, and helping nurses prioritize patients and make rapid decisions in the ED.                                                        |
| 3  | Persepsi Perawat terhadap Penerapan Early Warning Score (EWS) di RSUD Banyumas. <sup>1</sup><br>Indonesia                                                                                           | Non-experimental descriptive quantitative. Respondent data were collected using a Likert-scale based questionnaire.                                                                                              | 68 nurses. Involving nurses selected purposively from the surgical and adult inpatient wards at Banyumas Regional Hospital.           | Most respondents (67.6%) had a good perception of vital sign assessment, with only 2.9% rating it poor. Perceptions of the EWS algorithm were divided—sufficient (30.8%), good (20.5%), less good (20.5%), and not good (26.4%). For implementation, perceptions were positive for patient response (52.6%) and reporting (55.1%), while early detection was mostly rated adequate (60.2%).                                                                                    |
| 4  | Hubungan Pengetahuan Perawat Dengan Dokumentasi Pengisian Form Early Warning Scoring di Instalasi Rawat Inap RS Islam Ibnu Sina Padang.<br><sup>17</sup> Indonesia                                  | Descriptive analysis with a cross-sectional approach Data collection was conducted using a knowledge level questionnaire and an EWS form checklist. Analysis was performed using the Spearman Rank test.         | 40 nurses. from three inpatient rooms (Marwa, Multazam, Zamzam).                                                                      | Nurses' Knowledge Level: Most nurses (55%) had good knowledge, while 15% had low knowledge. EWS Form Documentation: The majority (72.5%) completed EWS forms correctly; 27.5% were incorrect. Knowledge–Documentation Relationship: A significant moderate correlation was found between knowledge and documentation accuracy ( $r = 0.584$ , $p = 0.000$ ). Research shows that better nurse knowledge is significantly associated with more accurate EWS form documentation. |
| 5  | Studi Kasus Penerapan Early Warning Score sebagai Upaya Manajemen Keselamatan Pasien di Ruang Rawat Inap.<br><sup>23</sup><br>Indonesia                                                             | A case study was carried out in the male inpatient ward of Dr. Soebandi Regional General Hospital, Jember (April 4–6, 2022). The EWSS form assessed blood pressure, pulse, respiration, body temperature, oxygen | 5 patients, with consecutive sampling,                                                                                                | Most patients were aged 53–69 years with cardiovascular disease or diabetes complications. Two patients with high EWSS scores ( $>7$ ) died, while three improved or remained stable. Although 80% were hospitalized for more than three days, no Code Blue activations or ICU referrals occurred, even in high-score cases. EWSS is useful for detecting deterioration, but its follow-up remains suboptimal, especially for high-risk patients.                              |



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|    |                                                                                                                                                                        | saturation, consciousness level, and ventilator support use                                                                                      |                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 6  | Faktor – faktor yang berhubungan dengan kepatuhan perawat dalam pendokumentasian Early Warning Score System di RSUD dr. H. Jusuf SK. <sup>3</sup> Indonesia            | Analytical observational with cross-sectional approach. Data were collected through questionnaires and observation sheets.                       | 103 nurses, selected through probability sampling techniques with random sampling methods.                | Most nurses had a D3 education (52.4%), 2–5 years of experience (58.3%), and no EWSS training (70.9%). Compliance with EWSS documentation was low (20.4%), with 79.6% non-compliant. Knowledge was not significantly related to compliance ( $p = 0.062$ ), but attitude ( $p = 0.015$ , OR = 5.0) and motivation ( $p = 0.008$ , OR = 5.3) were significant factors. Overall, compliance is strongly influenced by attitude and motivation rather than knowledge.     |
| 7  | Pengalaman Perawat Dalam Penerapan Early Warning Score Di Ruang Rawat Inap. <sup>8</sup> Indonesia                                                                     | Qualitative with a phenomenological approach. Data collection was carried out through in-depth interviews and analyzed using Giorgi's technique. | 5 nurses from the inpatient ward were selected as participants through purposive sampling.                | Seven themes were identified: EWSS is often accreditation-driven rather than clinically applied; socialization is irregular post-pandemic; documentation is incomplete; it supports early detection and care planning; form availability is limited at night; understanding varies, especially among new nurses; and some hospitals lack active Code Blue teams, leaving escalation to ward staff.                                                                     |
| 8  | Hubungan Tingkat Pengetahuan Perawat terhadap Sikap Perawat dalam Menindaklanjuti Penilaian <i>Nursing Early Warning Score System</i> (NEWSS). <sup>24</sup> Indonesia | A descriptive correlational cross-sectional study using questionnaires to measure nurses' knowledge and attitudes toward NEWSS                   | 112 nurses. Samples were taken using proportional random sampling technique.                              | Most respondents were aged 26–35 years (50%), held a D3 education (74.1%), and had attended NEWSS training (83.9%). Overall, 66% demonstrated good knowledge and 77.7% a positive attitude. Nurses with good knowledge were significantly more likely to have a positive attitude ( $p = 0.001$ ; OR = 11.33)                                                                                                                                                          |
| 9  | Pengetahuan Perawat Dalam Menerapkan Early Warning Score System (Ewss) Di Ruang Perawatan. <sup>25</sup> Indonesia                                                     | A cross-sectional descriptive-analytical study using questionnaires to assess knowledge and observation sheets to evaluate EWSS implementation   | 39 nurses, The total sampling technique was used to involve the entire population in two inpatient rooms. | (1)Nurses' Knowledge: 35.9% had good knowledge, 46.2% fair, and 17.9% poor. (2) Education and Training: Most held a Diploma 3 (61.5%), and 87.1% had BT&CLS training. (3) EWSS Implementation: 51.3% were in the fair category, 23.1% good, and 25.6% poor. (4) Documentation: Only 35.8% was complete, with frequent omissions in consciousness parameters (30.7%).                                                                                                   |
| 10 | Pemahaman perawat tentang dokumentasi pengisian form early warning scoring EWSS di instalasi rawat inap RS Islam Ibnu Sina Padang. <sup>26</sup> Indonesia             | Descriptive Research Describes the level of nurses' knowledge about EWS documentation. Samples from inpatient rooms (Marwa, Multazam, Zam-zam)   | 40 nurses. with the total sampling method.                                                                | Most respondents were female (92.5%), aged 26–35 years (62.5%), with a Diploma 3 in Nursing (62.5%), and had more than 11 years of work experience (47.5%). In terms of knowledge, 55% had good knowledge, 30% moderate, and 15% poor. However, only 63% of EWS entries were completed correctly; many relied on previous entries without reflecting the actual patient's condition, and documentation was frequently skipped during the first six hours of admission. |
| 11 | <i>White lies and safety nets: The</i>                                                                                                                                 | <i>Mixed-method/Qualitative.</i>                                                                                                                 | A total of 161 nurses                                                                                     | The study highlights the tension between reliance on EWSS and the need for higher-                                                                                                                                                                                                                                                                                                                                                                                     |

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|    | <i>perception of nurses on the use of early warning score system and the development of higher-order thinking skills</i> <sup>27</sup><br>Australia | Combined (qualitative and quantitative) to explore nurses' perceptions. Thematic analysis of qualitative responses. Participation of the public and private health systems in Australia. | participated, answering demographic questions, 12 Likert-scale matrix items with optional qualitative fields, and two open-ended questions for additional perceptions | order clinical reasoning. While EWSS supports patient safety, it cannot substitute holistic judgment and critical thinking. Ongoing training is essential, and further research—particularly quantitative and experimental studies—is recommended to evaluate EWSS impact more comprehensively                                                                                                                                                                                                                                                                                                                      |
| 12 | <i>Introducing the National Early Warning Score – a qualitative study of hospital nurses perception and reactions.</i> <sup>28</sup><br>Norwegia    | Qualitative study. Data were collected through participant observation in eight hospital units, nine seminars, and 23 simulation sessions.                                               | 296 nurses. Qualitative with activity theory as the analytical framework.                                                                                             | Four themes emerged: (1) tension between EWSS and clinical judgment, with some nurses feeling it constrained intuition; (2) challenges in nurse–physician collaboration; (3) regulatory and compliance burdens, with protocols viewed as difficult to apply; and (4) increased workload from EWSS implementation without adequate support.                                                                                                                                                                                                                                                                          |
| 13 | <i>Barriers and facilitating factors related to use of early warning score among acute care nurses</i> <sup>29</sup><br>Denmark                     | Qualitative study. The research used a qualitative approach with interviews. Data were analyzed using text-based content analysis.                                                       | 18 nurses. focus groups involving nurses from acute medical and surgical wards.                                                                                       | Three categories emerged. (1) Compliance with Monitoring: Staff shortages and time pressures led to neglected monitoring, particularly at night, while over-monitoring based on intuition was seen as burdensome. (2) Reporting to Junior Doctors: Nurses were reluctant to report to junior doctors, perceived as less competent, unless cases were serious; lack of trust and guidance were major barriers. (3) Calling the MET: Interpersonal dynamics influenced decisions to call the Medical Emergency Team, with negative attitudes from some members creating psychological barriers.                       |
| 14 | <i>Why do healthcare professionals fail to escalate as per the early warning system EWSS protocol?</i> <sup>10</sup><br>Irelandia                   | Qualitative. This study employed a systematic literature search of qualitative studies. Data from 18 studies involving healthcare workers were analyzed thematically.                    | 7 countries were analyzed thematically.                                                                                                                               | Five themes of barriers and facilitators were identified. (1) Governance (2) RRT Response: (3) Professional Boundaries (4) Clinical Experience (5) EWSS Parameters.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 15 | <i>Overview Of Acasia Room Nurses' Knowledge, Attitude and Skills Regarding Early Warning Score.</i> <sup>30</sup><br>Indonesia                     | Quantitative approach with descriptive design. Research instruments include questionnaires and observation sheets.                                                                       | 16 People. The entire population of nurses in the Acacia Room was taken as a sample using the total sampling technique.                                               | Most nurses (93.8%) demonstrated good knowledge, though some errors occurred in distinguishing EWS parameters such as systolic versus diastolic blood pressure. All respondents had positive attitudes shaped by understanding and work experience. In practice, all nurses documented and observed EWS scores; 87.5% monitored stable (green) patients every 8 hours, while 12.5% monitored unstable (yellow) patients every 2 hours. Overall, nurses in the Akasia Room showed good knowledge, positive attitudes, and appropriate skills, with documentation and observation consistent with patient conditions. |
| 16 | Efikasi Diri dan Implementasi Early                                                                                                                 | Cross-sectional with                                                                                                                                                                     | 100 nurses                                                                                                                                                            | Over half of nurses (51%) had high self-efficacy, 26% medium, and 23% low. Most                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

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|    | Warning Scoring System (EWSS) pada Pasien Henti Jantung oleh Perawat Ruang Rawat Inap. <sup>31</sup><br>Indonesia                                                          | Data were collected using a self-efficacy questionnaire and an EWSS implementation observation sheet.                                                                                                                  | purposive sampling.                                                                                                                                                                             | (64%) implemented EWSS completely, while 36% did not. A significant relationship was found between self-efficacy and EWSS implementation ( $p = 0.001$ ); 80.3% of nurses with high self-efficacy completed EWSS fully compared to only 21.8% with low self-efficacy. Nurses' self-efficacy is significantly associated with successful EWSS implementation.                                                                                                                                                                                                                    |
| 17 | The Role of The National Early Warning Score (NEWSS) in Identifying Critically Ill Patients at Risk of Mortality in Nigeria.<br><sup>32</sup><br>Nigeria                   | Retrospective design with review of medical records of adult patients admitted to medical and surgical wards over a 6-month period. Data included vital parameters, NEWS scores, and patient clinical outcomes.        | 405 Adult patients admitted to medical and surgical wards between January 2021 and July 2021. All records of patients admitted to inpatient care at JUTH during a 6-month period were reviewed. | Among 405 patients, 13.3% died during hospitalization, with the highest mortality in those with high NEWS scores. Patients at high risk had four times greater odds of death than low-risk patients ( $p < 0.001$ ). The median NEWS score 24 hours before outcome was 9 in patients who died versus 6 in those discharged. NEWS showed modest effectiveness in predicting mortality, with an AUC of 0.604 at admission and 0.52 within 24 hours before outcome.                                                                                                                |
| 18 | <i>Implementation of a digital early warning score (NEWSS2) in a cardiac specialist and general hospital settings in the COVID-19 pandemic.</i><br><sup>33</sup><br>London | Methodology:Qualitative thematic analysis with the NASSS (Non-Adoption, Abandonment, Scale-Up, Spread, and Sustainability) framework. Data was collected through interviews.                                           | 11 nurses 67 online surveys. Thematic analysis of semi-structured interviews with purposively sampled nurses and managers, and an online survey from March to December 2021.                    | Three themes emerged: (1) Challenges and Support for NEWSS2 Implementation—barriers included limited IT literacy, resources, and training, while facilitators were induction training, management support, and EHR integration; (2) Value for Alarms and Escalation—NEWSS2 was useful for detecting deterioration and escalation, though false alarms, over-reliance, and added workload, especially during the pandemic, were concerns; and (3) Digitization—EHR integration improved accuracy and audits but was limited by insufficient workstations and measurement errors. |
| 19 | Hubungan Beban Kerja Mental dengan Tingkat Kepatuhan Perawat dalam Penerapan Early Warning Score System (EWSS). <sup>9</sup><br>Indonesia                                  | This quantitative study used a descriptive correlation with a cross-sectional design. Respondents were drawn from two inpatient ward floors, data were collected using NASA-TLX questionnaires and observation sheets. | 46 The nurses consist of 22 nurses on the 8th floor and 24 nurses on the 7th floor.                                                                                                             | Most nurses experienced moderate (65.2%) or severe (34.8%) mental workload. Compliance with EWSS was low, with only 34.8% compliant and 65.2% non-compliant. A significant relationship was found between mental workload and compliance ( $p = 0.046$ , OR CI = 0.163), with higher workload linked to greater non-compliance. Increased mental workload negatively affects nurses' compliance with EWSS implementation.                                                                                                                                                       |
| 20 | Hubungan Motivasi dengan Kepatuhan Perawat dalam Pendokumentasian Early Warning Score System di Rawat Inap RSUD dr. Soebandi Jember. <sup>34</sup><br>Indonesia            | Correlation with cross-sectional approach. Data were collected using a questionnaire to measure motivation and compliance levels, and analyzed using the Spearman Rank test.                                           | 133 nurses Samples from inpatient nurses, taken using simple random sampling technique                                                                                                          | Most nurses reported high motivation (63.9%), while 36.1% had moderate motivation. Compliance with EWSS documentation was very high (97.7%). Spearman Rank analysis showed a significant but weak positive correlation between motivation and compliance ( $p = 0.020$ ; $r = 0.202$ ), indicating that higher motivation contributes to better compliance, though the relationship is weak.                                                                                                                                                                                    |

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|----|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 21 | <i>Using the National Early Warning Score (NEWS) outside acute hospital settings.<sup>6</sup></i><br>Inggris Barat                                | Qualitative, with semi-structured interviews from a range of organizations, including primary care, ambulance, referral management, community services, and mental health. Data were analyzed thematically using a data-driven, inductive approach. | 25 health workers purposively selected, primary care (9), ambulance (3), referral management/acute interface (5), community (4) and mental health services (3), and service commissioning (1) | Four themes were identified: NEWS improves cross-sector communication but is limited when not fully understood; it helps prioritize care but may miss specific conditions such as head injuries; it supports but cannot replace clinical judgment and may sometimes conflict with it; and its integration varies, being routine in ambulances but selective in primary care. |
| 22 | <i>Nurses' Experiences and Perceptions of two Early Warning Score systems to Identify Patient Deterioration.</i><br><sup>35</sup><br>Denmark      | Qualitative with focus groups from six hospitals in Denmark. Data were analyzed using thematic content analysis.                                                                                                                                    | 45 nurses<br>Six focus groups were conducted in six Danish hospitals from February to June 2019.                                                                                              | One overarching theme emerged with four categories: NEWS supports early detection but may conflict with clinical judgment; it fosters nurse–physician communication yet trust issues persist; it enhances novice nurses' skills and reflection; and strict protocols can create anxiety, prompting reliance on personal experience                                           |
| 23 | Pengembangan Aplikasi National Early Warning Score 2 (NEWS2) Berbasis Web dalam Penilaian Awal Pasien dengan Penyakit Akut <sup>7</sup> Indonesia | Research and Development (R&D) approach with trials, data is tested using NEWS2 based on web application.                                                                                                                                           | 4 patients at the Emergency Room of Muhammadiyah Hospital Palembang.                                                                                                                          | 1. Respondent Characteristics: Participants were aged 28–40 years (mean 33.25), with an equal gender distribution.<br>2. NEWS2 Score: The average score was 4 (range 3–6), with 75% of respondents in the low-risk category.<br>3. Trial Success: All four patient trials were successful (100%).                                                                            |
| 24 | Pengetahuan Perawat dalam Penerapan Early Warning System (EWS) di Ruang Rawat Inap. <sup>36</sup><br>Indonesia                                    | Explanatory design with a cross-sectional approach. Using a questionnaire to assess nurses' knowledge and observation of compliance in implementing EWS.                                                                                            | 32 Nurse. Respondents in the inpatient room of Muhammadiyah Hospital Palembang.                                                                                                               | Nearly half of nurses demonstrated good knowledge (46.9%), while 53.1% had poor knowledge. Compliance with EWS implementation was 53.1%, with 46.9% non-compliant. A significant relationship was found between knowledge and compliance ( $p = 0.000$ ). Nurses' knowledge level is significantly associated with compliance in implementing EWS                            |

A review of 24 articles identified eight major challenges in EWSS implementation. The first is limited knowledge and training—many nurses reported difficulties in understanding EWSS parameters and applying them clinically. Formal training was inconsistent and often failed to include system updates, contributing to gaps in competence.<sup>5</sup>Second, low compliance with documentation and escalation: EWSS documentation is frequently incomplete or fails to reflect the patient's actual condition. In many cases, nurses

complete the form merely for administrative purposes rather than as a tool to guide clinical decision-making.<sup>26</sup>Third, high workload and limited resources: Heavy workloads, staff shortages, and time constraints often lead to neglect of EWSS implementation, particularly during night shifts.<sup>9</sup>Fourth, ineffective interprofessional communication and collaboration: Relationships among nurses, physicians, and the resuscitation team (MET) do not always facilitate EWSS implementation. Professional hierarchies and lack of



mutual trust further hinder effective clinical escalation.<sup>29</sup> Fifth, organizational culture barriers: A blame culture, rigid protocols, and lack of accountability within the system create discomfort and reluctance in the escalation process. Sixth, low nurse self-efficacy and motivation: Nurses' confidence and motivation are strongly correlated with compliance in completing and following up on EWSS results. Seventh, dependence on data input accuracy: The reliability of EWSS scores depends heavily on accurate data entry; errors in recording physiological parameters may lead to incorrect clinical interpretations. Eighth, minimal use of digital technology: Utilization of web-based applications or integration with electronic health records (EHRs) remains limited in many developing countries due to inadequate infrastructure and insufficient technological training.

## DISCUSSION

### 1. Limited Knowledge and Training.

Unequal knowledge and lack of routine training hinder EWSS implementation. In Indonesia, training is irregular and often excludes system updates, leading to poor understanding of score parameters (Articles 1, 3, 4, 24). By contrast, countries like Norway and Denmark integrate training and simulations into staff development, supporting more accurate use (Articles 12, 22).

### 2. low compliance with documentation and escalation.

In developing countries, EWSS forms are often completed without reflecting patients' actual conditions, causing delays in detection and intervention (Articles 4, 10, 20). In contrast, hospitals in developed countries integrate EWSS into EHRs with automated alerts, which improves compliance (Articles 13, 18).

### 3. High Workload and Limited Resources.

In developing countries, heavy workloads and limited staffing often lead to neglect of EWSS, particularly during night shifts or peak

volumes (Articles 6, 11, 19). By contrast, developed countries with stronger organizational structures and better staffing ratios sustain routine EWSS use even in high-demand periods (Articles 12, 13).

### 4. Ineffective Interprofessional Communication and Collaboration:

In developing countries, hierarchical barriers and lack of trust hinder escalation between nurses, physicians, and MET teams (Articles 7, 14). By contrast, in countries like Denmark, EWSS can act as a shared clinical language to strengthen collaboration, though consistent interpretation of scores remains a challenge (Article 22).

### 5. Organizational culture barriers.

EWSS effectiveness is strongly influenced by organizational culture. In Indonesia and Ireland, a blame culture and lack of accountability reduced nurses' willingness to escalate care (Articles 7, 14). In contrast, supportive contexts with flexible protocols and collaborative cultures in developed countries facilitate timely escalation.

### 6. Low self-efficacy and motivation of nurses.

Nurses' compliance with EWSS depends heavily on self-efficacy and motivation. High self-efficacy promotes consistent documentation and follow-up (Articles 16, 20), while low motivation can result in poor implementation even with adequate resources and training.

### 7. dependence on the accuracy of data input.

EWSS reliability relies on precise and complete data entry, as errors in parameters like blood pressure or consciousness can distort scores (Articles 4, 5, 24). In developed countries, automated recording systems and routine audits help maintain data integrity and support decision-making (Articles 2, 13).

### 8. Minimal Use of Digital Technology:

In developing countries, EWSS digital tools remain underutilized due to weak IT infrastructure and low digital literacy, despite initiatives like the

NEWS2 application (Article 23). In contrast, integration with EHRs in the UK and Australia has improved early detection and streamlined clinical documentation (Articles 18, 21)

### Practical Implications

Sustainable training that integrates clinical skills with interprofessional communication is essential to strengthen nurses' competence in implementing EWSS. Structured programs using case simulations and communication exercises should be complemented by stronger documentation and supervision systems to ensure accuracy and compliance. Integration of EWSS into electronic health records (EHR) can enable automated recording, real-time alerts, and early detection. Finally, fostering collaboration through communication training, regular forums, and clear escalation protocols is key to effective interprofessional teamwork in patient care.

### Future Implications

Further research is needed to evaluate interventions that address barriers to EWSS implementation, particularly strategies to enhance nurse compliance, ensure data accuracy, and strengthen interprofessional collaboration. The development of AI-based digital tools represents a key direction, offering automated data analysis, real-time alerts, and faster, more precise decision support. Equally important is the reinforcement of hospital policies through clear SOPs, regular training, compliance monitoring, and robust escalation systems to manage patient deterioration.

### CONCLUSION

EWSS implementation faces multidimensional challenges at the individual, team, and system levels. The eight key barriers are limited training, low compliance, high workload and resource shortages, weak interprofessional communication, cultural barriers, low motivation, inaccurate data entry, and limited digital integration. Addressing these requires continuous training,

stronger documentation and escalation systems, improved collaboration, and context-appropriate digital solutions. Further research in developing countries is needed to evaluate interventions. These findings can guide hospitals and nursing education institutions in developing policies, adaptive training, effective supervision, and technological support for EWSS.

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