

THE RELATIONSHIP BETWEEN NURSES' KNOWLEDGE OF THE EARLY WARNING SCORE SYSTEM (EWSS) AND THE ACCURACY OF EWSS IMPLEMENTATION IN THE INPATIENT WARDS OF RSI SAKINAH MOJOKERTO

CHINTA WINDARJATI, MOCH. ACHWANDI, BINARTI DWI WAHYUNINGSIH

Universitas Bina Sehat PPNI Mojokerto, Mojokerto, Indonesia

Corresponding Author: chintawindarjati@gmail.com

ABSTRACT

Patient safety in inpatient wards depends on the early detection of clinical deterioration using the Early Warning Score System (EWSS). Nurses, as frontline healthcare providers, require adequate knowledge of EWSS to perform accurate assessments and ensure timely clinical responses. Insufficient knowledge may result in scoring errors and delayed interventions. This study aimed to analyze the relationship between nurses' knowledge of EWSS and the accuracy of EWSS assessment in the Inpatient Wards of RSI Sakinah Mojokerto. A correlational study with a cross-sectional approach was conducted among 34 nurses selected through total sampling. Data were collected using a knowledge questionnaire and a NEWS2-based observation sheet, then analyzed using Spearman's rho test. Most nurses had good knowledge (70.6%) and performed accurate EWSS assessments (76.5%). The results showed a significant moderate positive correlation ($r = 0.439$; $p = 0.009$), indicating that higher knowledge was associated with greater assessment accuracy.

Keywords: *nurses' knowledge, Early Warning Score System, assessment accuracy, inpatient ward*

INTRODUCTION

Patient safety in inpatient wards depends heavily on comprehensive and continuous assessment of clinical condition, since patients admitted to these units are at risk of sudden deterioration. One of the key tools supporting timely and accurate identification of deterioration is the Early Warning Score System (EWSS), which enables early intervention by monitoring vital signs such as systolic blood pressure, pulse rate, respiratory rate, oxygen saturation, body temperature, level of consciousness, and other physiological parameters (Masela et al., 2023). Proper implementation of EWSS in inpatient wards is essential to prevent adverse events and to improve overall nursing care quality, as EWSS helps nurses initiate early intervention and management, such as increasing nurse vigilance, providing accurate information, or activating rapid response or emergency medical teams (Lutfi et al., 2026).

Nurses, as the healthcare providers who interact most directly with patients for 24 hours a day, are required to possess adequate knowledge of EWSS because they spend the most time monitoring changes in patients' condition and act as first responders during emergencies. Insufficient knowledge may lead to failures in EWSS implementation, scoring errors, or other mistakes (Fergiawan et al., 2024). Because recognizing deterioration is inherently difficult and nurses' clinical judgment is a critical part of patient risk-assessment practice, strong knowledge of EWSS is essential for nurses to perform assessments in inpatient wards accurately, carefully, and consistently (Destri et al., 2024).

Several previous studies have shown a strong correlation between nurses' knowledge of EWSS in inpatient wards and the accuracy of EWSS implementation. A study conducted at RSUP Surakarta found that most nurses' knowledge of EWSS fell into the good category (47.6%), although a considerable proportion remained in the moderate category (45.2%) (Supriyadi et al., 2024). Similarly, a study conducted at Santa Elisabeth Hospital, Batam City, in 2022 examined the relationship between nurses' knowledge and compliance in completing EWSS forms in inpatient wards as a strategy to reduce cardiac-arrest-related mortality

(Jagentar et al., 2024). Overall, this evidence indicates that nurses' knowledge is a critical factor that directly affects the accuracy of EWSS assessment.

Non-compliance in EWSS implementation may result from several factors, including limited time, staff shortages, and nurses' lack of confidence in their ability to manage deteriorating patients. Previous studies have also reported that nurses sometimes admit to not following EWS protocols, omitting parameters, or inaccurately documenting vital signs in order to obtain scores they believe more accurately reflect their own clinical judgment when the EWS score does not align with their assessment of the patient's condition (Intan et al., 2025). This condition is compounded by the fact that EWSS implementation in clinical practice continues to show deviations and remains suboptimal, which threatens scoring accuracy and may disrupt the hospital's overall rapid-response system (Suara & Retnaningsih, 2025).

Inaccurate EWSS assessment endangers patient safety, including by delaying the response to clinical deterioration and increasing the risk of adverse events. Many experienced nurses prioritize patient safety over strict adherence to EWSS guidelines and protocols (Ernawati et al., 2025), yet some report being willing to adjust EWS scores, by omitting or altering data, to prompt actions they believe will improve patient safety. Research in Indonesia has also found that nurses' knowledge regarding EWS implementation for emergency patients in adult inpatient wards still needs improvement, reflecting a gap between theoretical understanding and its application in the field, a condition worsened by high workloads and a lack of standardized EWSS training in many hospitals (Dewi et al., 2023).

Strengthening nurses' knowledge of EWSS and improving the accuracy of its assessment in inpatient wards requires the development of EWSS-based initial-assessment models within nursing-care documentation, which is expected to enhance nurses' critical thinking and clinical reasoning so that EWSS score interpretation supports clinical decision-making rather than being reduced to a mere number (Harviani Hamsah et al., 2022). Given this background, it is important to conduct research that specifically analyzes how nurses' knowledge of EWSS correlates with the accuracy of EWSS assessment in inpatient wards, as such evidence provides a scientific foundation for developing better training programs and clinical policies (Pujiastuti et al., 2021). This study therefore aimed to analyze the relationship between nurses' knowledge of EWSS and the accuracy of EWSS assessment among patients in the Inpatient Ward of RSI Sakinah Mojokerto, contributing new empirical evidence from a private Islamic hospital setting that has rarely been examined in previous EWSS-knowledge studies (Djala et al., 2024).

METHOD

Research Design

This study used a correlational design with a cross-sectional approach, in which the independent and dependent variables were measured simultaneously without any intervention, in order to determine how nurses' knowledge of EWSS relates to the accuracy of EWSS assessment (Sugiyono, 2023). Data were collected through direct observation in the Inpatient Ward of RSI Sakinah Mojokerto on 9 June 2026.

Subjects, Population, and Sample

The population consisted of all nurses working in the Sunan Bonang (10 nurses), Sunan Drajat (8 nurses), Gunung Jati 1, and Gunung Jati 2 (16 nurses) inpatient wards of RSI Sakinah Mojokerto. Because the population was relatively small (fewer than 100 people), a total sampling (saturated sampling) technique was applied, in which every member of the population was included as the sample, in order to increase data representativeness, reduce bias, and improve the validity of the results (Sugiyono, 2023). The final sample consisted of 34 nurses who met the inclusion and exclusion criteria.

Data Collection Procedure

Data were collected using two instruments: a knowledge questionnaire covering five indicators, namely basic EWSS concepts, physiological parameters, scoring procedures, score interpretation, and clinical follow-up; and a structured observation sheet adapted from the National Early Warning Score 2 (NEWS2) standard (Royal College of Physicians, 2017), covering seven parameters, namely respiratory rate, oxygen saturation, use of supplemental oxygen, body temperature, blood pressure, pulse rate, and level of consciousness (AVPU). Prior to data collection, the researcher obtained ethical permission from Universitas Bina Sehat PPNI Mojokerto and the Director of RSI Sakinah Mojokerto, followed by coordination with the head nurses of each ward to explain the purpose of the study. Nurses were then observed directly, and patients' medical records related to EWSS assessment were reviewed, over a period of approximately one month, from April to June 2026. Data were subsequently processed through scoring, coding, and tabulation.

Data Analysis

Data were analyzed using univariate analysis to describe the frequency distribution and percentage of respondent characteristics, nurses' knowledge level, and EWSS assessment accuracy, using the formula $P = (f/N) \times 100\%$, where P is percentage, f is frequency, and N is the total number of respondents. Bivariate analysis was performed using Spearman's rho correlation test, since both the independent variable (nurses' knowledge) and the dependent variable (EWSS assessment accuracy) were measured on an ordinal scale. A p-value below 0.05 indicated a statistically significant correlation between the two variables, while the strength of the correlation coefficient (r) was interpreted as very weak (0.00-0.199), weak (0.20-0.399), moderate (0.40-0.599), strong (0.60-0.799), or very strong (0.80-1.000), with a positive coefficient indicating that better nurses' knowledge corresponded with more accurate EWSS assessment. This study adhered to the ethical principles of informed consent, anonymity, and confidentiality throughout the research process. This study complies with ethical research principles, including informed consent, anonymity, and confidentiality of respondent data. This study obtained ethical clearance from the Health Research Ethics Committee of Bina Sehat University, PPNI, with Number 81/KEP/UBS-PPNI/VII/2026.

FINDING AND DISCUSSION

RESEARCH RESULT

This study was conducted to analyze the relationship between nurses' knowledge of the Early Warning Score System (EWSS) and the accuracy of EWSS assessment in the Inpatient Ward of RSI Sakinah Mojokerto. Data were obtained from 34 respondents who met the inclusion and exclusion criteria. The results are presented as frequency distributions of respondent characteristics, EWSS knowledge level, EWSS assessment accuracy, and the results of the Spearman's rho correlation test.

Table 1: Frequency Distribution of Respondent Characteristics

Characteristics	n	%
Gender		
Male	13	38.2
Female	21	61.8
Age		
20-30 years	23	67.6
31-40 years	11	32.4
Last Education		
Bachelor of Nursing / Ners	34	100.0
EWSS Training		
Attended training	29	85.3
Did not attend training	5	14.7
Total	34	100.0

Source: Primary Data, 2026

Based on Table 1, most respondents were female (61.8%) and nearly half were male (38.2%). Most respondents were aged 20-30 years (67.6%) and nearly half were aged 31-40 years (32.4%). All respondents held a Bachelor of Nursing/Ners qualification (100.0%). Nearly all respondents had attended EWSS training (85.3%), while a small proportion had not (14.7%).

Table 2: Frequency Distribution of Nurses' Knowledge of EWSS

EWSS Knowledge Category	n	%
Moderate (score 56%-75%)	10	29.4
Good (score 76%-100%)	24	70.6
Total	34	100.0

Source: Primary Data, 2026

Based on Table 2, most respondents had good knowledge of EWSS (score 76%-100%), amounting to 24 nurses (70.6%), while nearly half had moderate knowledge (score 56%-75%), amounting to 10 nurses (29.4%). No respondent fell into the poor knowledge category.

Table 3: Frequency Distribution of EWSS Assessment Accuracy

EWSS Assessment Accuracy	n	%
Accurate	26	76.5
Inaccurate	8	23.5
Total	34	100.0

Source: Primary Data, 2026

Based on Table 3, most nurses performed accurate EWSS assessments, amounting to 26 nurses (76.5%), while a smaller proportion performed inaccurate assessments, amounting to 8 nurses (23.5%).

Table 4: Cross-Tabulation and Spearman's Rho Correlation Test Results of Nurses' Knowledge of EWSS and EWSS Assessment Accuracy

Nurses' Knowledge	Accurate n	Accurate %	Inaccurate n	Inaccurate %	Total %
Moderate (56-75%)	5	50.0	5	50.0	100.0
Good (76-100%)	21	87.5	3	12.5	100.0
Total (n=34, 100%)	26	76.5	8	23.5	100.0

Source: Primary Data, 2026. Spearman's rho (r) = 0.439; p = 0.009

Based on Table 4, of the 10 respondents with moderate knowledge, half (50.0%) performed accurate assessments and half (50.0%) performed inaccurate assessments. Of the 24 respondents with good knowledge, nearly all (87.5%) performed accurate assessments and a small proportion (12.5%) performed inaccurate assessments. The Spearman's rho correlation test yielded $r = 0.439$ with $p = 0.009$ ($p < 0.05$), so H_0 was rejected and H_1 was accepted, indicating a significant, moderate, and positive correlation between nurses' knowledge of EWSS and the accuracy of EWSS assessment in the Inpatient Ward of RSI Sakinah Mojokerto.

DISCUSSION

Nurses' Knowledge of EWSS

Most nurses (70.6%) had good knowledge of EWSS. This high proportion is closely related to the nurses' educational background and their considerable participation in EWSS training. The National Early Warning Score (NEWS) 2 (Royal College of Physicians, 2017) defines EWSS as a standardized physiological scoring system that uses six main parameters: respiratory rate, oxygen saturation, body temperature, systolic blood pressure, pulse rate, and level of consciousness (AVPU scale). Each parameter is scored 0-3 according to its degree of deviation from normal values, and the scores are summed to produce a total score that determines the risk category and the corresponding clinical response protocol.

Nevertheless, nearly half of the nurses (29.4%) remained in the moderate knowledge category. Item-level analysis in the underlying dataset indicated that questions concerning the interpretation of the respiratory-rate parameter and clinical decision-making based on the aggregate score had the highest proportion of incorrect answers, suggesting that knowledge of respiratory parameters and escalation protocols still needs to be strengthened through continuous training, since the ability to apply EWSS correctly is strongly influenced by education, training, and clinical experience.

Accuracy of EWSS Assessment

Most nurses (76.5%) performed EWSS assessments accurately. Assessment accuracy is a highly critical aspect of patient safety, since errors in assessment can result in failure to detect clinical deterioration at an early stage. NEWS2 (Royal College of Physicians, 2017) emphasizes that assessment accuracy depends on the precision of each parameter measurement, the consistent application of the scoring algorithm, and the speed of response to changes in score: a low NEWS score (0-4) requires routine monitoring, a moderate score (5-6) requires clinical escalation, and a high score (≥ 7) requires an immediate emergency response.

The presence of 23.5% of nurses who still performed assessments inaccurately indicates the need for continuous competency strengthening. Assessment inaccuracy most often occurs in parameters that require more complex clinical interpretation, such as determining the level of consciousness using the AVPU scale and adjusting oxygen-saturation thresholds for patients receiving supplemental oxygen therapy, as also reflected in the NEWS2 update.

Relationship Between Nurses' Knowledge of EWSS and EWSS Assessment Accuracy

The Spearman's rho test result of $r = 0.439$ with $p = 0.009$ ($p < 0.05$) confirms a significant correlation of moderate strength and positive direction between nurses' knowledge of EWSS and the accuracy of EWSS assessment. The coefficient $r = 0.439$ indicates that approximately 19.3% of the variation in EWSS assessment accuracy can be explained by the knowledge variable, while the remainder is influenced by other factors such as workload, availability of measurement equipment, and clinical supervision.

The pattern of association is clear: nurses with good knowledge achieved an assessment-accuracy proportion of 87.5%, considerably higher than nurses with moderate knowledge, who achieved only 50.0%. This finding supports the theoretical proposition that knowledge is a fundamental prerequisite for appropriate clinical practice, since a person cannot perform a clinical action accurately without adequate understanding of its scientific basis, procedure, and purpose. This finding is consistent with the NEWS2 framework (Royal College of Physicians, 2017), which asserts that accurate EWSS implementation requires comprehensive knowledge among all healthcare providers involved, including understanding of the scientific rationale for each parameter, how to integrate assessment into the patient-monitoring workflow, and understanding of the escalation protocol according to risk-score category. Without adequate knowledge, nurses are at risk of performing inaccurate assessments and detecting clinical deterioration too late, which may seriously affect patient safety.

This study has several limitations. First, the cross-sectional design captures the relationship between knowledge and assessment accuracy at a single point in time and cannot establish causality. Second, the relatively small and single-site sample (34 nurses in four wards of one hospital) limits the generalizability of the findings to other settings. Third, other potential contributing factors, such as workload, staffing ratio, and the availability of monitoring equipment, were not measured in this study, even though the moderate correlation strength ($r = 0.439$) suggests that factors beyond knowledge substantially influence assessment accuracy.

These findings imply that strengthening nurses' knowledge of EWSS, particularly regarding respiratory-parameter interpretation and escalation protocols, through regular and continuous training, together with routine supervision and audit of EWSS compliance, is likely to improve the overall accuracy of EWSS assessment and, in turn, support patient safety in inpatient wards. Future research using quasi-experimental designs is recommended to test the effectiveness of NEWS2-based educational interventions and to examine additional variables such as workload, motivation, and availability of facilities that may also contribute to EWSS assessment accuracy.

CONCLUSION

This study found a significant relationship between nurses' knowledge of the Early Warning Score System (EWSS) and the accuracy of EWSS assessment in the Inpatient Ward of RSI Sakinah Mojokerto, with a Spearman's rho value of $r = 0.439$ and $p = 0.009$ ($p < 0.05$), reflecting a moderate correlation strength in a positive direction. Most nurses (70.6%) had good EWSS knowledge and most (76.5%) performed accurate EWSS assessments, and better knowledge consistently corresponded with more accurate assessment.

These findings suggest that hospitals should organize regular EWSS training for all nurses, particularly those who have not yet been trained, strengthen standard operating procedures for EWSS according to risk category, and conduct routine supervision and compliance audits. Nursing education institutions are encouraged to integrate NEWS/EWSS content into medical-surgical and critical-care nursing curricula and to strengthen laboratory-based simulation practice. For future research, a quasi-experimental design is recommended to test the effectiveness of NEWS2-based educational interventions on EWSS assessment accuracy, along with the inclusion of additional variables such as workload, motivation, and availability of facilities.

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