

## Improving Nurses' Knowledge of EWSS ( Early Warning System Score) in Relation With Level of Compliance

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### KEYWORDS

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### ABSTRACT

Patient safety is a very important aspect of health care. One of the steps taken by hospitals to fulfil patient safety standards is the implementation of the Early Warning Score System (EWSS). EWSS is an early warning system that involves a series of information communication, starting with early detection and followed by appropriate decision making. Success in achieving service quality standards and patient safety is highly dependent on the role of nurse professionalism. In the implementation of EWSS, nurses' competence is required to measure, document, and provide appropriate team responses with interventions that must be implemented according to the algorithm, so that the scoring system can function optimally. This study aimed to analyse the relationship between nurses' knowledge of EWSS and the level of compliance with its implementation in the NICU room. The research method used a cross sectional approach with 34 respondents selected through total sampling technique. Data was collected using a questionnaire that included demographic data, 16 questions about EWSS knowledge, and 15 questions about EWSS implementation compliance. The results showed a relationship between nurses' knowledge and compliance with EWSS implementation. Rank Spearman statistical test resulted in p value < 0.001 and r = 0.659, indicating a significant and positive relationship between knowledge and EWSS implementation compliance.

### Introduction:

Patient safety is an important part of healthcare. Patient safety is described as a collaborative effort by healthcare providers in an integrated system to prevent medical errors or avoidable injuries aimed at protecting patients<sup>1</sup>. WHO passed WHA resolution 55.18 on the quality of patient safety services where countries are asked to give full attention to patient safety issues and build and strengthen science-based systems to improve patient safety. Therefore, WHO established patient safety as a global health priority<sup>2</sup>. The failure of nurses to recognise changes in the clinical condition of patients in hospital inpatient rooms can result in unexpected events, which result in unplanned transfer of patients to the intensive care unit, cardiac arrest, pulmonary arrest and death<sup>3</sup>.

Patient Safety has been recognised as a priority in healthcare since 2007 when Sir Liam Donaldson, Chairman of the World Alliance for Patient Safety inaugurated the 'Nine Live-Saving Patient Safety Solutions'<sup>4</sup>. In its development, the hospital world in Indonesia through PERSI, National KKPRS, KARS and the Ministry of Health socialised the Patient Safety programme during 2006-2007 in various cities in Indonesia. The Patient Safety Programme has been regulated in the Regulation of the Minister of Health of the Republic of Indonesia Number 11 of 2017 concerning patient safety<sup>5</sup>. One of the hospital's efforts to achieve patient safety standards is the implementation of an Early Warning Score System (EWSS). This scoring is a procedure and flow of data and information that can describe patient care so that medical and para-medical staff are expected to get information quickly (early detection) if there

is a worsening of the patient's condition. Early detection with EWSS is expected to improve the quality of patient care, especially patient safety<sup>6</sup>.

One of the efforts to improve quality related to patient safety in hospitals is the implementation of EWSS in clinical patient changes in hospital inpatient installations. EWSS itself began to be implemented in Indonesia, driven by the inclusion of EWSS in hospital accreditation requirements. Achievement of these accreditation standards is expected to improve patient safety and further impact patient satisfaction<sup>7</sup>. The patient safety goals set by Joint Commission International (JCI) for hospitals state that hospitals must improve vigilance and response to changes in patient conditions. An instrument developed to be able to determine patients who need to be monitored more intensively and determine the resuscitation actions that need to be taken is the early warning score system (EWSS). The early warning score system can predict the incidence of cardiac arrest within 48 hours. Research conducted in New Zealand stated that the implementation of EWSS was able to significantly reduce the incidence of cardiac arrest in hospitals. In the Asian population, it was also found that EWSS significantly reduced the incidence of in-hospital cardiac arrest<sup>8</sup>.

EWSS is a simple, practical and proven scoring system that can improve vigilance and response to signs of poor physiological change. The EWSS, which is monitored within 24 hours and performed on an ongoing basis, has a good ability to monitor the condition of patients in the inpatient setting who are at risk of clinical deterioration before cardiac arrest, unplanned transfer to intensive care, and death<sup>9</sup>. The indicators measured through EWSS are very simple and easy to perform, namely 7 physiological variables consisting of blood pressure, pulse, respiratory rate, body temperature, oxygen saturation, supplemental oxygen use, and level of consciousness. These data are easy to obtain compared to supporting data such as laboratory tests or other diagnostic results. The tools used to take the measurements are easily found in the inpatient ward. Some of these conveniences make the EWSS effective in predicting mortality<sup>10</sup>.

Nursing services are the largest activity in the hospital and reflect the quality of hospital services, so competent nurses are needed as one of the professional care providers (PPA) in the hospital<sup>11</sup>. The use of EWSS as part of patient safety requires nurse competence in measuring and documenting and appropriate teamwork responses in implementing interventions according to existing algorithms so that the function of scoring can run optimally. EWSS is very helpful for nurses in recognising changes in patient conditions, facilitating nurse communication in the process of transferring patients from inpatient rooms to ICU rooms and helping nurses to communicate in collaboration. The application of EWSS can improve vital sign monitoring by 95% for 24 hours after being transferred from the ICU room<sup>12</sup>. EWSS improves the role of nurses in the early detection of deterioration in patient conditions, but delays in response time by doctors expose systematic weaknesses in health care. This suggests the need for teamwork in the implementation of the healthcare system<sup>13</sup>.

A nurse's level of knowledge about EWSS can coordinate nursing care. The ability to provide scoring affects the level of compliance in carrying out implementation in accordance with the scores that have been obtained<sup>14</sup>. Compliance of professional staff (nurses) is the extent to which a nurse's behaviour is in accordance with the provisions given by the nurse leader or the hospital<sup>15</sup> (Pramana et al., 2022). The Critical Care Stakeholder Forum (2005) identified 3 key problems that can lead to delays in identifying and referring patients, including low standards of documentation and observation in the ward, poor knowledge of critical illness and its signs and symptoms, and suboptimal service to at-risk patients caused by inadequate skills and knowledge and poor organisational systems. Some other factors that can affect the incidence of patient mortality in hospitals include the characteristics of nurses and doctors, support for patients, the environment, patient characteristics, and hospital location<sup>16</sup>.

The neonate mortality rate in Indonesia is still higher than Vietnam (11 per 1000), Brunei Darussalam (6 per 1000), Thailand and Malaysia (5 per 1000), and still far from Singapore whose neonate mortality rate is only 1 per 1000 live births<sup>17</sup> (Sampurna et al., 2023). Based on

the results of the Litbangkes Sample Registration System (SRS) in 2016, the 3 main causes of infant mortality were intrapartum complications (28.3%), respiratory and cardiovascular disorders (21.3%) and LBW & prematurity (19%). Meanwhile, based on the Maternal Perinatal Death Notification (MPDN) data dated 21 September 2021, the top 3 causes of infant mortality are LBW (29.21%), Asphyxia (27.44%), Infection (5.4%) with the highest location of death being in hospitals (92.41%)<sup>18</sup>. From these data, it can be seen that the mortality rate of neonates in Indonesia is still high, so efforts are needed to prevent it, one of which is by increasing knowledge and compliance with the implementation of EWSS.

### Material and Methods:

This study used a quantitative approach, the approach used was cross sectional. The population in this study were nurses who served in the NICU room of dr. Soeradji Tirtonegoro Klaten General Hospital, namely 37 nurses. Inclusion criteria in this study were all executive nurses in the NICU room with exclusion criteria were nurses who were on leave and nurses who were on study assignments or undergoing training. The sampling technique used in this study was total sampling. In this study, the sample was 34 nurses. The knowledge assessment instrument used a knowledge questionnaire about EWSS consisting of 16 and a compliance questionnaire totalling 15 statements. Data analysis using Spearman rank test.

### Results:

Respondents' characteristics included age, education, tenure and EWSS information. The characteristics of respondents based on age showed that the mean age of respondents was 34.74 years, with an age range of 27 - 49 years. These results are in accordance with research conducted before Ezdha, nurses are at a productive age of 20-35 years and according to Papalia and Feldman that a young worker is a worker who is in the young adult stage of development and is aged 20-40 years. At this stage of development, they are starting to be required to be able to live independently, have a family and have income to support themselves and their families<sup>19</sup>.

Table 1 Frequency Distribution of Respondents Based on Education, Working Period, and EWSS Information

| No | Variabel              | f  | %     |
|----|-----------------------|----|-------|
| 1  | Education Level       |    |       |
|    | Diploma III           | 12 | 35,29 |
|    | Bachelor S 1          | 22 | 64,71 |
| 2  | Working Period        |    |       |
|    | < 1 Year              | 0  | 0     |
|    | 1-5 Years             | 12 | 35,29 |
|    | 6-10 Years            | 7  | 20,59 |
|    | 11-15 Years           | 8  | 23,53 |
|    | >15 Years             | 7  | 20,59 |
| 3  | EWSS Information      |    |       |
|    | Meetmor socialisation | 34 | 100   |
|    | Total                 | 34 | 100   |

Source : authors, 2024

The results of the study on respondents' compliance in implementing the early warning system (EWSS) in respondents at dr. Soeradji Tirtonegoro Klaten General Hospital obtained data , namely most of the respondents had compliance with the implementation of the early warning score system (EWSS) in the compliant category as many as 27 respondents (79.41%). In this study, there were still 7 respondents who were less compliant in the implementation of EWSS, this could be due to the EWSS form used in the NICU is still not suitable for neonate parameters, so that it affects the scoring which ultimately affects the actions to be taken.

Table 2: Relationship between Nurses' Knowledge and Compliance with EWSS Implementation

| No    | Knowledge | Good (%)   | Fair (%)  | Less (%) | <i>P value</i> | <i>r</i> |
|-------|-----------|------------|-----------|----------|----------------|----------|
| 1     | Good      | 14 (51,85) | 0         | 0        | < 0,001        | 0,659    |
| 2     | Fair      | 13 (48,15) | 2 (28,58) | 0        |                |          |
| 3     | Less      | 0          | 5 (71,42) | 0        |                |          |
| Total |           | 27(100)    | 7(100)    | 0        |                |          |

Source : Author, 2024

### Discussion:

Respondents' education in table 1 shows that the majority of respondents have undergraduate education, as many as 22 respondents (66.71%), with good and sufficient EWSS knowledge. Based on the results of research conducted before, it states that nurses' knowledge in assessing the early warning scoring system is supported by the level of education, work experience, and training in the form of educational background of DIII and S1 graduates, length of experience, experience, and competence from training<sup>20</sup>.

Based on table 1, the majority of nurses have a working period of 1-5 years, as many as 12 respondents (35.29) with the majority having sufficient and good knowledge. Research conducted by Suwaryo that the length of service of nurses also affects the level of knowledge about the early warning score system (EWSS). The longer and more experience gained, the knowledge will also increase. The length of work experience will allow the development of nurses' knowledge due to the variety of patient cases in emergency conditions encountered over the years<sup>21</sup>.

The information obtained by respondents about EWSS in Table 1 shows that all respondents obtained information from the socialisation of the head of the room during the morning meeting. The way each human being absorbs the information they get is processed in different ways, so that even though the source of information obtained is the same, there are still respondents who have less knowledge about EWSS<sup>22</sup>. This is in line with research conducted by Ernawati et al., (2022) which states that the absorption of information conveyed depends on the type of senses involved in the process of receiving messages.

The results of research conducted on 34 nurse respondents in the NICU Room of Dr Soeradji Tirtonegoro Klaten General Hospital obtained data in table 3 that most respondents had sufficient knowledge about EWSS, namely 15 respondents (44.12%) and good knowledge, namely 14 respondents (41.18%), with the highest mean value on EWSS knowledge items and low mean value on items on how to apply EWSS. Based on the results of research conducted by Nawang ningrum , it states that nurses' knowledge in assessing the early warning scoring system is supported by the level of education, work experience, and training in the form of educational background of DIII and S1 graduates, length of experience, knowledge of experience, and competence from training<sup>23</sup>.

The respondent's working period is also one of the factors that can affect the respondent's knowledge about the early warning score system (EWSS) where table 2 shows that respondents who have worked for more than 15 years as many as 7 respondents (20.59%) all have good knowledge. The experience as a source of knowledge is a way to obtain the truth of knowledge by repeating the knowledge gained in solving problems faced in the past. Learning experiences at work that are developed provide professional knowledge and skills and learning experiences while working will be able to develop the ability to make decisions which is a manifestation of the integration of scientific and ethical reasoning starting from real problems in their field of work<sup>24</sup>.

The educational background of respondents where most respondents have a bachelor of nursing education background as many as 22 respondents (64.71%). The education is an effort to develop personality and abilities inside and outside school and lasts a lifetime. Education affects the learning process, the higher a person's education the easier it is for that person to

receive information. Table 2 shows that of the 14 respondents who had good knowledge, all of them were compliant in implementing EWSS (51.85%). Of the 15 respondents who had sufficient knowledge, most respondents were compliant in implementing EWSS as many as 13 respondents (48.15%). Respondents with poor knowledge were less compliant in implementing EWSS, namely 5 respondents (71.42%).

In this study, the correlation coefficient value was 0.659, which means that it has a strong level of relationship, while the  $p$  value  $< 0.001 < 0.05$ , so  $H_a$  is accepted, so it can be concluded that there is a relationship between nurses' knowledge about the early warning score system (EWSS) and compliance with the implementation of EWSS in the NICU room of Dr Soeradji Tirtonegoro Hospital, Klaten. According to the researcher's assumption, the results showed that the knowledge possessed by respondents could affect respondents' compliance in implementing EWSS, this happened because with good knowledge, respondents would understand information and insights about EWSS well, so that respondents could apply it to patients as well. The results of this study indicate that the better the knowledge, the more compliant the nurses will be in implementing EWSS. This can reduce infant mortality Research conducted in New Zeland stated that the implementation of EWSS was able to significantly reduce the incidence of cardiac arrest in hospitals. In the Asian population, it was also found that EWSS significantly reduced the incidence of in-hospital cardiac arrest<sup>25</sup>.

### **Conclusion:**

The results showed that there was a relationship between the nurse's knowledge factor and compliance in the implementation of the Early Warning Score System in the NICU Room. The better the nurses' understanding of the EWSS, the higher the compliance with the implementation of the EWSS. Lack of understanding and non-compliance in the implementation of EWSS can negatively impact the ability to detect early critical conditions of patients, potentially increasing the risk of adverse events. This study recommends the development of educational programmes and routine supervision systems to strengthen nurses' compliance with EWSS, so that the quality of health services and patient safety can be better ensured.

### **Ethical Considerations**

This study was approved by the Institutional Review Committee of Universitas Muhammadiyah Klaten (Code: 190/ECL/2024), and formal permission was granted from the Ward Office. Informed consent was obtained from the respondents before data collection.

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### **Authors Contribution**

Conceptualization: Arlina Dhian Sulistyowati; Methodology: Elsy Yulita Sari; Investigation: All authors; Data curation: Fitri Suciana; Formal analysis: Puput Risti Kusumaningrum; Writing of the original draft: Devi Permatasari; Review and editing: All authors.

### **Conflict of interest:**

There is no conflict of interest in this research.all members of the research team have the same interest in disseminating the results of this study to the public so that it can be utilized.

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