IMPLEMENTATION OF EARLY WARNING SYSTEM IN NURSING WARD: A NARRATIVE REVIEW

By Meli Diana

Review Article

IMPLEMENTATION OF EARLY WARNING SYSTEM IN NURSING WARD: A NARRATIVE REVIEW

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Abstract

Hospital service is a process that involves all elements in the hospital including nurses and inpatient rooms or nursing wards. Different inpatient conditions will be treated in separated wards, by the same token patients with unstable conditions are admitted in intensive care units, this procedure aims to reduce the mortality incidence due to sudden cardiac arrest, therefore early detection of patients' clinical deterioration using the early warning score system performed by the nurse in the nursing wards is required. This review aims to describe the importance of the early warning system in the nursing wards. The data was obtained from international journal providers s from data base search based on Scopus, Ebscohot: CINHL, Proquest, Springerlink, Google scholar, and Midline. We used the keyword "Early Warning System" or "Early Warning Score" with a search range in 2016-2021. The search results in 127 articles. Language selection was performed as all journals found were in English. Here, we will review 10 articles. Implementation of early warning score in nursing ward is expected to improve the quality of service to patients and reduce the mortality rate. Early detection clinical emergency or known as the Early Warning Score System (EWSS) is the application of a scoring system for early detection of patient's condition before a worsening situation occurs. The implementation of this scoring system is necessary due to the high rate of deterioration of patient conditions that requiring immediate management to prevent profound deterioration and its subsequent adverse effect.

Keywords: *Early warning system, nurse care, literature review.*

INTRODUCTION

Hospital service quality could affect patient morbidity and mortality (Kemenkes RI, 2017). Indicators of health services quality including patient safety, effectiveness, patient-centered, punctual, efficient and ensure the welfare of services. The existence of these indicators means that the hospital has an important role in the prevention and management of patient conditions alteration (Kemenkes RI, 2017).

Hospital service is a process that involves all elements in the hospital including nurses and inpatient rooms or nursing wards. Different inpatient conditions will be treated in separated wards, by the same taken patients with unstable conditions admitted in intensive care units, this procedure aims to reduce the mortality

incidence due to sudden cardiac arrest (Taenzer, 2011). "If life-threatening conditions are could be managed early or prevented, patients' output could be better" (Fox, 2015).

Quality improvement related to patient safety in the hospital performed by implementing the Early Warning System (EWS) in the hospital's inpatient wards (Dean, 2018). Early detection of clinical emergency or known as the Early Warning Score System (EWSS) is the application of a scoring system for early detection of a patient's condition before a worsening situation occurs (Duncan & McMullan, 2012).

Early Warning System (EWS) is a system that focuses more on conditions before an emergency occur in patients, therefore this system is applicable in all nursing wards. The Early Warning Score System (EWSS) established based on the patient's vital signs and the effectiveness of its use adjusted to each user; therefore, data tools can implement based on patient's condition treated in their respective care unit (Kyriacos U, Jelsma J, James M, Jordan S, 2014).

Systematic EWSS implementation is expected to be able to improve patients quality of service and to reduce mortality, especially due to cardiac arrest. Nurses are health personnel with the longest contact duration with patients. Hence, patient safety depends on how nurses recognizing and initiate intervention in a timely fashion.

The highest rate of patient safety incidents occur in inpatient wards due to nurses' lack of compliance in initiating and performing intervention procedure based on SOP (Pagala & Shaluhiyah, 2017). A study conducted by Subhan et al (2018) at RSUP Dr. Hasan Sadikin Bandung showed that EWS observations that was not performed or implemented inconsistent with the SOP due to the limited health provider resouces, that caused the suboptimal patient – health provider ratio, increasing nurse's workload, and possibly due to nurse's lack of awareness of the importance of EWS implmentation.

It is important for nurses understand and competent in assesing patients with worsening or critical conditions to reduce the mortality rate. Nurse have a crucial role in providing nursing services to patients, as nurses have the longest time to interact with the patient. Nurses also play a vital role in patient safety because the nurses' timely assessment and intervention can improve patient safety. Therefore, adequate knowledge and skills in identifying signs of patient's deterioration are mandatory for nurses.

DEVELOPMENT
Hospital Service

Health services are a series of activities related to the safety of one's body and life. The quality of health services may affect the level of patient' satisfaction, therefore hospitals have to eatablish programs in an effort to improve health services to increase the quality of hospital services. The hospital is an integral part of a social and health organization that functions as a provider of comprehensive services, disease prevention and management; or community prevention measures. According to Indonesian law no. 44 of 2009, the hospital has a function as the maintenance and improvement of individual health through comprehensive second-level health services and second-level according to medical requirements, the hospital also functions to provide medical treatment and health recovery services in accordance with hospital service standards, the hospital also functions to provide education and training for human resources in the context of increasing the ability to provide health services, the hospital also functions to conduct research and development, as well as technology screening in the health sector in order to improve health services by taking into account the ethics of science in the health sector.

Hospitalization

Hospitalization is a process of patient care carried out by health workers due to certain disease, a patient is treated in a hospital ward.

Nursing wards are rooms dedicated for patients care.

Hospital and Medical Service Standards

Hospital service standards currently implemented including administration and management, medical services, emergency services, intensive services, operating theatres, high risk assesment services, nursing services, anesthesia services, radiology services, facility maintenance, libraries, infection control, Central sterilizing services, nutrition services, laboratory services, medical rehabilitation services, pharmaceutical services, work safety, fire, disaster alert. Meanwhile, medical service standards are standards used to improve the quality of hospitals to be more effective and efficient.

Early Warning Score

Early Warning Score is a ranking score employed during patients care services, performed and recorded by the nurse. The nurse will record vital signs using the EWS instrument. The instrument used is an additional instrument that is useful to detect worsening patients, especially in patients who are treat in nursing wards. This system is a scoring system employed by nurses in the medical surgical unit before emergency conditions occurs.

Early Warning Score is a clinical instrument designed specifically to prevent patient clinical deterioration. The untilization of EWS increased in order to detect early deterioration of the patient's condition by categorizing the severity of a disease.

The Early Warning System (EWS) has shown to be an exceptionally effective system for detecting patients who are at risk run into deteriorating clinical conditions or death. Used properly, EWS will encourage the earliest possible treatment, so that it may improve patient outcomes (Suwaryo, 2019)

The parameters used by the EWS are respiratory rate, oxygen saturation, systolic blood pressure, pulse, temperature, level of consciousness (ACVPU) and then calculated and assessed. The parameters are varied, the score will be assesed when patient admitted, that obtained score can used as a reference for nurses to perform appropriate interventions.

Ample studies on the Early Warning System (EWS) have been conducted. We obtain literatures from data base search based on Scopus, Ebscohot: CINHL, Proquest, Springerlink, Google scholar, and Midline. We used the keyword "Early Warning System" or "Early Warning Score" with a search range in 2016-2021. The search results in 127 articles. Language selection was performed as all journals found were in English. Here, we will review 10 articles.

The following are the study results revuewed in this article, we can see in table 1.

Table 1. Research Originality on EWS Instrument Development Research.

No	Title (Authors, Year)		Study Method		Study Results
1	*Derivation and Validation Of A Risk Score For Predicting Mortality Among Inpatients Following Rapid Response Tea, Activation*	D	Cohort		1. The accuracy of the risk-weighted score is measured based on the UC and the performance characteristics for the various cut-off scores
		S	1151 consecutive RRT activations involving 800 tertiary adult inpatients		
		V	Patient characteristics trigger and act of RRT and mortality		

	(White, Kyle ; Bernard and Scott, 2019)	I	Medical records, death lists and NEWS	2.	Validated risk scores estimate the risk of death post RRT with an accuracy of more than 80% helping identify patients whose targeted rescue care improves survival.
		A	Multivariable risk prediction regression model		
2	*Less is more: the design of early-warning scoring systems affects the speed and accuracy of scoring* (Christofidis et al., 2015)	D S V I A	Quantitative 47 Respondences Scoring system design Participant response time and error rates Obsevation NEWS Paper based graphic chart SPSS		An early warning scoring system may be more effective without an individual vital sign scoring line. Even when charts are designed by a multidisciplinary team of human factors specialists and physicians, empirical evaluation is essential
3	*How do nurses use early warning scoring systems to detect and act on patient deterioration to ensure patient safety? A scoping review* (Wood C, Chaboyer W, Carr P, 2018)	D S V I A	Scooping Review Literature search was performed using the following medical subject headings: physiological, clinical deterioration, and the expanders early warning score system, nurse attitudes, with Boolean operators in Ovid MEDLINE, CINAHL, and EMBASE databases. - - Extracted data included study aims, key findings, afferent/efferent focus and rapid response team description. Effective practice and organisation of care taxonomy guided data synthesis, before a thematic analysis was perform.		Nurses aim to use early warning score systems to detect deterioration and ensure patient safety, however cultures, confidence and past experiences impact on rates of afferent limb failure globally. Simple to follow algorithms used in track and trigger charts are likely difficult for nurses to adhere to due to heavy workloads and challenges in getting medical officers to review within recommended time frames. Nurses rely heavily on the scores generated by early warning score systems but should aim to follow algorithms better and undertake holistic physical assessments to detect deterioration earlier and ensure patient safety is not compromised.
4	*Multicentre, Randomised Intervention Study Of The Paediatric Early Warning Score: Study Protocol For A Randomised Controlled Trial Claus Sixtus*	D S	Multicenter, randomized, controlled clinical intervention study. Pediatric patients in four pediatric departments, four emergency and pediatric assessment units, one		The PEWS Central Denmark Region is superior to Bedside PEWS in terms of reducing unplanned transfers of hospitalized children to intensive care units and

	(Jensen *et al.*, 2017)		emergency unit [2] and a dedicated pediatric unit for children with neurological diseases in the Central Denmark Region, including in both university hospitals, and several regional hospitals	[2] transfers from regional hospitals to university hospitals due to clinical deterioration requiring intensive pediatric closeness.
		V	-	
		I	Central Danish PEWS and Canadian Bedside Pediatric Early Warning Score 1. Logistic regression (PEWS main outcome) 2. chi-square [17] (categorical data) 3. Mann-Whitney U test (Continuous data not [2] normally distributed	
		A	Descriptive statistics will be calculated to describe baseline variables and clinical characteristics, using STATA version 10 software	
5	[11] *Early Warning Scores: Unravelling Detection and Escalation* (Smith, 2015)	D	Qualitative	[11] Wrong EWS choices or poorly understood EWS escalations can result in unnecessary workloads to pass on and staff to respond.
		S	-	
		V	Outcome of cardiac arrest patients	
		I	NEWS and VIEWS	
		A	-	
6	[14] *Introduction of An Electronic Physiological Early Warning System: Effects on Mortality and Length of Stay* (Dawes *et al.*, 2014)	D	Observational	[15] The introduction of electronic [13] alerts did not reduce mortality when adjusted for disease severity determined by physiological variables. Predictive performance not improved by the results of biochemical variation and morbidity.
		S	3184 patient physiological data (admi [15], moving, discharged) in the acute medical unit and Worth Hospital, UK were collected from Vital PACTM electronic alert software in February - July 2010	
		V	Mortality rate	
		I	Early Warning Score: Whorthing Electronic Physiological Scoring System (PSS)	
		A	Poisson Regression Logistic Regression	
7	[12] *Nurses' Knowledge Of Early Warning Score At A Private Hospital In Eastern Indonesia*	D	Quantitative	This study revealed that most nurses (81.25%) were at the level of adequate in regard with their knowledge of EWS.
		S	Total of 48 nurses at a private hospital in Eastern part of Indonesia were recruited in this study	

	(Olang J, Juniati, M,2018)	V	Nurse's knowledge of the EWS	Further study is recommended to explore nurse's compliance on EWS implementation in hospital and how it is associated with patients' deterioration conditions
		I	Questionnaire that consisted of demographic data and knowledge of EWS	
		A	Descriptive analysis	
8	*The Effect of Nursing Early Warning Score System (NEWSS) Based Application on Reducing Frequency of Emergency Cardiac Arrest: A Case Study of Pelamonia Hospital, Makassar* (Nusdin, Handayani T, 2019)	D	Quasy Experiment	The system is effective in reducing the frequency of emergency cardiac arrests. Nurses need to been considered this strategy to reduce the frequency of emergency cardiac arrest.
		S	40 patients	
		V	NEWSS dan Reducing Frequency of Emergency	
		I	NEWSS assessment	
		A	The Mann-Whitney	
9	*Early Warning Systems* *(Georgaka D, Mparmparousi M, 2012)*	D	Literature Review	there has been significant research within the medical community regarding the prevention of clinical deterioration among hospital patients. The detection and management of deteriorating ward patients is a highly complex process influenced by a variety of factors. Early detection and intervention through early warning systems (EWS) are essential to prevent serious, often life-threatening events, as they have already shown promising results in significantly lowering mortality rates.
		S	1695 patients, 300 emergency patients. 499 admissions from the ED were under the review. The final analysis contained 280 participants.	
		V	EWS	
		I	-	
		A	Descriptive	
10	*Knowledge and Skill in Relation to the Speed and Accuracy of the Nurses When Assessing Using an Early Warning System (EWS)* (Nur, Nursalam, Ahsan, 2020)	D	*Research and Development (R & D)*	The nurse's knowledge and skill have a stronger relationship with accuracy when assessing using the EWS when compared to the nurses' speed. The nurse's knowledge about the EWS and the nurse's skill needs to be improved in order to support the increased speed and accuracy needed by the
		S	104 nurses who served in IRNA 1 RSUD Dr. Saiful Anwar Malang.	
		V	Nurses knowledge of EWS and nurse's ability to use EWS instrument	
		I	NEWS2	
		A	Descriptive	

nurses when assessing patients using the EWS. The development of an appropriate method needs to been done to improve the nurses' knowledge and skill related to the EWS.

DISCUSSION

Early detection of clinical emergency or known as the Early Warning Score System (EWSS) is the application of a scoring system for early detection of a patient's condition before a worsening situation occurs (Duncan & McMullan, 2012). This system focuses more on the situation before an emergency condition is occur, hence this system is applicable in all nursing care wards. The Early Warning Score System (EWSS) established based on the patient's vital signs and the effectiveness of its utilization adjusted to each user, therefore the data tools may employ based on the patients been treated in their respective care unit (Kyriacocos U, Jelsma J, James M, Jordan S, 2014).

Factors that influence the use of EWS according to Odell (2015) include the work culture of the inpatient room, the division of labor of nurses, skills, and knowledge of nurses. Stafseth (2016) said that the EWS was very helpful for nurses in recognizing the worsening of the patient's condition. However, the implementation of EWS is still not optimal, as evidenced by the results of study conducted by Desy (2017) at a private hospital in Indonesia that 100% of nurses who do not implement EWS according to the algorithm. A similar study at Saiful Anwar Hospital Malang on 20 nurses and found that as many as 75% of nurses experienced difficulties in implementing the EWS, 50% made mistakes when completing the EWS instrument, 50% made mistakes in interpreting the EWS instrument (Nur, Nursalam, Ahsan, 2020). Meanwhile, research conducted by Hutabarat (2020) at the Friendship Respiratory Referral Center Hospital Jakarta found that 24% of nurses said they did not carry out EWS in accordance with the SPO.

Connolly (2017) states that the EWSS implementation process must be give attention to get better outcomes. The successful implementation of the EWSS must be adjust to the type of inpatient room where this system will be applied. The introduction of the use of the EWSS focuses on the perception and action of nurse needs to be socialize in order to reduce the knowledge gap about the application of the EWSS. Patient safety training needs to be provided to nurses to improve patient safety implementation (Yulia, Hamid, Mustikasari, 2012). Many patients treated in nrsing wards experiences worsening conditions that requiring immediate management to prevent profound deterioration and its subsequent adverse effect (Suwaryo, 2019).

DECLARATION OF CONFLICTING INTEREST

None.

AUTHOR CONTRIBUTION

Meli Diana: Main author of the literature review and source search used for article writing.

Dimas Hadi Prayoga: Looking for the sources used to write and supervised the work of systematic literature review.

Dini Prasetyo Wijayanti: Looking for the sources used to write and supervised the work of systematic literature review.

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