



The Impact of Early Warning Sign (EWS): Perception of Nursing Staff at Aster Sanad Hospital, Riyadh City, Kingdom of Saudi Arabia

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Abstract

Background: Early Warning Sign (EWS) is a tool made up of vital signs chart and scoring to identify clinical decline and early detection of abnormal condition in regard with patients at hospital. However, it is still unclear how the tool impacts nurses' perception and reaction.

Aim: To explore hospital nurses' perceptions and reactions to EWS

Methods: A descriptive cross-sectional study with convenience sampling enrolled 88 nurses in Aster Sanad Hospital during the period from November 2021 until February 2022. Electronic-based questionnaires were distributed to the nurses in English language. The questionnaire consisted of nurse's characteristics and their perceptions about EWS. Data analysis was interpreted in descriptive and inferential analysis by using Statistical Package for the Social Sciences (SPSS) version 21.0.

Results: The overall perception gained by study participants was encouraging since the vast majority of them (n=82; 93.2%) answered positively toward EWS. The majority of respondents agreed with the statements of that they are aware, confident and competent regarding EWS criteria. Most of the nurses mentioned that EWS is meaningful in identifying patient deterioration in different ways as increasing patient safety (n=50; 56.8%), reducing unplanned ICU transfer (n=50; 56.8%), preventing deterioration to code blue (n=46; 52.3%), and further deterioration to death (n=44; 50%). Also, most of the nurses stated they received enough training and education about EWS criteria and capable to train and teach it. Moreover, the highest perception scores towards EWS were encountered among supervisors as well as obstetric and gynecological wards nurses (P. value= 0.008), master degrees (P. value = 0.025) and more than 5 years experienced nurses (P. value = 0.045).

Conclusion: The vast majority of our nurses showed positive perception to EWS criteria, and agreed with EWS criteria are meaningful and significant in identifying patients deterioration, as well as, they recommend other hospital to implement it.



Introduction

Early Warning Signs (EWS) Score systems are based on seven parameters using an assessment of the patient's physiological response. The seven parameters include respiration, systolic blood pressure, temperature, pulse, oxygen saturation, additional oxygen, and the level of patient awareness [1]. Patient safety relies on nurses' timely assessment and actions. Thus EWS has been recommended and implemented to enhance patient safety by ensuring that patient deterioration is recognized and addressed in health care [2,3].

Deterioration is a risk to all in hospital patients and includes the risk of suffering a Serious Adverse Event (SAE) such as cardiac arrest, unplanned admission for intensive care, and unexpected death. The majority (84%) of patients have abnormal vital signs prior to SAE, suggesting that some can be prevented if abnormal vital signs are detected and acted upon by nurse and clinicians [4].

Kruissel brink et al in Uganda found that after using the EWS, the mortality rate of patients' critical illness in 7 days was only 5.5% and 41.4% of the patients could be discharged. This also showed that EWS contributes greatly to improve the quality of health services [5].

A previous study conducted by Janwar O et al recruited 48 nurses at a private hospital in Eastern part of Indonesia, revealed that nurses' knowledge about EWS significantly influenced their actions. In this case, related to patients' management [6].

Despite the use of the EWS, there are still problems in nurses' detection of patient deterioration and of errors in the EWS and non-adherence to referral protocols has been highlighted. It is argued that the effectiveness of the EWS is dependent on its users [3]. Factors influencing the use of the EWS have been highlighted, such as motivation, clinical relevance, meaningfulness [7], recording of vital signs, communication, practitioner engagement [8], ward culture, staffing, skills and knowledge [9].

Although there are some studies of the EWS implementation process [7,10,11], little is known about how hospital nurses perceive and react to the EWS in clinical practice and how the working context. By exploring the introduction of the EWS to nursing practice, with a focus on nurses' perceptions and reactions as potential factors that affect the use of such a system, gaps in knowledge of the implementing the EWS system will be illuminated. Therefore, the aim of this study was to assess hospital nurses' perceptions to EWS at Aster Sanad Hospital in Riyadh, KSA.

Methods

Sample and participants

The study was carried out using a quantitative approach, involving a cross sectional study from November 2021 until February 2022. There were 88 nurses involved from Aster Sanad Hospital in Riyadh, KSA. The convenient sampling method is used in this study with inclusion criteria of the nurses that include work in the wards that utilizes EW.

Data collection

Data collection was conducted through electronic-based questionnaires consist of two parts. Part A involves socio-demographic data on years of experience, area of practice and educational level. Part B of the questionnaires contained queries

regarding statements related to EWS.

The answers on self-perceived 21 perception items were reported in 5-choices categories such as "strongly disagree", "disagree", "neutral", "agree", and "strongly agree" and scaled from 0 to 5. Then, perception assessments was performed by using Likert's scaling system as follow: positive perceptive (promoter) (scores: 71-105), neutral perceptive (passive) (scores: 36-70) and negative perceptive (detractor) (scores ≤ 35).

Ethical considerations

The study was approved by Committee from Aster Sanad Hospital. Participant's anonymity and guaranteed confidentiality of any delivered information were emphasized as well as insurance about declining participation would not have managerial consequences.

Data analysis

Data was analyzed by using a computer program Statistical Package for Social Sciences (SPSS V. 21.0). The analyzed data presented in tables and figures designed by Microsoft Excel 2010. Frequencies with proportions (percentages) were reported for categorical variables and means with Standard Deviations (SDs) were reported for continuous variables. One-way ANOVA was used to compare the perception score's mean values between more than two independent categorical variables. All P. value considered as significant if less than 0.05.

Results

In total this study recruited 88 nurses and their working units were detailed in **Figure 1**.

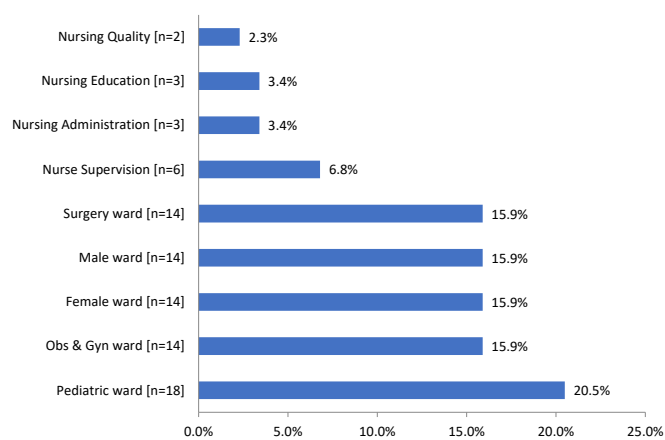


Figure 1: The distribution of nurse's units (N=88).

Figure 2 revealed that, 54(61%) were registered nurses, 20(23%) were head/administrative nurses and 14(16%) were charge nurses.

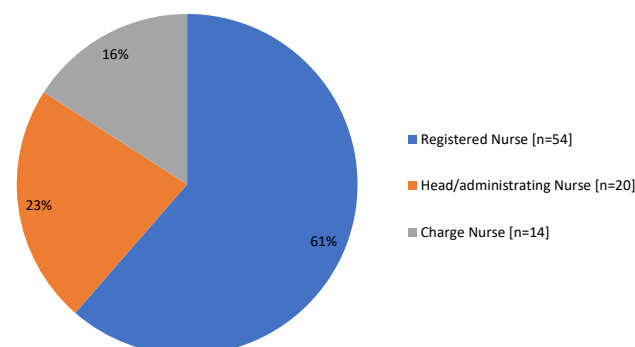


Figure 2: The distribution of nurse's professions (N=88).

As shown in Table (1), the majority of the nurses had diploma degrees (n= 53; 60.2%) and more than 5 years working experience (n= 56; 63.3%).

Table 1: The education degrees and experience years of nurses (N=88).

	N	%
Degree		
• Diploma	53	60.2
• Bachelor	32	36.4
• Master	3	3.4
Years of experience		
• 1-3 years	12	13.6
• More than 3 to 5 years	20	22.7
• More than 5 years	56	63.6

Table 2 showed the nurse's perceptions toward EWS, in technical aspects the majority of the participants mentioned they aware about EWS policy and procedure (n=44; 50%) and the

action for each EWS score (n=46; 52.3%), able to interpret EWS criteria (n=55; 62.5%), confident enough to utilize EWS criteria (n=45; 51.1%), fully engaged with EWS criteria (n= 53; 60.2%), competent to complete EWS documentation (n=54; 61.4%), competent enough to escalate EWS score if met its criteria (n=5; 64.8%) and competent enough to follow each intervention based on EWS criteria (n=57; 64.8%). Concerning to patient's related aspects, the majority of the respondents agreed with that EWS criteria increase patient safety (n=50; 56.8%), reduce unplanned ICU transfer (n=50; 56.8%), prevent deterioration to code blue (n=46; 52.3%), prevent further deterioration to death (n=44; 50%), and not prefer follow patients vital sign records without EWS (n=37; 30.7%). According to the training and educational aspects, the most of the nurses stated they were received enough training of EWS criteria (n=56; 63.6%), interested to share their experience in EWS criteria (n=48; 54.5%), capable to training EWS as a speaker (n=36; 40.9%), confident to teach EWS to new staff (n=48; 54.5%), recommend other hospital to implement EWS (n=51; 58%), and nursing quality provide them with the appropriate feedback with the knowledge and skills during the audit (n=53; 60.2%).

Table 2: The nurses perceptions to Early Warning Signs statements (N=88).

Statements	Strongly disagree N (%)	Disagree N (%)	Neutral N (%)	Agree N (%)	Strongly agree N (%)
Technical perceptions					
Aware of EWS policy and procedure	0(0)	0(0)	0(0)	44(50)	44(50)
Aware for action for each EWS score	0(0)	0(0)	3(3.4)	46(52.3)	39(44.3)
Able to interpret EWS	0(0)	0(0)	3(3.4)	55(62.5)	30(34.1)
Confident enough to utilize EWS	0(0)	0(0)	2(2.3)	45(51.1)	41(46.6)
Fully engaged with EWS	0(0)	1(1.1)	5(5.7)	53(60.2)	29(33)
Competent to complete EWS documentation	1(1.1)	0(0)	4(4.5)	54(61.4)	29(33)
Competent enough to escalate EWS score if met its criteria	0(0)	0(0)	1(1.1)	57(64.8)	30(34.1)
Competent enough to follow each intervention based on EWS	0(0)	0(0)	4(4.5)	57(64.8)	27(30.7)
EWS consume the nursing care time	15(17)	0(0)	8(9.1)	45(51.1)	20(22.7)
Nurses follow EWS just to comply policy and procedure instead of patient safety	25(28.4)	0(0)	12(13.6)	34(38.6)	17(19.3)
Patient's related perceptions					
EWS increase patient safety	0(0)	0(0)	1(1.1)	37(42)	50(56.8)
EWS reduce unplanned ICU transfer	1(1.1)	0(0)	3(3.4)	50(56.8)	34(38.6)
EWS prevent deterioration to code blue	0(0)	0(0)	1(1.1)	46(52.3)	41(46.6)
EWS prevent further deterioration to death	0(0)	0(0)	1(1.1)	43(48.9)	44(50)
Prefer to follow patients vital sign without EWS	37(30.7)	0(0)	15(17)	24(27.3)	22(25)
Training and education perceptions					
Received enough training of EWS	0(0)	3(3.4)	3(3.4)	56(63.6)	26(29.5)
Interested to share the experience in EWS	0(0)	0(0)	11(12.5)	48(54.5)	29(33)
Interested to training EWS as a speaker	0(0)	15(17)	19(21.6)	36(40.9)	18(20.5)
Confident to teach EWS to new staff	0(0)	1(1.1)	9(10.2)	48(54.5)	30(34.1)
Recommend other hospital to implement EWS	0(0)	6(6.8)	8(9.1)	51(58)	23(26.1)
Nursing Quality appropriate to feedback with the knowledge and skills during the audit	0(0)	2(2.3)	6(6.8)	53(60.2)	27(30.7)

As demonstrated in **Table 3**, by using Likert's scaling system, the average perception scores of our study group was 86 points (range= 61-105 points), and the vast majority of them 82(93.2%) were positively perceptive toward EWS criteria (**Table 3**).

Table 3: The nurse's perception scores by Likert's scaling system (N=88).

	Average	Minimum – Maximum
Total perception scores (out of 105 points)	86	61 – 105
Positive perceptive (Promoter) (TS: 71-105); n(%)	82(93.2)	
Neutral perceptive (Passive) (TS: 36-70); n(%)	6(6.8)	
Negative perceptive (Detractor) (TS: ≤35); n(%)	0(0)	

The correlation between nurse's characteristics and perception scores illustrated in table (4), in which the highest scores were significantly associated with supervisors as well as obstetric and gynecological wards nurses (P. value= 0.008), master degrees (P. value = 0.025) and more than 5 years experience (P. value = 0.045).

Table 4: The correlation between perception scores and nurse's characteristics.

	Mean	SD	P. value
Units			
• Obs & Gyn	94.2	8.5	0.008 ^a
• Female ward	87.7	8.2	
• Pediatric ward	83.3	9.3	
• Male ward	87.8	8.6	
• Surgery ward	86.6	7.8	
• Nursing education	82.3	9.0	
• Nurse supervisor	94.5	1.0	
• Nursing quality	78.6	6.4	
• Nursing administration	87.3	5.5	
Profession			
• Registered nurse	87.4	8.9	0.887 ^a
• Charge nurse	86.8	10.7	
• Head and administrating Nurse	86.2	8.1	
Degree			
• Diploma	85.2	8.6	0.025 ^a
• Bachelor	89.4	9.2	
• Master	95.7	3.8	
Years of experience			
• 1-3 years	85.6	8.2	0.045 ^a
• More than 3 to 5 years	87.7	9.5	
• More than 5 years	92.4	10.2	

Discussion

This study explored hospital nurses' perceptions and reactions to EWS in the working context among 88 respondents. In general, the overall perception gained by study participants was encouraging since the vast majority of them (93.2%) answered positively toward EWS, which is indicating EWS showed to be important to the nurses in different traits. This is in line with findings of recent Swedish study of Spångfors M et al who also reported that the nurses positively perceptive toward EWS criteria in their hospitals [12].

The effectiveness of EWS is dependent on user engagement with the tool and compliance [3]. Technical wise, the majority of our study respondents agreed with the statements of that they

are aware, confident and competent regarding EWS policies, utilization, documentation, interpretation, engagement and also escalating, this condition is probably caused by the nurses' initiative to participate in internal training. Therefore, training is needed to improve the level of knowledge of the nurses which eventually generates good quality professional nurses. This is a huge concern as the nurses are part of healthcare delivery team, so they need to become knowledgeable and aware about EWS to prevent medical malpractice or promote better care for patients. Although, Ludin S identified that the nurses in her study were lacked knowledge in EWS scoring and consequently detecting the risk of deterioration by patient's condition. The researcher suggested that nurses must improve their skills and awareness on EWS criteria [13].

On the other hand, it is important to note that more than one-half of the nurses (51.1%) stated EWS consume the nursing care time, and this could be attributed to their busy schedule or presumably maybe due to the lack of understanding EWS criteria as reported in the study of Anati L and Salizar M in Malaysia [14], and this issue should be considered by nursing staff administration.

EWS has been recommended and implemented to enhance patient safety by ensuring that patient deterioration is recognized and addressed in health care [2,3]. This fact was confirmed in this study since the most of the nurses stated that EWS is meaningful and significant in identifying patient deterioration in different scopes such as increasing patient safety, reducing unplanned ICU transfer, preventing deterioration to code blue and even the death. Consistently, Jørghild K et al found that the overall perception gave by the nurses was they have a strong commitment to EWS criteria and scores to achieve optimal patient safety and thus prevent deteriorations [3]. Also, nurses in the study of Caroline S et al mentioned that the EWS criteria are expressive and important in identifying patient deterioration [15]. In systematic review of Saab M et al who analyzed 10 studies, the perception of nurses is that EWS scoring is important to detect patients' health problems, then, to identify the intervention needed to reduce the incidences of medical emergency and serious adverse events of patients [16].

For no doubt, training and education are corner-stones for any medical management and intervention. Therefore, it is important to improve the practice on EWS among nurses through training or further information/ education provided by institution or hospitals. Most of the nurses in our study stated they were received enough training and education about EWS criteria and they capable to train and teach this criteria. Also they underlined the particular utility value of EWS for new and inexperienced nurses by sharing their experiences and described it as a tool that could enable them to more readily identify patient's condition. These observations were consistent with the findings of Jørghild K et al study [3].

Significantly, the present study showed that, the highest perception scores towards EWS were encountered among supervisors, advanced educational degree (Master Degree), and more than 5 years experienced nurses (P. value<0.05). These findings were in agreement with the studies of Peter G et al [17] Mackintosh et al [18] in United Kingdom those reported that the senior/supervisor nurses more tend to have positive attitude and perceptions towards EWS. In same line, Janwar O et al reported good knowledge and perceptions to EWS was associated with longer experience years above 2 years [6].

When categorizing nurses according to their workplace's and units, this study showed positive EWS perceptions were associated with obstetric and gynecological wards nurses (P. value < 0.05). However, Spångfors M et al reported the good adherence and positive perceptions to EWS were highest in surgery and orthopedics and lowest in the cardiac high dependency unit [12].

The limitations of this study could be summarized in single-center study design that could not permit us to generalize these findings. Also, we did not examine the direct influence of EWS practicing on patients outcomes, therefore further studies are needed to examine the actual effects of this criteria on patients by measuring incidences of death and adverse side effects among them.

Conclusion

The present study concluded that, the vast majority of our nurses were positively perceptive toward EWS criteria, and agreed with EWS criteria are meaningful and significant in identifying patients deterioration, as well as, they recommend other hospital to implement it. Moreover, the highest perception scores towards EWS were encountered among supervisors, obstetric and gynecological wards nurses, advanced educational degree (Master Degree), long experience years above 5 years. Furthermore, sustainable nurses training of modified and updated EWS criteria are recommended to ensure knowledgeable, aware and professional nursing staff.

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