Knowledge, Attitudes and Practice of Nurses in Assessing Patients using Early Warning Sign (EWS) Scoring in a teaching hospital in Kuantan Pahang, Malaysia

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ABSTRACT

Introduction: Early Warning Sign (EWS) is a tool made up of vital signs chart and scoring to detect any changes in patient so that immediate and appropriate care can be further determined and provided. The objectives of the study are to assess the level of knowledge, attitudes, and practice of nurses in assessing patient using EWS scoring and to identify association between socio-demographic with knowledge, attitudes, and practice, as well as to determine the associations between knowledge with attitudes, attitudes with practice and knowledge of nurses in assessing patient using EWS scoring. **Methods:** A quantitative cross- sectional study with convenience sampling study was conducted on 132 nurses from medical, surgical and orthopedics wards in Sultan Ahmad Shah Medical Centre (SASMEC) from November 2020 until January 2021. Printed questionnaires were distributed to the nurses in English language. The questionnaire consisted of two parts. Part A was about socio-demographic data (area and on years of nursing practice, & service, area of practice, educational level, as well as whether holding post-basic/ advance course certificate, attending life support training and ICU outreach participant). Part B was about knowledge, attitudes, and practices of EWS. Data analysis was interpreted in descriptive and inferential analysis using Statistical Package for the Social Sciences (SPSS) version 20.0. **Results:** A total of 108 respondents involved in the study represents 82% response rate. Majority of respondents scored low in knowledge questions with grade F (n=106, 98.3%). One respondent scored grade D, correctly answering 8 over 13 questions (62%). Only one respondent obtained grade B with 85% score. Based on the result, there are more participants (n=58, 53.7%) achieving good attitudes while respondents with poor attitudes were (n=50, 46.3%). Moreover, 59 respondents (54.6%) have higher practice level than mean score, indicating good EWS practice. The remaining 49 respondents (45.4%) scored below the mean score cut off point indicating poor practice. The mean values are different depending on working areas in terms of attitudes and practice. The association between attitudes and practice ($r = 0.641$, p-value<0.01) is confirmed having a positive and strong correlation. **Conclusion:** The study revealed that despite having poor knowledge on EWS, the nurses have demonstrated good attitudes and practice in detecting patients' progressive deteriorating conditions; thus, confirming that there are associations in area of practice with attitudes and practice. The results also shows that there is a significant difference between attitudes and practice of nurses in assessing patient using EWS with (p- value< 0.05).

Keywords: Early Warning Sign, Deterioration, Nurses. Knowledge, Attitude, Practice

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INTRODUCTION

Early Warning Sign (EWS) is a tool made up of vital signs chart and scoring to detect any abrupt changes in patient so that appropriate care can immediately be provided. It is a chart that contain seven elements indicating patient's conditions such as blood pressure, pulse, oxygen saturation, oxygen supplement, temperature, pain score and level of consciousness. National Early Warning Score (NEWS) or Early Warning Sign (EWS) was first established by Royal College of Physicians (RCP) in 2012 (1). It was created based on Track and Trigger System in which track means

detecting physiological changes in patient, and trigger as intervention and attendance of medical professionals. The scoring system of the EWS is categorized into three levels which are low, medium, and high risk. Low risk (score below 4) will need nurse response; medium risk (score 5 or 6) needs doctor or physician attention, and high risk (above 6) will require specialists' attention (1). There are various types of EWS such as Modified Early Warning Sign (MEWS), Pediatrics Early Warning Sign (PEWS), Modified Early Obstetrics Warning Sign (MEOWS) and more (2).

Nurses play a central role in the use of EWS systems (3). Most of the time, based on researchers' experience, the frequency to record the vital signs is based on the doctor orders or the patient's condition itself. The nurses must be quick in response or action if the patient's condition is deteriorating. According to Kyriacos and colleagues (4), a variety of vital signs monitoring tools have been introduced across the United Kingdom incorporating early warning scoring (EWS) systems designed to track signs of deterioration and trigger a rapid response to improve patient's safety. Some researchers stated that failure of nurses in realizing the importance of patient's vital signs can cause absences in detailed and holistic care assessment and subsequently caused delay in attending to patients based on their needs of care, which eventually can significantly affect their safety (5,6). This shows that patient's safety cannot be guaranteed if nurses and other medical staffs are unable to give proper treatment at the right time. In addition, failure in recognizing signs of early detection and providing timely response to patients' condition, may lead to their death. The impacts are not only in term of patient complications with mortality outcomes, but also caused variations in failure-to-rescue rates among hospitals (7). Absence of tools that can aid in giving sign for healthcare delivery to initiate care will likely affect the nurses who cannot fully rely on clinical judgment (7). Therefore, the main goal of the study is to assess knowledge, attitudes, and practice of nurses' ability in assessing patients using EWS in SASMEC. This study hypothesized that there should not be any significant association between all the variables. Furthermore, this kind of research is still not being carried out in Malaysia as the EWS is yet widely being applied in hospitals. This can also be a baseline for future research in improving EWS or the nurses' knowledge on EWS so that it can be widely implemented in Malaysia.

METHODS

The study was carried out using a quantitative approach, involving a cross sectional study from November 2020 until January 2021. There were 132 nurses involved from medical, surgical and orthopedics wards in SASMEC, Pahang. The convenient sampling method is used in this study with inclusion criteria of the nurses that include work in the wards that utilises EWS, able to communicate in English or Malay and have working experience of at least 6 months in SASMEC. The reason being is to ensure that the nurses have sufficient experience in doing the scoring and using EWS in the ward. The exclusion criteria were unable to fully co-operate in the research process and nurses who are on extended leave. This study used a set of questionnaires adapted from Ludin (8) assessing on knowledge, attitudes and practices related to the risks of deteriorated patients. The questionnaires were originally adapted and modified based on Donilon (9), Bainbridge et al. (10) and Stenhouse et al. (11)'s works. Both the questionnaires' part A and B relating to EWS were tested with Cronbach's Alpha of 0.956 (7). The sample size was calculated using Raosoft Software based on total number of 200 nurses in medical, surgical, and orthopedic wards. Thus, if 50% of population use EWS, with the margin of error being 5% and confidence level at 95%, the result indicates the required sample size was 132.

Questionnaire

The questionnaires consist of two parts. Part A involves socio-demographic data on years of nursing practice, number of years in service, area of practice, educational level, whether or not attending post-basic/ advanced course certificate, life support training attendance and ICU outreach participant. Part B of the questionnaires contained queries regarding knowledge, attitudes and practices related to EWS. Knowledge assessments in the questionnaires comprise seven items constructed in a table form for the respondents to answer.

The table has seven physiologic parameters such as respiratory rate, heart rate, systolic blood pressure, urine output, temperature, neurologic and oxygen saturation with reading. The respondents must circle range of reading on every parameter that showed risk of deterioration. There were also two items on self-perceived knowledge using Likert scale. On attitudes assessment part, there were 6 items in which first item was about the nurses' level of concern in managing deteriorating patient and the other five items were

self-perceived attitudes. For level of concern, the participants need to tick either yes or no on the ten items listed that will reflect whether they have any concern related to the item. Finally, practice assessment was self-perceived competence in which they need to rate themselves from 0-10 on each of the 13 items. The results on self-perceived questionnaires were reported in categories such as "poor", "moderate", "good" and "excellent" in scale from 1 to 10.

DATA ANALYSIS

Descriptive analyses were done for socio-demographic factors of the nurses. All categories were presented in frequencies and percentage. For knowledge level, the total mark of 13 will be graded by percentage score and sorting into arbitrary grade. The total mark of knowledge level was graded by percentage score and sorting into arbitrary grade.

The descriptive statistics were computed into frequency and percentage. For attitudes and practice assessment, mean score is used as reference in classifying the respondents' response into categories such as good and poor. Inferential analysis was applied to discover association between independent and dependent variables. To determine association between socio-demographic and knowledge, attitudes and practices, One-way ANOVA was used to compare the mean values between more than two independent categorical variables with dependent numerical variables.

To determine the associations between knowledge with attitudes, attitudes with practices and practice with knowledge, person correlation was used to establish the correlation between numerical variables. A p-value of <0.05 was determined as the significant level findings.

PERCENTAGE SCORE (%)	GRADE
100-90	A
89-80	B
79-70	C
69-60	D
59-0	F

Table 1: Arbitrary grading system based on percentage of score

RESULTS

The years of nursing practice are organised in the range of 0-1 year, 2-3 years, 4-5 years, 6-10 years and over 10 years. The highest percentage (n=37, 34.3%) is between 2 to 3 years nursing practice and the lowest (n=6, 5.6%) is over 10 years. Years of working in current specialty are using the same range as the latter variable with the highest (n=45, 41.7%) being 2 to 3 years and the lowest (n= 2, 1.9%) being over 10 years.

Areas of practice for respondents are from three different departments which are medical, surgical and orthopedics in SASMEC. The highest number of respondents is from surgical ward (n=47, 43.5%), followed by medical ward (n=39, 36.1%) and the least is from orthopedics ward (n=22, 20.4%). Despite the education level among the nurses, as stated in the questionnaires, includes diploma, associate degree, baccalaureate, and master or higher, 100% (n=108) of the respondents' education is diploma. None of the respondents have education higher than diploma (n=0, 0%).

Majority of the respondents did not have post-basic or advanced course certificate which were 103 (95.4%) and only 5 (4.6%) of the respondents have attended post-basic or advanced course. Majority of the respondents have attended life support training (n=100, 92.7%). Most of them have basic cardiac life support certificate (n=92, 85.2%) and the least is ACLS (n=2, 1.9%). Some of them have attended more than one life support training (n=6, 5.6%). Only 7.4% of the respondents have not attended any life support training (n=8). Most of the participants did not participate in the ICU outreach (n=76, 70.4%). A minority (n=32, 29.6%) of the respondents had participated in the ICU outreach.

Majority of the participants scored low in knowledge questions which is grade F (n=106, 98.3%). One scored grade D with 8 over 13 correct (62%). Only one scored grade B with 85%.

To categorise good and poor attitudes and practice, the researcher decides to use mean score of the attitudes score as reference. Thus, respondents scoring less than mean score will be categorised as poor and those above the mean score will be categorised as good.

Based on the result, there are more than half of participants (n=58, 53.7%) achieved more than mean score 38.61 (±SD) which portrays good attitudes towards the practice. However, there is also those who did not achieve more than the mean score (n=50, 46.3%).

Variable		Frequency (n)	Percentage (%)
Years of nursing practice	0-1 year	10	9.3
	2-3 years	37	34.3
	4-5 years	28	25.9
	6-10 years	27	25.0
	over 10 years	6	5.6
Years working in current specialty	0-1 year	31	28.7
	2-3 years	45	41.7
	4-5 years	23	21.3
	6-10 years	7	6.5
	over 10 years	2	1.9
Area of practice	Medical	39	36.1
	Surgical	47	43.5
	Orthopedics	22	20.4
Education	Diploma	108	100
Post-basic/ Advance course	Yes	5	4.6
	No	103	95.4
Life support training	Basic cardiac life support	92	85.2
	ACLS	2	1.9
	No	8	7.4
	More than one	6	5.6
ICU outreach	Yes	32	29.6
	No	76	70.4

Table 2: Frequency distribution of participants' Socio-demographic profiles

Total mark (13)	Percentage score (%)	Grading	Frequency (n)	Percentage (%)
0	0	F	26	24.1
1	8	F	22	20.4
2	15	F	6	5.6
3	23	F	14	13.0
4	31	D	11	10.2
5	38	B	22	20.4
6	46		4	3.7
7	54		1	0.9
8	62		1	0.9
11	85		1	0.9

*Descriptive statistics

Table 3: Participants' percentage of score (grade) based on EWS knowledge question

TOTAL SCORE	FREQUENCY (N)	PERCENTAGE (%)
Attitude Level		
<38.61	50	**46.3**
>38.61	58	**53.7**
Practice Level		
<97.28	49	**45.4**
>97.28	**59**	**54.6**

Table 4: Participants' mean score for attitudes and practice in using EWS scoring

There are 59 respondents (54.6%) have higher practice level than the mean score indicating good EWS practice. The score below the mean score cut off point is 49 (45.4%) indicating poor practice.

To compare socio-demographic and knowledge (K), attitude (A) and practice (P)(KAP) of nurses, One-way ANNOVA was used. The data was normally distributed which p-value>0.05 using Kolmogorov-Smirnov. The findings suggested that the mean values do not differ much between years of nursing practice and the participants' KAP (either they are senior staff or junior staff, their KAP score does not shows any significant different) However, there was an association (p-value< 0.05) between area of practice with attitudes and practice of nurses in assessing patients using EWS.

In this study, the area of clinical practice does have an association with nurses KAP. However, the result was only significant among medical and surgical nurses.

Multiple Comparisons

Dependent Variable	Area of practice (I)		Area of practice (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
KNOWLEDGE SCORE	Scheffe	Medical	Surgical	.297	.495	.836	-.93	1.53
			Orthopedics	.107	.609	.985	-1.41	1.62
		Surgical	Medical	-.297	.495	.836	-1.53	.93
			Orthopedics	-.190	.590	.950	-1.66	1.28
		Orthopedics	Medical	-.107	.609	.985	-1.62	1.41
			Surgical	.190	.590	.950	-1.28	1.66
	Bonferroni	Medical	Surgical	.297	.495	1.000	-.91	1.50
			Orthopedics	.107	.609	1.000	-1.37	1.59
		Surgical	Medical	-.297	.495	1.000	-1.50	.91
			Orthopedics	-.190	.590	1.000	-1.63	1.25
		Orthopedics	Medical	-.107	.609	1.000	-1.59	1.37
			Surgical	.190	.590	1.000	-1.25	1.63
ATTITUDE SCORE	Scheffe	Medical	Surgical	4.033*	1.449	**.024**	.43	7.63
			Orthopedics	1.601	1.784	.669	-2.83	6.03
		Surgical	Medical	-4.033*	1.449	**.024**	-7.63	-.43
			Orthopedics	-2.431	1.728	.375	-6.72	1.86
		Orthopedics	Medical	-1.601	1.784	.669	-6.03	2.83
			Surgical	2.431	1.728	.375	-1.86	6.72
	Bonferroni	Medical	Surgical	4.033*	1.449	**.019**	.51	7.56
			Orthopedics	1.601	1.784	1.000	-2.74	5.94
		Surgical	Medical	-4.033*	1.449	**.019**	-7.56	-.51
			Orthopedics	-2.431	1.728	.487	-6.64	1.77
		Orthopedics	Medical	-1.601	1.784	1.000	-5.94	2.74
			Surgical	2.431	1.728	.487	-1.77	6.64

*. The mean difference is significant at the 0.05 level.

Table 5: Association between participants' area of practice and their KAP

Multiple Comparisons

Dependent Variable	Area of practice (I)		Area of practice (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Boun
PRACTICE SCORE	Scheffe	Medical	Surgical	5.141	3.375	.317	-3.24	13.52
			Orthopedics	-7.059	4.154	.241	-17.38	3.26
		Surgical	Medical	-5.141	3.375	.317	-13.52	3.24
			Orthopedics	-12.200*	4.025	**.012**	-22.19	-2.21
		Orthopedics	Medical	7.059	4.154	.241	-3.26	17.38
			Surgical	12.200*	4.025	**.012**	2.21	22.19
	Bonferroni	Medical	Surgical	5.141	3.375	.392	-3.07	13.35
			Orthopedics	-7.059	4.154	.277	-17.17	3.05
		Surgical	Medical	-5.141	3.375	.392	-13.35	3.07
			Orthopedics	-12.200*	4.025	**.009**	-21.99	-2.41
		Orthopedics	Medical	7.059	4.154	.277	-3.05	17.17
			Surgical	12.200*	4.025	**.009**	2.41	21.99

*. The mean difference is significant at the 0.05 level.

Table 5: Association between participants' area of practice and their KAP cont.

To assess association between knowledge, attitudes and practice, Pearson correlation is used to measure degree of relationship between linearly related variables. Based on the result; there was no association between knowledge with attitudes, and practice with knowledge. However, there was association between attitudes and practice (r= 0.641, p- value<0.01) with strong correlation. Table 6 portrays that only participants' attitude shows significant correlation to practice's score.

`		**ATTITUDE (r)**	**PRACTICE (r)**
ATTITUDE	Pearson Correlation	1	.641**
	Sig. (2-tailed)		.000
	N	108	108
PRACTICE	Pearson Correlation	**.641****	1
	Sig. (2-tailed)	**.000**	
	N	108	108

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6: Correlations between attitudes and practice

DISCUSSION

The finding shows that 106 nurses failed and only two nurses passed the test. Thus, this finding may suggest that they have poor knowledge in EWS scoring to detect any deterioration in patient's conditions. This is a huge concern as the nurses are part of healthcare delivery team, so they need to become knowledgeable in preventing medical malpractice or promote better care for patients. This present study consistent with the previous study by, Ludin (8) that identified that the nurses in her study were lacked knowledge in detecting the risk of deterioration by patient's condition. The researcher suggested that nurses must improve their skills on assessing risk of deterioration on patient. Mackintosh et al. (12) held research in United Kingdom using ethnographic methods. In their research, it was evident that the senior nurses tend to use intuitive knowledge (i.e" subjective judgment, gut feeling) in response to early deterioration of patient condition while the junior nurse will depend on the marking of the EWS. Nevertheless, Vincent et al. (7) stated that EWS alleviates the need to simply rely on the nurse's clinical judgment to initiate a response, because they are likely to reduce disagreement in nurse expectations versus physician response.

Most of the nurses in this current study perceived themselves to have good attitudes towards nursing practices. The researcher belief that this is a relief as attitude is important in providing care towards patient especially for the nurses. The nurses with good attitudes can provide good care. However, it contradicted with the level of attitudes of nurses in which the findings before stated the nurses have poor attitudes in detecting the risk of deterioration among patients (12). Jensen et al. (13) identified the perception on the EWS is basically related to the nurses' competency in the hospital; they relied too much on EWS record as they thought the EWS is still not complete or insufficient to detect patient's deterioration. Besides, they also mentioned that the nurses thought that EWS can overestimate the condition of the patient. However, they still agree that EWS can be a helping tool for the nurses especially inexperienced nurses to detect early abnormalities and EWS can also help nurses to be more aware on patient's condition.

In this current study, despite showing poor knowledge score, it was discovered that the nurses self-perceiving their competency (practice) as good practice (Mean score 54.6%). It is specified that the nurses feel that they are competent in managing patient using EWS score to prevent further deterioration of the patients. However, the mean score of their response to knowledge question shows otherwise when only two participants passed, while the rest failed. This situation may happen due their busy schedule or presumably maybe due to the lack of understanding to the risk or clearly poor knowledge in using EWS.

Consistently, there was also other study (14) showing that the nurses did not apply good practice in using EWS. The nurses explained that it is due to busy schedule which made them not strictly observing patients according to protocol and the EWS score range three to six is still considered as low risk (14). The nurses stated that they didn't do the scoring as frequent as they think it is over-monitoring and, in these instances, it was described as interfering with workflow and unnecessary.

There was an association between area of working and KAP of nurses especially nurses who are working at medical and surgical ward. Nurses working at medical ward scored higher than nurses working at surgical ward and orthopedics in knowledge and attitudes levels, with mean scores of 2.74 and 40.69, respectively. However, orthopedics ward nurses scored higher (mean score: 105.24) than others in practice level. There was a study that compares medical ward and surgical ward nurses. Lavoie et al. (15) identified that surgical ward nurses relied more on EWS than medical ward nurses although the EWS should be used more in medical units. The findings showed that there was no relationship between years of working and KAP of EWS. Nevertheless, in contra to this current study finding, Foley et al. (3) found that there was no relationship between working experience and ability to recognise early deterioration in patient's health conditions. This finding may indicate that seniority doesn't give any impact onto the ability to detect patients' condition.

This current study also found that there was an association between attitudes and practice ($r= 0.641$, $p\text{-value}<0.05$), and indicated that the association is positive and strong. Attitudes is important in relation to provide good practice as mentioned by the author, Ludin (8) who stated that low attitudes during delivery care will affect the quality of care towards the patients, and subsequently can lead to greater effect on them. Thus, the result of the research was that the relationship between attitude and practice is a positive correlation, whereby nurses have higher

score in attitudes indicating that the nurses may also have higher competency in practice in assessing EWS. Hence, it can be said that the attitudes and practice is related to each other in which the higher the attitude, the better the practice will be implied to patients using EWS.

CONCLUSION

Based on the result of the research, the nurses have good attitudes and practice in assessing patient using EWS except for the level of knowledge as the findings stated that the nurses have poor knowledge on EWS scoring. In addition, the study also discovered that seniority show no association to KAP of nurses in assessing patient using EWS but there is significant difference between working area and KAP of the nurses. Finally, the analysis found that there is an association but only related to attitudes score and practice level with positive and strong correlation observed. The study revealed that while the nurses have poor knowledge on EWS, they however have good attitudes and practice in detecting patient's progressive deterioration. There are a few recommendations to improve for future researchers that intend to further the study. It is recommended to further study in different wards that use different type of EWS according to patient's condition or age such as MEWS, PEWS, MEOWS, and others. In addition, it is important to improve the practice on EWS among nurses; the institution or management can provide training or further information/ education on EWS. Besides, EWS can also be included in nursing syllabus to ensure the nursing students can theoretically and practically master the EWS. In short, it is important to for the nurses to be introduced with knowledge and practice or how to use of EWS early in their nursing training to avoid mistakes during working in hospital.

ETHICAL MATTERS

The study was approved by the Kulliyyah Nursing Committee (KON), the University Ethics Committee (IREC), and SASMEC Ethic Committee. Information regarding the study's purpose, procedures, assurance of confidentiality and statements about their right to withdraw at any time. The return of the completed questionnaire was treated as informed consent to participate.

LIMITATION OF STUDY

This study had been successfully conducted. However, some limitations may affect the overall findings in this study. First, the data was collected during the Covid-19 pandemic. The study had to be postponed for a few months due to Movement Control Order. The number of patients admitted to the wards also are very limited. This may affect the responds rate, as some of the targeted samples were not able to be reached as the questionnaire were passed on to the nursing supervisor to distributed and collected by her. Furthermore, nurses had to recall back on their past memory to answer the questionnaire.

CONFLICT OF INTEREST

We declare no conflict of interest for this study.

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