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RISK OF DETERIORATION AMONG GENERAL WARD PATIENTS: NURSES' ABILITY IN ASSESSING EARLY WARNING SIGNS.

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ABSTRACT

Background: The challenge of recognizing ward-based patients at risk of deterioration is discussed frequently within the relevant literature. Nurses in particular hold the prime position to identify problems at an early stage using systematic patient assessment. However, general ward nurses' perceived knowledge, attitudes, and practice related to assessment of the risk of deterioration are not well understood. Failures to recognize or act upon the deterioration of general ward patients has sometimes resulted in the implementation of early warning scoring systems and Critical Care Outreach teams.

Aim: The study aim to explore general ward nurses' perceived knowledge, attitude, and practice (KAP) in assessing patients at risk of deteriorating in general wards.

Method: A Cross-sectional study design with Modified Early Warning Score questionnaire for general ward nurses was done in one tertiary hospital in Malaysia in 2013 and 2014.

Results: General ward nurses perceived that they struggled with knowledge and attitude, but they feel they performed good practice in assessing patients at risk for deterioration. Nevertheless, the study finding shows otherwise. Only one respondent achieved 'grade B' (85%) and the remainder scored in the band 'grade F' (very poor). The respondents' attitude was measured by their perception of their levels of confidence and concern. The mean confidence level was greater than six out of 10 for all categories. The attitudes mean score ± SD was set at 42.02 ±7.76. The data showed that 51% (N=50) scored below mean core of 42.02. However, participants' overall mean score ±SD for perceptions of practice (risk of deterioration assessment) was 90.27 ± 21.87 (6.94+/-1.683). The majority of participants awarded themselves a score between eight and nine, which is in the 'good' range for the scale (0-2 weak; 3-5 moderate; 6-8 good; 9-10 excellent). Those who scored above it were classified as having a good attitude.

Conclusion: A need exists for general ward nurses to gain a knowledge foundation in detecting abnormality to address lack of confidence, poor attitude and alertness, and concern.

Keywords: General ward nurses, Risk of deterioration, Nurses' perceptions, Critical Care outreach services, Malaysia

INTRODUCTION

Failures to recognize or act upon the deterioration of general ward patients has resulted in the implementation of early warning scoring systems and critical care outreach teams (Odell, Victor and Oliver, 2009). There is a push for ICU staff to shift the focus of their work to 'critical care without walls' (Kerridge and Saul, 2003). In 2007, a national postal survey in the United Kingdom identified that many acute National Health Services (NHS) trusts had no outreach services and those outreach services which did exist were incongruous (McDonnell *et al.*, 2007). These findings suggest that many hospitals did not meet the NHS requirement that every hospital have a 24-hour formal outreach service available every day. In addition, the National Patient Safety Authority (NPSA) released a report following the analysis of 576 deaths over a one-year period in 2005, which indicated that 11% of the deaths resulted from deterioration that was not recognized or acted upon (NHS, 2007). Recognizing early signs of deterioration in hospitalized patients and responding appropriately is essential to ensure patients' safety (Smith 2006). In Malaysia however, there is lacked of evidence on nurses' ability to detect the early warning signs on deteriorating patients. This study focused on general ward nurses' perceived knowledge, attitude, and practice (KAP)

based on their demographic characteristics related to caring for critically ill patients in general wards.

LITERATURE REVIEW

In recent years, the acuity of patients managed on general wards has increased while access to critical care beds has decreased (Kyriacos, 2015; Massey, Chaboyer, Anderson, 2017). An aging population, rapid patient turnover, and advanced technologies are also contributing to higher patient acuity in hospitals (Hill, 2010). This has led to increasing demands on general ward staff to care for patients. Failure to recognize and respond to patient deterioration and escalate care has led to an increased risk of adverse events (AEs) in hospitalized patients that may have been avoided if patient deterioration had been recognized and responded to earlier (Massey, Chaboyer, Aitken, 2014).Unrecognized changes in a patient's condition can lead to major complications, including death, and are referred to as 'failures to rescue' (Thomas *et al.*, 2007). Recent evidence from the 'failure to rescue' literature indicates a high level of disturbed physiological variables (e.g. heart/respiratory rate and blood pressure) in the general ward population and poorer patient outcomes due to mismanaged patient deterioration (Cooper *et al.*, 2011) . Thus, general ward nurses often required help and support in recognizing and responding to patient deterioration, frequently seeking this support from peers or more senior nurses, or medical staff (Massey, Chaboyer, Aitken, 2014).

Moreover, there is evidence that up to 80% of in-hospital cardiac arrests are predictable as patients often have demonstrable deterioration prior to the event (Chan, 2015; Morrison *et al.*, 2013; Nolan *et al.*, 2010). While METs or Rapid Response System (RRS) have been shown to significantly increase patient safety and decrease mortality and cardiac arrest rates, in adult and paediatric hospitals, and are widely employed around the world (Chen *et al.*, 2014).

Steen, 2010 and Chen *et al.*, 2014 recognized that staff who did not work in critical care areas, such as general ward nurses, did not necessarily have the knowledge and skills to identify the early warning signs of deterioration, even though they were sometimes required to implement timely and appropriate interventions to prevent deterioration and reduce mortality. Similarly, Chapman and Blackman found that general ward nurses lacked the skills to work with critically ill patients and ICU survivors. Wright (2005) suggested that a lack of confidence may contribute to the problem. General ward nurses who often lack confidence may wait before discussing a patient's condition with senior members of the team, which can lead to delays in treatment (Massey, Chaboyer, Anderson, 2017). Hart *et al.*, 2003 identified that a failure to recognize and respond appropriately involved multiple factors: nurses' lack of knowledge, inconsistent monitoring of vital signs, delays in notifying medical staff of the signs of deterioration, failure to seek prompt assistance, failure to communicate with other staff, and a lack of clarity regarding roles and responsibilities.

Studies have shown that the majority of deterioration events occur in medical-surgical units (Hart *et al.*, 2003; Bonnici, *et al.*, 2016) and nurses are frequently the first healthcare providers to recognize and respond to deterioration in acute patients. Although nurses may recognize the presence of physiological abnormalities, they may be reluctant to initiate basic life support interventions or alert emergency response teams due to negative emotional responses such as anxiety, being reprimanded for their action, felt their action and credibility could be threaten if the action is wrong or panic (Massey, Chaboyer, Aitken, 2014). Furthermore, premature discharge from intensive care units can be due to inadequate bed to cater for ill patients. However this situation significantly challenges ward nurses. Beside heavy workload, nurses' inadequate knowledge of acute care or inadequate skills for caring for high acuity patients with associated complex technologies causes delayed medical care at ward level. This is evidenced as the cause of deteriorating patients and ICU readmission (Elliot *et al.*, 2011).

ETHICAL CONSIDERATIONS

Approval for the study was obtained from International Islamic University Malaysia, Directors of the participating hospitals, and the National Medical Research Ethics Committee of Malaysia. Respondents were provided with all information regarding the study, 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.

METHODOLOGY

A cross sectional study design was done on a group of general wards nurses in a tertiary hospital under

Ministry of Health facilities in the East coast of Malaysia in 2014. The sample size was calculated using the Raosoft Sample Size Calculator (Raosoft, 2004). There were a population of 124 general wards (medical and surgical) nurses. It was anticipated that the response rate was at least 50%, the research. The estimated sampling size was 94 for general wards was considered appropriate to provide sufficient power (β=0.9) with confidence level of 95% and a 5% error margin. Convenience sampling however used to recruit general ward nurses who met the inclusion criteria the researcher believes that they were the most suitable people that could provide the first hand data and including everyone would be of benefits. The criteria were: permanently-employed bedside nurses having more than six months' experience, worked full-time, performing shift duty/office hours, understanding English and Bahasa, and not on long service leave, sick leave, or study leave.

To identify how general ward nurses assessed the need for outreach services, the nurses were given a two-part, self-administered survey questionnaire (see Appendix) adapted from Donilon (2013), Bainbridge *et al.*, (2010) and Stenhouse *et al.*, (1999) was given to general ward nurses. The questionnaire consisted of Part A (six items) is for demographic information and Part B is for nurses' perceptions of knowledge, (three items), attitude (six items), and practice (13 items) related to Early Warning sign for risk-of-deteriorating assessment. The questionnaires were pre-tested, returning a Cronbach's alpha of 0.956. Content validity was checked and validated by content experts specializing in intensive care.

The researcher made arrangements with the participating hospital to talk to the nurses about the study after hand-over-meetings and to invite them to participate. Nurses who volunteered to participate were given stamped, pre-addressed envelopes containing the self-administered questionnaire and information on how to return it. Descriptive analysis and inferential analysis were done for survey finding. Descriptive analysis resulted in data sets representing frequency, percentage, mean, standard deviation (SD), the degree of freedom, and f-statistic, as shown in the following tables. The researcher used an arbitrary standard for grading a 100-point knowledge test because there was no point of reference to grade them by the mean score (see Table 1).

Table 1: Arbitrary standard for grading a 100-point knowledge test

Point range	Grade
100-90	A
89-80	B
79-70	C
69-60	D
59-0	F

The researcher therefore converted the marks into percentages. Results for the association between variables were interpreted based on the significant *p*-value, with the level of significance set at α=0.05. Post Hoc test Bonferroni's procedures (Privitera, 2014) were done to confirm the finding.

RESULTS

The results will be presented according to the each phase of the study.

Demographic Characteristics- General Ward Nurses

The return rate was 79% (n=98). Table 2 shows respondents' demographic characteristics distribution

Table 2: Respondents' (General wards) demographic characteristics

Characteristics	Frequency (f)	Percentage (%)
Years of experience		
• 0 – 1 year	14	14.3
• 2-3 year	18	18.4
• 4-5 year	23	23.5
• 6-10 year	25	25.5
• Over 10 year	18	18.4
Years of experience in current specialty		
• 0-1 year	20	20.4
• 2-3 year	26	26.5
• 4-5 year	20	20.4
• 6-10 year	20	20.4
• Over 10 year	12	12.2

Area of practice • Medical • Surgical	 65 33	 66.3 33.7
Educational preparation • Diploma • Associate degree • Baccalaureate	 93 4 1	 94.9 4.1 1.0
Post basic/advance course certification • **Yes** • **No**	 29 69	 29.6 70.4
Participation in life training • **Yes** ○ Basic cardiac life support • **No** ○ Others	 88 85	 89.8 86.7

General ward nurses' knowledge, attitude, and practice (KAP) score on risk of deterioration assessment

Table 3 shows 49% (N=48) of the sample scored 0 out of 13 for knowledge. Only one respondent achieved 'grade B' (85%) and the remainder scored in the band 'grade F' (very poor). The respondent who achieved a 'grade B' was a nurse with about two to three years of experience and an associate degree educational background.

Table 3: Distribution of general ward nurses' knowledge score

Total mark (13)	Score percentages %)	Frequency(n)	Percentages (%)
0	0	48	49.0
1	8	27	27.6
2	15	6	6.1
3	23	5	5.1
4	31	6	6.1
5	38	4	4.1
7	54	1	1.0
11	85	1	1.0
Total		**98**	**100**

The respondents' attitude was measured by their perception of their levels of confidence and concern. The mean confidence level was greater than six out of 10 for all categories. Due to the absence of a point of reference for attitude, the researcher decided to use the mean scores as the cut-off point to classify respondents' attitudes. The attitude mean score ± SD was 42.02 ±7.76. Those who scored lower than this were classified as having a poor attitude, while those who scored above it were classified as having a good attitude. The data showed that 51% (N=50) scored below mean core of 42.02, while 49% (N=48) scored more than 42.02 (see Table 4).

Table 4: Distribution of general ward nurses' attitude score

Total score for Attitude	Frequency (n)	Percentage (%)
<42.02	50	51
>42.02	48	49

Participants' overall mean score ± SD for perceptions of practice (risk of deterioration assessment) on a scale of 0 (lowest self-perceived competence) to 10 (highest self-perceived competence) was 90.27 ± 21.87 (6.94+/- 1.683 (see Table 5). The majority of participants awarded themselves a score between eight and nine, which is in the 'good' range for the scale (0-2 weak; 3-5 moderate; 6-8 good; 9-10 excellent). Those who scored above it were classified as having a good attitude.

Table 5: Distribution of general ward nurses' perceived practice

On scale 1 to 10:	N	Minimum	Maximum	Mean	SD
Assessment of signs and symptoms of deterioration in patient's clinical condition	98	3	10	6.58	1.816
Utilizing decision making skills to determine action.	98	2	10	6.54	1.895
Taking action to manage patient's changing situation.	98	3	10	6.65	1.806
Prioritizing actions based on assessment findings	98	3	10	6.67	1.838
Accessing resources to assist in managing patient situations	98	3	10	7.10	1.690
Reporting findings to members of the healthcare team	98	3	10	7.14	1.816
Clearly communicating pertinent information about the patient's status	98	3	10	7.14	1.844
Understanding rationale for actions and orders	98	3	10	7.12	1.835
Seeking clarification from the physician or licensed independent provider for questions or concerns regarding the treatment plan.	98	3	10	7.22	1.902
Evaluating the patient's response to interventions	98	3	10	7.01	1.864
Updating the plan of care to reflect the patient's current clinical condition.	98	3	10	7.09	1.794
Reflecting on your process of managing rapidly changing patient situations	98	3	10	7.07	1.737
Extrapolate knowledge from the reflection process to apply in managing future patient situations?	98	3	10	6.91	1.873
Total Practice score	98	39	130	**90.27**	**21.878**
Percentage- practice	98	30	100	**69.43**	**16.829**
Valid N (listwise)	98				

The association between general ward nurses' demographic characteristics and KAP in risk of deterioration assessment.

One way ANOVA and independent t test analysis were done to compare the means score between the nurses' (medical & surgical) demographic characteristics. Overall the results shows absent of association accept for years of experience ($p < 0.042$).It was found that only the mean scores for general ward nurses between zero to one year and over 10 years were seen significantly different Higher practice score results were perceived by general ward nurses who had over 10 years' experience ($p < 0.048$).

Examination of the association between nurses undergoing post-basic training and KAP were done. While for the association between post basic and practice the result interpreted shows the mean for respondent having post basic was 7.55±1.757, higher then respondent who did not have post basic respectively (6.69±1.593). In term of the type of course, examination of the association between nurses who had Basic Life Support (BLS) training and knowledge show significant difference ($p<0.048$). The mean score for nurses knowledge with BLS was 5.92±1.634, while those nurses without life support training was higher

(7.06±1.654).

Comparing the KAP of medical ward nurses and surgical ward nurses

There was no difference in the levels of knowledge or attitude reported by medical or surgical ward nurses. However, as Table 6 shows, the mean practice score for the medical ward was 7.20±1.681, while for the surgical ward it was 6.45±1.587. The findings indicated an association between work areas and practice (*p*-value < 0.05), with medical ward nurses scoring higher than surgical ward nurses.

Table 6: Association between Demographic characteristics and general ward nurses' perceived practice (Post hoc test)

	(I) Years of experience as a nurse (Medical)	(J) Years of experience as a nurse (Surgical)	Mean Difference (I -J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Scheffe	0-1 year	2-3 year	-10.708	5.811	.498	-28.97	7.56
		4-5 year	-11.598	5.528	.361	-28.97	5.78
		6-10 year	-5.448	5.443	.909	-22.56	11.66
		over 10 year	-16.777	5.811	.089	-35.04	1.49
	2-3 year	0-1 year	10.708	5.811	.498	-7.56	28.97
		4-5 year	-.890	5.132	1.000	-17.02	15.24
		6-10 year	5.260	5.041	.895	-10.58	21.10
		over 10 year	-6.068	5.436	.870	-23.15	11.02
	4-5 year	0-1 year	11.598	5.528	.361	-5.78	28.97
		2-3 year	.890	5.132	1.000	-15.24	17.02
		6-10 year	6.150	4.711	.790	-8.66	20.96
		over 10 year	-5.178	5.132	.906	-21.31	10.95
	6-10 year	0-1 year	5.448	5.443	.909	-11.66	22.56
		2-3 year	-5.260	5.041	.895	-21.10	10.58
		4-5 year	-6.150	4.711	.790	-20.96	8.66
		over 10 year	-11.328	5.041	.290	-27.17	4.51
	over 10 year	0-1 year	16.777	5.811	.089	-1.49	35.04
		2-3 year	6.068	5.436	.870	-11.02	23.15
		4-5 year	5.178	5.132	.906	-10.95	21.31
		6-10 year	11.328	5.041	.290	-4.51	27.17
Bonferroni	0-1 year	2-3 year	-10.708	5.811	.685	-27.42	6.00
		4-5 year	-11.598	5.528	.386	-27.49	4.30
		6-10 year	-5.448	5.443	1.000	-21.10	10.20
		over 10 year	-16.777*	5.811	**0.048**	-33.49	-.07
	2-3 year	0-1 year	10.708	5.811	.685	-6.00	27.42
		4-5 year	-.890	5.132	1.000	-15.65	13.87
		6-10 year	5.260	5.041	1.000	-9.24	19.75
		over 10 year	-6.068	5.436	1.000	-21.70	9.56
	4-5 year	0-1 year	11.598	5.528	.386	-4.30	27.49
		2-3 year	.890	5.132	1.000	-13.87	15.65
		6-10 year	6.150	4.711	1.000	-7.40	19.70
		over 10 year	-5.178	5.132	1.000	-19.93	9.58
	6-10 year	0-1 year	5.448	5.443	1.000	-10.20	21.10
		2-3 year	-5.260	5.041	1.000	-19.75	9.24
		4-5 year	-6.150	4.711	1.000	-19.70	7.40
		over 10 year	-11.328	5.041	.270	-25.82	3.17
	over 10 year	0-1 year	16.777*	5.811	**0.048**	.07	33.49
		2-3 year	6.068	5.436	1.000	-9.56	21.70
		4-5 year	5.178	5.132	1.000	-9.58	19.93
		6-10 year	11.328	5.041	.270	-3.17	25.82

The relationship between general ward nurses' knowledge, attitude, and practice on risk of deterioration assessment

No relationship was found between knowledge and attitude, or knowledge and practice, but there was a positive correlation between attitude and practice, as shown in Table 7 ($r = 0.514$, $n = 98$, $p = 0.001$). Overall, there was a moderate, positive correlation between attitude and practice. Increases in the attitude score correlated with an increase in the practice score.

Table 7: The relationship between attitude and practice

Variables	Total attitude score
Practice score	0.514[a]
	0.001[b]

[a] Pearson correlation coefficient, [b] P-value

DISCUSSION

Perceive knowledge, attitude and practice in risk of deterioration assessment

The findings suggest that general ward nurses had very poor knowledge related to risk-of-deterioration assessment for critically ill patients. Even some senior staff members scored zero for knowledge. General ward nurses' attitude was also seen as poor when 51% of them scored below the mean cut-off point. This is a concern because if clinically competent care is delivered with an uncaring attitude, it can affect other healthcare personnel as well as patients' recovery (Institute of Health and Nursing Australia, 2014). Good care cannot be provided without a good attitude; for example, concern may prompt nurses to report an abnormal reading, which may be important in maintaining a good prognosis. In contrast to the attitude scores, the overall score for nurses' perceived competence (practice) was at the higher end of the scale, giving them a 'good' rating. This may indicate that nurses at least feel competent managing patient situations in acute care.

The general ward nurses' weaknesses in knowledge and attitudes, if not perceived competence (practice), highlighted the potential significance of outreach services as a solution.The ICU nurses in this study agreed that skill and experience are needed to prioritize clinical care in order to provide quality care to patients, but that these qualities were often lacking among nurses from general wards. This corresponds with work by Elliot et al. (2012), who concluded that nurses from general wards did not have the knowledge or skills required to care for acutely ill patients. The argument for implementation is strengthened by the lack of any significant correlation between the ICU nurses' perceptions and highest education level or years of nursing employment, which indicates that, regardless of these variables, ICU nurses perceived a definite need for services to assist in the successful transition of patients from the ICU to general wards.

In-service education, skills training on risk assessment should be done regularly to enhance general ward nurses KAP in early assessment ad response to acutely ill patients. Junior or inexperience nurses should be guided by a more experience nurses or Critical care outreach team in providing care to acute patients in the ward.

The relationship between general ward nurses' work experience and KAP

Melnyk and Fineout-Overholt (2005) stated that the wellbeing of patients could be at risk when nurses practice using outdated evidence. It is therefore crucial for nurses to continually revise and update their knowledge of new treatments, trends, and news pertaining to nursing. In this study, most of the senior nurses scored low marks for knowledge, suggesting that had failed to revise and update their knowledge. Despite this, and despite the finding of one outstanding junior nurse, nurses acknowledged that experience helped with their skills. More experienced nurses may have 'gut reactions' that tell them when it is necessary to carry out a set of observations. Newly qualified staff may be lacking in competencies and inexperienced staff may not recognize other signs of deterioration, which may cause them to remain unaware of the seriousness of a situation (Fletcher *et al.*, 2003). However, staff tiredness and a lack of concentration are also known to contribute to deterioration incidents (Fletcher *et al*., 2003).

The relationship between general ward nurses' work experience in current specialty and KAP

A healthcare worker's specialty is "based on their education, training, supervised experience, consultation, study, or professional experience" (APA, 2011). However, the findings in this study indicated no association between work experience in current specialty and the three stated variables. The researchers interpreted these findings as an indication that experience in a current specialty is not the only factor required for good knowledge, attitude, and practice; nurses' awareness is what counts. Thousands of nurses with good skills do not work in a specialty area, but gain valuable experience through working with various patients in various settings. It should still be noted that working in a specialty area provides additional opportunities for nurses to develop current and new skills.

The relationship between post-basic training and general ward nurses' KAP

It was found that post-basic training (as a one-off course) may not be associated with attitude or knowledge, because an ongoing learning with new material is necessary to maintain and extend nurses' knowledge. According to Davis *et al.*, 2014, lifelong learning involves seeking and appreciating new words or ideas in order to gain a new perspective, as well as questioning one's environment, knowledge, skills, and interactions. The finding that nurses with post-basic training had higher practice scores than those without it is therefore a positive result.

The relationship between life support training and general ward nurses' KAP

A study by Cooper *et al.*, (2011) found that, despite significantly higher knowledge scores, those who had recently completed life support training did not perform any better in the nursing scenarios (OSCEs) than those who had not completed such training. In the current study, lack of knowledge may have been due to lack of revision. However, good practice may have been due to nurses' past experience because the majority had between 4-6 years of nursing experience. Nevertheless, the result on knowledge and nurses response to MEWs does not show that they have a good practice and knowledge.

Comparison of KAP between medical ward and surgical ward nurses

The finding that there was no difference in terms of knowledge and attitude between medical ward nurses and surgical ward nurses, but that medical ward nurses had better practice scores than surgical ward nurses, is contrary to Steen's (2010) finding that staff who did not work in critical care areas may not have had the required knowledge and skills. Nevertheless, nurses' exposure to patients in different ward settings is important for developing skills and competence. Carberry (2002) and Odell *et al.*, (2009) share the opinion that general ward staff have less or infrequent exposure to critically ill patients and therefore have reduced opportunities to develop competencies and confidence.

The association between general ward nurses' knowledge, attitude, and practice

Attitude is the nurses' 'inside value' that may not affect their level of knowledge. For example, some newly experienced nurses may have a higher level of concern for the patient compared to senior nurses. The Audit Commission (1999) suggested that suboptimal care was due to poor academic preparation, as well as inadequate support for and supervision of junior doctors and nurses. The Audit Commission also suggested that knowledge and practice do not relate to each other because practice is about skills competence, and some people who are good in theoretical knowledge cannot perform in practice settings.

This study's findings show a relationship between attitude and practice, where higher levels of concern are directly proportional to nurses' competence. The greater a nurse's level of concern, the more carefully they will perform patient care, and they will improve on the care day-by-day. Both medical and surgical ward nurses stated that confidence is developed by continuous practice and experience.

LIMITATIONS

Time limitations on data collection affected the return rate for the surveys of general ward nurses (79%). The findings may not be generalizable because of the small sample size (conducted in only one hospital, and only in medical and surgical wards). This limitation may have an effect on the results interpretation and the appropriateness of the questionnaires (suitability of the instrument to the study context and culture). In future studies, researcher may include other wards caring for patients who have

undergone surgery (for example, a gynecology ward or an orthopedic ward).

CONCLUSION

This study has revealed the need for examining the service such as Critical Care Outreach as a possible solution that may improve nurses' knowledge, attitude, and practice related to assessment of patients' risk of deterioration, especially considering the identification of a relationship between attitude and practice. There also appears to be a need for surgical ward nurses to spend time in medical wards to improve their competence by nursing the wider variety of patients admitted to medical wards. Development and implementation of an outreach service for all nurses to improve their knowledge about early detection of patient deterioration and nurses' attitude in taking faster action in calling on specialized nursing teams to prevent and/or deal with patient deterioration, is essential.

This study's results demonstrate a need and a potential for the implementation of outreach services in all Malaysian hospitals. However, implementing this new program will present institution-specific challenges such as inadequate workforce, financial issues, or time management issues. It is recommended that outreach services organize specific training sessions for general ward nurses, or ICU nurses, about their role in improving the quality of patient care after discharge from ICU to general wards, and improving their skills with regards to educating patients' family members. Furthermore, nursing students should receive knowledge about outreach services as part of their nursing curriculum. Further research is recommended into the specific needs of outreach services and the impact of outreach services on patient mortality, length of hospital stay, and ICU readmission from general wards is also needed.

ACKNOWLEDGEMENTS

The author would like to express our sincere thanks to all nurses, who volunteered to participate, and nursing supervisors and hospital management for their support and cooperation throughout this study. Last but not least, we would like to thank IIUM and Ministry of Health Malaysia for approving and allowing this project to be conducted.

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