Relationships between Triage Knowledge, Training, Working Experiences and Triage Skills among Emergency Nurses in East Java, Indonesia

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Abstract

Background: Since there are increased numbers of clients with traumatic injuries and non-traumatic cases in the emergency department in Indonesia, triage skill is an essential competency required for the emergency nurses.

Purposes: This study aimed to examine the level of perceived triage skills and the relationship between knowledge, training, working experience and perceived triage skills among emergency nurses.

Method: Two hundred and sixty six emergency room (ER) nurses working in two secondary and two tertiary public hospitals in East Java Province, Indonesia, were recruited by purposive sampling. Data were collected using a set of questionnaires which included the Demographic Data including training and working experiences, Triage Knowledge Questionnaire (TKQ) and Triage Skill Questionnaire (TSQ). The contents of questionnaires were validated by three experts and tested for reliability. The correlation coefficient for the TKQ was 0.99 and Cronbach's alpha coefficient of the TSQ was 0.93. The collected data were analyzed using descriptive statistics including Pearson's product-moment correlation to examine the relationship.

Result: The results showed that the majority of subjects were female (71.4%) with aged of 22 – 40 years (79.3%), educated to diploma level (94.4%). All subjects had attended Basic Life Support (BLS) and Advanced Life Support (ACLS), and about half of them had greater than 5 years working experiences in ED. Overall perceived triage skill was at a moderate level with the mean score of 75.12 (SD = 11.23). There were significantly positive correlations between triage skill and working experience (r = .27, p < .01), training experience (r = .37, p < .01), and triage knowledge (r = .38, p < .01).

Conclusion: The findings provide a better understanding of triage skills among ER nurses and suggest that the continuing education and training courses related to triage and advanced management of medical emergencies for ER nurses are required in order to increase and update the triage skills in enhancing the quality of emergency care and patient safety.

Key Words : Triage knowledge, triage skills, training, working experience, emergency nurse

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Introduction

Emergency department (ED) generally provides immediate care 24 hours everyday. The unpredictable numbers of patients coming to ED suffer from various conditions with unknown severity, urgency, and definite diagnosis. The patients who are suffering from life threatening conditions, such as cardiac arrest, airway obstruction, and shock should be prioritized to provide them an early immediate care to save their lives. However, the over crowdedness of patients visiting to ED can have an impact on the quality of care by diversifying the resources intended for patients, which are in need of emergency care to the individuals who have potentially less urgent needs (Milbrett & Halm, 2009). There is consensus that triage is an essential procedure in ED as an effective system for reducing waiting times and ensuring that all patients visiting to ED receives the appropriate treatments (Considine, Botti, & Thomas, 2007).

ED triage is a type of triage that emergency nurses perform daily. The goal is to identify the most severe patients who are in need of immediate care (Qureshi & Venema, 2007). ED triage composes of primary and secondary triage decision (Gerdtz & Bucknall, as cited in Considine, Botti, & Thomas, 2007). Primary triage decision is related to the procedures of the primary assessment and allocation the patients to appropriated treatment. Secondary triage decision is related to initiation of nursing intervention, and provides comfort to the patients (Gerdtz & Bucknall, as cited in Considine et al., 2007). However, the primary triage skill of the emergency nurses is more focused as it is included the procedures of rapid assessment, patient categorization, and patient allocation (Proehl, 2007; Sharma, 2005). For the effectiveness of the ER triage, all above procedures require the ability of making decision in accuracy and timely. Triage skill is one of the most competencies required for the emergency nurses

(Andersson, Omberg, & Svedlund, 2006; Gerdtz & Bucknall, 2001; Gilboy, Travers, & Wuerz, 1999). Previous studies have shown that the main factor related to triage skill of the emergency nurses was triage knowledge (Andersson et al., 2006; Considine et al., 2007). However, its relationships has yet to be explored among ER nurses in the countries where have high workload and demands of care particularly in Indonesia.

As an example in one of the famous General Hospital in East Java province, Indonesia to reflect the care situations, there are totally 74 emergency nurses allocated to work in three shifts. About 20-25 emergency nurses provide services to 50-70 patients per shift. The ratio of emergency nurses in triage room to patients each shift is 1: 25-35 approximately. According to the study by Wardhani (2001), it showed that the mortality rate in the ED of East Java province was 26.4%. Since every hospital in Indonesia concerns the patient safety issue with the high quality of care, it is necessary to examine emergency nurse's triage skills and related factors such as knowledge, training and working experience in ED. The study was conducted in an attempt to provide useful information for improvement better triage skills among Indonesian emergency nurses in the future.

Aim

The objectives of this study were to examine 1) the level of triage skills perceived by emergency nurses and 2) the relationship between triage knowledge, training, working experience and triage skill among emergency nurses in East Java province of Indonesia.

Method

Definition of Terms

Triage skills referred to the level of nurses' perception of ability in making decision accurately and timely in the following areas: (1) rapid assessment, (2) patient categorization, and (3) patient allocation. It is measured by the Triage Skill Questionnaire (TSQ) developed based on the literature review.

Triage knowledge referred to the level of factual and procedural knowledge required for emergency nurses to perform rapid assessment, patient categorization, and patient allocation. It is measured by the Triage Knowledge Questionnaire (TKQ) developed based on the literature review.

Training experience referred to the numbers of time and the types of previous training in triage and related topics in the past three years, such as attending short course, workshop, etc. It is measured by using training index.
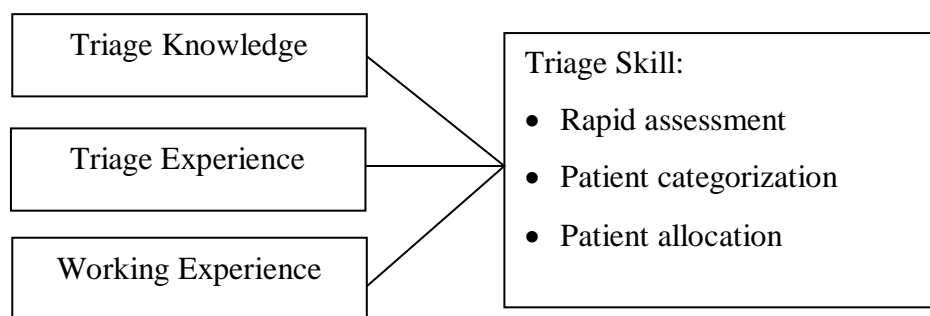
Working experience referred to the numbers of months in working as emergency nurses.

Research design and study framework

This study conducted using a descriptive correlational study to examine the relationships among triage knowledge, training experience, working experience and triage skills. The conceptual framework of this study was derived from the synthesis and the integration of literature review in the area of emergency nursing. Triage skill in the ED was the performance of emergency nurse using decision-making capability to prioritize patients into the right categories within a limited space of time (Andersson et al., 2006; Gerdtz & Bucknall, 2001; Gilboy, 2005). The triage skill includes rapid assessment, patient categorization, and patient

allocation (Bracken, 2003; Gilboy; Zimmerman & Herr, 2006; Gilboy & Travers, 2007).

The triage knowledge was examined in terms of the factual knowledge and the procedural knowledge, which are essential as the basic knowledge for the emergency nurses to perform the triage effectively (Patel et al., 2002). Factual knowledge is knowledge about a fact or set of facts condition without wide understanding such as anatomy, physiology, pathophysiology, and common illness of the patients visiting to ED. Procedural knowledge is a kind of knowing related to how to perform actions in many activities such as nursing techniques using in primary triage. The training experiences can improve the nurse's triage skill for identifying the patient's scale of urgency, diagnosing the patient, and providing emergency nursing intervention in ED (Chung, 2005). To be skillful in triage, the emergency nurses are required to participate in the training program regarding triage and the related topics, and should be refreshed every one to three years. The working experience refers to the duration of working as the emergency nurses. Figure 1 presents the conceptual framework of this study. The factors related to triage skill are the level of triage knowledge, training experience, and working experience.

Figure: 1 Conceptual Framework of the Study

The sample and settings

The population were nurses working in ED in both tertiary and secondary hospitals. Only government hospitals were selected for the target setting based on the following reasons: 1) it provides public emergency services in East Java province as referral hospitals for the East area of Indonesia, 2) the ratio of patients to nurses and doctors are higher than private hospital, 3) working environment is different from private hospital. Two tertiary (Hospital A and B) and two secondary public hospitals (Hospital C and D) in East Java province were conveniently selected to recruit estimated sample size of 306 subjects (including additional 10% to compensate for expected attrition). All nurses working in emergency department of those hospitals were recruited to be the samples. The inclusion criterion was those nurses who had the nursing education background at least diploma in nursing level. From 40 out of 306 emergency nurses who had under diploma degree *(Sekolah Perawat Kesehatan* or nursing education at the level of senior high school) were excluded. Thus, 266 emergency nurses were met the criteria.

Instruments

Data were collected using a set of questionnaires: 1) Demographic Data Sheet (DDS) including training and working experience; 2) Triage Skill Questionnaire (TSQ) was a 37-item questionnaire with three dimensions including rapid assessment, patient categorization, and patient allocation. Subjects were asked to respond to each item using 1-5 rating scale: 1 = need improvement, 2 = poor, 3 = fair, 4 =good, and 5 = very good. The possible range of the total score was 37-185. The total score was converted to percentage. Using the criterion-referenced, the following score was interpreted as: < 60% = low level of triage skills, 60-80% =

moderate level of triage skills, and > 80% = high level of triage skills; 3) Triage Knowledge Questionnaire (TKQ) consists of 35 items. Each question has four choices. The correct answer of each item was get 1 score and incorrect answer was get 0 score. The higher scores indicate that the nurse had more knowledge. The possible range of total score of triage knowledge is 0-35. The total score was calculated to percentage. Using the criterion-referenced, the total score less than 60% was low level of knowledge, 60-80 % was moderate level of knowledge and more than 80% was high level of knowledge.

Training experience in the past three years was interpreted using training index with the formula: number of training x number of times. The higher score was reflected the higher training experience. Working experience was calculated using months of working as emergency nurses. The longer months of working experience reflects the higher experience. The instruments were translated from English to Javanese and back translation from Javanese to English by two skilled bilingual translators from Nursing Science Program, Brawijaya University Malang Indonesia. The content validity of the questionnaires was evaluated by three experts. The revised version in accordance with recommendation of the experts was tested reliability among 20 emergency nurses. The internal consistency of the TSQ was analysed using Cronbach's alpha coefficient, yielding .93. By test-retested method, the correlation coefficient of the TKQ was .99.

Data collection

Data were conducted during January to February 2010 after approval from the Intuitional Review Board (IRB) of the Faculty of Nursing, Prince of Songkla University, the ethical committee of medical research medical faculty Brawijaya University, and the permission from directors of the hospitals. Due to limited authority of the principal

researcher, the head nurses in ED from each hospital had to be approached for introducing the ED nurses to participate in the study. The researcher maintained the anonymity of the subjects by using code and all data were kept confidential. The subjects were asked to answer the questionnaires and return to the researcher within one week. The data were analyzed by descriptive statistics, and the relationships of the mean scores were analyzed by Pearson's product moment correlation.

Results

Demographic characteristics

Of 266 emergency nurses, the majority (71.40%) was female, with a mean age 33.37 years (SD = 7.54). Most of the subjects (94.40%) had educated of diploma degree. The rest (5.60%) had completed bachelor in nursing. Three fourth of subjects (75.60%) has been working in tertiary hospitals; the rest (24.40%) has been working in secondary hospitals. Subjects from Hospital A-D were 176, 64, 35 and 31 respectively. Regarding to the tertiary hospitals, there were 25 – 40 emergency nurses per shift. Two or three of those nurses had rotated to work in the triage room, in which the ratio of triage nurse to patient was 1: 30-40. In Hospital A, a physician had contributed in triage room; but none in Hospital B. During the 2010 survey, approximately 50 – 100 cases per shift both traumatic and non traumatic problems were treated at ED. The common traumatic cases from the most to the least were traumatic brain injury, urinary tract injuries, open wound of extremities, maxillofacial injuries, fracture of clavicle, and multiple organ injuries. The common non-traumatic cases from the most to the least were diarrhoea, acute pharyngitis, acute upper respiratory infection, fever, dyspepsia, severe hypertension, stroke, spontaneous vertex delivery, asthma, gastritis, gastroenteritis measles, renal failure, and DHF.

In the secondary hospitals (Hospital C and D), there were 6-7 emergency nurses per shift. A general physician and a nurse were shared responsibility in the triage room, in which the ratio of triage nurse to patient was 1: 25-40 approximately. The common problems of the patients visiting to ED from the most to the least were fever, head injury, diarrhoea, wound laceration, stroke, asthma, appendicitis, fever, DHF, head injury, GE (Gastroenteritis), ulcer, CVA (Cerebrovascular Accident), DHF, vomiting, colic abdomen, and gastritis.

Level of training experiences, working experiences, triage knowledge and triage skills

During the past three years, all subjects had attended several short training courses. The three most attended courses were the Basic Life Support (BLS) training course (100%), the Basic Trauma Life Support (BTLS) training course (59.39%), the Advanced Life Support (ACLS) training course (30.83%). In addition, some were trained about TOC (Triage Officer Course), ambulance protocol, the Advanced Trauma Life Support (ATLS), ECG resuscitation, Trauma Nursing Care (TNC), but less number of nurses was trained in Emergency Care, first aid in emergency, and disaster management. By training index calculation, 66.2% of subjects had training experience at a low level (1 - 5), 28.6% had training experience at a moderate level (6 - 10), and only 5.2% had training experience at a high level (> 10). More than half of subjects (51.90%) had experienced in working at ED more than five years, but most of them (82.30%) had working experience in triage room less than five years. Currently, there were only 16.20% have been working in triage room (Table 1).

Table 1

Frequency and Percentage of Subjects Classified by Experiences (N=266)

Experiences	Frequency	Percentage
Training experience (more than one answer)		
BLS (Basic Life Support)	266	100.00
BTLS (Basic Trauma Life Support)	158	59.39
ACLS (Advanced Cardiac Life Support)	82	30.83
TOC (Triage Officer Course)	78	29.32
Ambulance protocol	39	14.66
ATLS (Advanced Trauma Life Support)	34	12.78
ECG Resuscitation	27	10.15
TNC (Trauma Nursing Care)	23	8.64
Emergency care	8	3.00
First Aid in Emergency	8	3.00
Disaster management	7	2.63
Training index		
Index of training 1-5	176	66.20
Index of training 6-10	76	28.60
Index of training > 10	14	5.20
Working experience in ED		
6-60 months	128	48.10
> 60 months	138	51.90
Working experience in triage room		
6-60 months	219	82.30
> 60 months	47	17.70
Current working in triage room		
Yes	43	16.20
No	223	83.80

Level of triage knowledge and triage skills

The subjects reported a low level of triage knowledge and a moderate level of perceived triage skills (see Table 2).

Table 2 *Range, Mean, Standard Deviation, and Level of Triage Knowledge and Triage Skill score (N=266)*

Variables	Possible range	Actual range	Mean	SD	Level
Triage knowledge	0-100	23-83	55.26	13.16	Low
Triage skill	5-100	49-99	75.12	11.23	Moderate
Rapid assessment	5-100	45-99	74.99	11.25	Moderate
Patient categorization	5-100	30-100	74.72	13.23	Moderate
Patient allocation	5-100	43-100	75.17	13.35	Moderate

Relationships between triage knowledge, training, and working experiences, and triage skills

The relationships between the mean scores of triage knowledge, training, and working experiences and triage skills were examined using Pearson's Product Moment Correlation. The results showed the significantly positive relationships between triage skill and triage knowledge (r = .38, p < .01), and working experience (r = .27, p < .01), training experience (r = .37, p < .01) respectively.

Discussion

The findings revealed that the mean score of triage skill and its sub-dimensions were at a moderate level. This may be because that emergency nurses had more experience, and 82.30% of them had worked in triage room. In addition, the triage skill in triage room is similar to primary assessment by ABC. During data collection, the researcher had met ED head nurse and discuss about the role of emergency nurse in triage room. The majority of emergency nurses have performed triage process collaborated with a physician that may help nurses to have a triage skill for precise decisions at some circumstance. This is similar to Chung (2005) who found that emergency nurses who had at least one year experience would have triage skill. However, the subjects had less training in emergency care especially triage training (29.32%) which may facilitate them to have a skill in a moderate level. Similarly to a previous study that the perceived self-assessed competence of nurses working in emergency setting were at a moderate level (Salonen, Kaunonen, Meretoja, & Tarkka, 2007). In addition, all skills related to advanced nursing skill were not high such as insertion of oropharyngeal or nasopharyngeal airway, assessment of internal and external bleeding, stop bleeding, manual ventilation, and bag-valve-mask ventilations.

These skills were mainly performed by physician rather than nurses and most of prepared ED nurses completed the degree at diploma level. In addition, existing training courses did not include either advanced skill or drills for actual practice at hospital.

Congruent with previous studies (Cone, 2000; Ferrario, 2003; Salonen et al., 2007; Anderson et al., 2006), working experience was correlated with triage skills (r = .27, p =.001) particularly for those who continued working at ED more than five years, and those experienced emergency nurses had more abilities in triage skill than novice nurses. Moreover, it was similar to Hicks, Merritt, and Elstain (2003) who found that more years of experience increased the decision-making consistency in triage skill (r = .42, p =.004). In contrast, Considine et al. (2007) reviewed four studies which found that there was no significant relationship between experience and triage decision making in triage skill. The more experienced and less experienced emergency nurses could have the same ability to perform triage. This may be due to other related factors such as training experience.

Training experience had a positive relationship with triage skill which reflects that the more trainings or drills attended, the higher skill nurses develop. Consistency to a study by Forsgren, Forsman, and Carlstrom (2009) who suggested that the regular training of triage could improve skill of nurses to handle stressful work situation. In addition, the mean score of triage knowledge which similar to previous study (Jezewski & Feng, 2007) was at low level. The reason might be that almost emergency nurses in this study graduated in diploma level, and a few had attended training course special to triage knowledge, and only 16.20 % of subjects currently work in triage room. However, triage knowledge had a positive relationship with triage skill even though it was a low level. This means that if triage knowledge is high, the triage skill would also be high. This finding was congruent with a

previous study by Considine et al. (2007) who reviewed four studies to examine the effect of factual knowledge on triage decisions. It was found that the factual knowledge had relationship with triage decisions in triage skill. Moreover, there were relationship between knowledge, skill, and judgment in nursing practice (Evans & Donelly, 2006). In addition, the relationship between decision making, knowledge, and intuition with clinical experiences were found in other study (Smith and Cone, 2010). However, the accuracy of triage decisions and triage knowledge must be further explored as it might not have any relationship in some particular context (Considine et al., 2007).

Since many subjects in this study graduated in diploma level, and less numbers had attended training or specific course to triage, their triage knowledge were low. In addition, the finding revealed that only 16.20 % of subjects currently work in triage room. It indicates that nurses' triage skills may be insufficient as a result of knowledge deficits. This suggests that triage knowledge should be provided and included as in-service education for ED nurses.

Conclusions, Limitations and Recommendations

The findings provide a better understanding of triage skill among emergency nurses in East Java Province, Indonesia. The triage skill was found to be at a moderate level while the triage knowledge was at a low level. In addition, there were significantly positive relationship between triage skill and triage knowledge, training experience and working experience. This could serve as the basis of development of in-service education and training programs that emphasized the specific triage knowledge for improving better skills. This study had a limitation in terms of convenience sampling used and conducted in an urban area which limits generalizability of findings. The findings suggest that the emergency nurses are required the proper knowledge and experience to increase their triage skill. The necessity to

improve quality of care and patient safety, triage skill of the ED nurses must be offered as continuing nursing education. Although it was a cross sectional study and limited generalizability, a longitudinal study should be conducted and included the nurses in private hospital.

Acknowledgements

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