Triage skill and Related Factors among Emergency Nurses in East Java Province, Indonesia

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Abstract

This study aimed to determine the level of triage skill perceived by emergency nurses, and examine the relationships between this triage skills and the nurses triage knowledge, training experience, and work experience. The participants included 266 emergency nurses working in two secondary and two tertiary public hospitals in East Java Province, Indonesia. The data were collected using a set of questionnaires which included the Demographic Data Sheet, the Triage Skill Questionnaire (TSQ), and the Triage Knowledge Questionnaire (TKQ), and which were validated, in terms of content, by three experts. The Cronbach’s alpha coefficient of the TSQ was 0.93. From the test-retest method, the correlation coefficient for the TKQ was found to be 0.99. The relationships between the mean scores for triage skill, triage knowledge, and work experience were analyzed by Pearson’s product-moment correlation. The Spearman Rho was used to test the relationship between the mean scores for triage skill and training experience.

The results showed that the mean scores for triage skill and work experience were at a moderate level (mean = 75.12, SD = 11.23, and mean = 59.48, SD = 33.81, respectively). However, the mean scores for triage knowledge and training experience were found to be at low levels (mean = 55.26, SD = 13.16, and mean = 4.47, SD = 3.19, respectively). There were significant positive correlations between triage skill and the three other factors: triage knowledge (r = .38, p < .01), training experience (r = .37, p < .01), and work experience (r = .27, p < .01).

These findings indicated that there were low correlations in the relationships between the triage knowledge, training experience, work experience, and triage skill perceived by the emergency nurses. Hence, it was concluded that the participants required continuing education and training courses related to triage to improve their knowledge and skill in order to increase patient safety.

Key words: triage skill, triage knowledge, work experience, training experience, emergency nurse
Background and significance of the problem

The emergency departments (EDs) of hospitals generally provide immediate care 24 hours a day. Unpredictable numbers of patients come to EDs, and these patients suffer from various conditions, with wide differences in severity, urgency, and definitiveness of diagnosis. Patients who suffer from life-threatening conditions, such as cardiac arrest, airway obstruction, and shock, should be given priority in order to provide them with the immediate care necessary to save their lives. However, the excessive numbers of patients that come to some EDs may have an impact on the quality of care at these facilities, as some resources which are needed for life-threatening cases may be being used for individuals who have less urgent needs (Milbrett & Halm, 2009). There is consensus that triage is an essential procedure in EDs, and is an effective system for reducing waiting times and ensuring that all patients visiting an ED receive appropriate treatment (Nuttal, as cited in McNally, 1996; Bailey, Hallam, & Hurst, as cited in McNally, 1996).

Hogan and Lairet (as cited in Qureshi and Veenema, 2007) stated that ED triage is a type of triage that emergency nurses perform in an ED. The goal is to identify the most severe patients who are in need of immediate care (Qureshi & Venema). ED triage is composed of primary triage decisions and secondary triage decisions (Gerdtz & Bucknall, as cited in Considine, Botti, & Thomas, 2007). Primary triage decisions are related to the procedures of the primary assessment and the allocation of treatment resources to the patients most in need. Secondary triage decisions are related to the initiation of nursing interventions, and involve the provision of comfort to patients (Gerdtz & Bucknall, as cited in Considine et al., 2007). This study focused on the primary triage skill of the emergency nurses, which included the procedures of rapid assessment, patient categorization, and patient/resource allocation (Proehl, 2007; Sharma, 2005).

To maintain the effectiveness of ED triage, emergency nurses require triage skill, which is centered around the decision-making ability to prioritize patients into the most correct urgency-of-care categories within a limited space of time (Andersson, Omberg, & Svedlund, 2006; Gerdtz & Bucknall, 2001; Gilboy, Travers, & Wuerz, 1999). There are several factors related to the triage skill of emergency nurses, including triage knowledge (Andersson et al., 2006; Considine et al., 2007), training experience (Chung, 2005; Kelly & Richardson, 2001; McNally, 1996), and work experience (Andersson et al.; McNally). Other factors have also been reported, such as working environment (Andersson et al.) and personal
characteristics (Goransson, Ehrenberg, Marklund, and Ehnfors, 2006). This study focused on triage knowledge, training experience, and work experience, as these three factors were believed to be the most significant, according to the literature review.

In Indonesia, every province has one or two tertiary hospitals and 10 to 15 secondary public hospitals which provide emergency service to patients 24 hours a day. Nearly all EDs are overcrowded, with 50-70 cases per shift being common. The cases involve both traumatic and non-traumatic illnesses. There are 20 to 25 nurses on duty per shift. However, they are assigned to work in several areas of the ED, such as in the triage room, the critical area, the intermediate ward, ambulatory care, the operating theatre, the intensive observation ward, and on ambulance duty. Only one to three emergency nurses per shift work in the triage room of each ED. The ratio of triage nurses to patients is 1:25–30, approximately. Wardhani (2001) found that the mortality rate in the EDs of hospitals in East Java province was 26.4%. Since every hospital in Indonesia is concerned with patient safety issues and with providing the highest quality of care, it is necessary to examine emergency nurses’ triage skill and its related factors. The study is expected to provide useful information to improve triage skill among emergency nurses in Indonesia.

Objectives

1. To determine the level of triage skill possessed by emergency nurses in East Java Province, Indonesia.

2. To examine the relationships between triage knowledge, training experience, work experience, and triage skill among emergency nurses in East Java Province, Indonesia.

Technical terms

Triage skill refers to the level of the nurses’ ability to make decisions accurately and timely in the following areas: rapid assessment, patient categorization, and patient allocation. It was measured by the Triage Skill Questionnaire (TSQ).

Triage knowledge refers to the level of factual and procedural knowledge required for emergency nurses to perform rapid assessment, patient categorization, and patient allocation. It was measured by the Triage Knowledge Questionnaire (TKQ).

Training experience refers to the amount and types of previous training in triage and related topics that the nurses had acquired over the past three years. It was measured by using a training index.
Work experience refers to the number of months each participant had worked as an emergency nurse.

**Framework of the study**

The conceptual framework of this study was derived from the synthesis and integration of the literature review, which was conducted in the area of emergency nursing. Triage skill in an ED was defined as the ability of emergency nurses to use their decision-making capabilities to prioritize patients into the right categories within a limited space of time (Andersson et al., 2006; Gerdtz & Bucknall, 2001; Gilboy, 2005). Triage skill includes rapid assessment, patient categorization, and patient allocation (Bracken, 2003; Gilboy, Zimmerman, & Herr, 2006; Gilboy & Travers, 2007). The three main factors that are related to the triage skill of emergency nurses are triage knowledge (Andersson et al., 2006; Considine et al., 2007), training experience (Chung, 2005; Kelly & Richardson, 2001; McNally, 1996), and work experience (Andersson et al.; McNally).

**Research methodology**

This descriptive research study was conducted during January and February of 2010. The target population was the emergency nurses working in the EDs of the public hospitals in East Java Province, Indonesia. Two tertiary and two secondary hospitals were selected, based on convenience factors. All the nurses working in the emergency departments of these hospitals were recruited as participants. An inclusion criterion regarding educational background was that each participant had to hold, at minimum, a diploma in nursing. Of the 306 emergency nurses, 266 met this criterion.

The data were collected using a set of questionnaires developed by the researcher and based on the literature review. Collection instruments consisted of the following items:

1. The Demographic Data Sheet (DDS) focused on personal characteristics, training experience, and work experience. Training experience in the past three years was interpreted using a training index in which higher scores reflected greater training experience. Work experience was evaluated by simply using the number of months each emergency nurse had worked, where more months reflected greater experience.

2. The Triage Skill Questionnaire (TSQ) was a 37-item questionnaire with three dimensions: rapid assessment, patient categorization, and patient allocation. Subjects were
asked to respond to each item using a 1-5 rating scale: 1 = needs improvement, 2 = poor, 3 = fair, 4 = good, and 5 = very good. The possible range of the total scores was from 37 to 185. The numerical scores were converted to percentages. Based on the referenced criterion, the percentages were interpreted as follows: < 60% = low level of triage skill, 60-80% = moderate level of triage skill, and > 80% = high level of triage skill.

3. The Triage Knowledge Questionnaire (TKQ) consisted of 35 items. Each question had four choices. A correct answer for each item received a score of 1 and an incorrect answer received a score of 0. Higher scores indicated that the nurses had more knowledge. The possible range of the total scores for triage knowledge was from 0 to 35. The numerical scores were converted to percentages. Using the referenced criterion, the percentages were interpreted as follows: < 60% = low level of knowledge, 60-80% = moderate level of knowledge, and > 80% = high level of knowledge.

The content validity of the questionnaires was evaluated by three experts. The questionnaires were then translated to the Indonesian language using the back-translation method by two bilingual translators from the Nursing Science Program at Brawijaya University in Malang, Indonesia. The translated version was tested for reliability among 20 emergency nurses. The internal consistency of the TSQ was analyzed using Cronbach’s alpha coefficient, yielding a result of 0.93. With a test-retest method, the correlation coefficient of the TKQ was found to be 0.99.

Research approval was obtained from the Institutional Review Board (IRB) of the Faculty of Nursing, Prince of Songkla University, and the ethical committee of medical research at the medical faculty of Brawijaya University. The researcher also obtained permission from the directors of the hospitals involved. The researcher met with the head nurse of each ED, who introduced the researcher to the emergency nurses in order to explain the purposes and benefits of the study. The subjects who agreed to participate in the study were requested to sign a consent form. The researcher maintained the anonymity of the subjects by using code. The subjects were asked to answer the questionnaires and return them to the researcher within one week.

The characteristics of the subjects were analyzed with descriptive statistics. The assumption of a normal distribution was made for the areas of triage skill, triage knowledge, and work experience. Therefore, the Pearson’s moment correlation coefficient (r) was used to analyze the correlation between these variables. However, the training experience scores
were not normally distributed, so the researcher used Spearman Rho to analyze the correlation between training experience and triage skill.

Results

The majority of the participants (71.40%) were female, and they were between 22 to 53 years old (mean = 33.37, SD = 7.54). Most of the subjects (94.40%) had a diploma in nursing. Three-fourths of the subjects (75.60%) had been working in tertiary hospitals; the rest (24.40%) had been working in secondary hospitals. The ED environments in the selected hospitals were uniformly overcrowded. In the tertiary hospitals, there were 25–40 emergency nurses on duty per shift. Two or three of those were assigned to work in the triage room, in which the ratio of triage nurses to patients was approximately 1:30-40. In the secondary hospitals, there were 6-7 emergency nurses on duty per shift. A general physician and a nurse had responsibility for the triage room, and the ratio of triage nurses to patients in that room was approximately 1:25-40.

During the three years prior to the study, all subjects had attended the Basic Life Support (BLS) training course, 59.39% had attended the Basic Trauma Life Support (BTLS) training course, 30.83% had attended the Advanced Life Support (ACLS) training course, and 29.32% had attended the Triage Officer Course (TOC). The mean training index score for training experience was 4.47 (SD = 3.19), which was considered to be low. More than half of the subjects (58.30%) had low triage knowledge scores, with the mean score being 55.26 (SD = 13.16).

More than half of the subjects (51.90%) had greater than five years of work experience in EDs. However, most (82.30%) had less than five years of work experience in actual triage rooms. Only 17.70% had worked in triage rooms for more than five years. At the time of the study, only 16.20% were working in triage rooms. The mean score for work duration was a moderate 59.48 months (SD = 33.81). Most of the subjects (65.40%) perceived their overall triage skill to be at a moderate level, and they felt the same towards each of the sub-dimensions of triage skill. The mean score for overall triage skill was 75.12 (SD = 11.23), which was considered moderate.

Significant, positive relationships were found to exist between triage skill and the three factors: triage knowledge (r = .38, p < .01), training experience (r = .37, p < .01), and work experience (r = .27, p < .01) (Table 1).
Table 1

Relationship Between the Three Factors and Triage Skill, Using Pearson’s Product Moment Correlation and Spearman Rho (N = 266)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Triage skill</th>
<th>Triage knowledge</th>
<th>Training experience</th>
<th>Work experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triage skill</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triage knowledge</td>
<td>.38**</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training experience (a)</td>
<td>.37**</td>
<td>.28**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Work experience</td>
<td>.27**</td>
<td>.43**</td>
<td>.31**</td>
<td>-</td>
</tr>
</tbody>
</table>

** p < .01 , (a) = using Spearman Rho

Discussion

The EDs of the selected hospitals were consistently overcrowded. In addition, the ratio of triage nurses to patients was 1:20-30, which was significantly higher than the standard ratio of 1:4 in the US (Malone, 2003). The work load situations were thought to impact quality of care and patient outcomes, particularly for patients with critical conditions who should be prioritized to receive emergency care (Milbrett & Halm, 2009). Andersson, Omberg, and Svedlund (2006) stated that the environment in an ED can affect the triage process and is an external factor in triage skill and decision making. However, most triage nurses in this study performed the triage process while accompanied by a physician, so that may have reduced the number of incorrect decisions made by the nurses.

The findings showed that almost all subjects (94.40%) had graduated with a diploma in nursing. This was different from a study in Australia, in which Gerdtz et al. (2001) found that their subjects had bachelors’ degrees in nursing, were certificated in emergency nursing, and possessed masters’ degrees in emergency nursing. This may have been why the mean score for the triage knowledge of the nurses in this study was at a comparatively low level. In addition, though all subjects in this study had attended a BCLS training course, few had attended such a course specifically for triage. The mean score for training experience was thus at a low level. This indicated that emergency nurses in Indonesia should spend more time reviewing triage knowledge. Continuing education or training courses related to the triage process should be provided for them. Such training regarding triage skill could allow emergency nurses to conduct triage tasks more effectively, thus resulting in better patient outcomes due to reduced triage errors in EDs (Kelly & Richardson, 2001).
The mean score for work experience was at a moderate level. Fifty percent of the subjects had work experience of more than five years. Similarly, Chung (2005) and Fry and Burr (2001) found that the work experience of emergency nurses in their studies was also more than five years. However, only 17.70% of the subjects in this study had work experience of more than five years in a triage room. At the time of the study, only 16.20% were working in a triage room. Thus, the mean score for triage skill was found to be at a moderate level. Similarly, Salonen, Kaunonen, Meretoja, and Tarkka (2007) found that the perceived self-assessed competence of nurses working in emergency settings was only moderate.

Even though there were significant positive correlations between triage skill and the three selected factors: work experience, training experience, and triage knowledge. All correlations were at a low level. This finding was similar to finding of the previous study (Salonen, Kaunonen, Meretoja, & Tarkka, 2007). They found that competence of emergency nurses had correlation with working experience ($r = .27, p = .001$). In addition, Goransson, Ehrenberg, and Marklund (2006) found that working experience in ED was significance relationship with triage decisions ($r = .13, p = .008$). Moreover, Hicks et al. (2003) 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 five studies which found that there was no significant relationship between experience and triage decision making in triage skill.

Training experience had low correlation with triage skill. Consistency, study of Forsgren, Forsman, and Carlstrom (2009) suggested that the regular training of triage could improve skill of nurses to handle stressful work situation. Triage knowledge had relationship with triage skill. This finding was congruent with previous study. Considine et al. (2007) reviewed four studies that examined the effect of factual knowledge on triage decisions. The three studies found that the factual knowledge had relationship with triage decisions in triage skill. Moreover, Evans and Donelly (2006) found that there were relationship between knowledge, skill, and judgment in nursing practice. They showed that nursing skill supported by knowledge and judgment. In addition, Smith and Cone (2010) revealed the relationship between decision making, knowledge, and intuition with clinical experiences ($r = .27, p = .001$). Their finding revealed that the total triage knowledge had relationship on the total triage skill among emergency nurses ($r = .38, p = .009$). In contrast, the study of Considine, Ung, and Thomas (as cited in Considine et al., 2007) showed there was not correlation between accuracy triage of triage decisions and triage knowledge.
Conclusions

The findings revealed that the emergency nurses in this study had nursing diplomas and worked in EDs which were overcrowded. Their triage knowledge and training experience were at a low level, whereas their work experience and triage skill were at a moderate level. There were significant positive relationships between their triage skill and the three other factors, but with low levels of correlations.

Recommendations

One limitation of this study was that triage skill was measured using self-reporting. Participatory observation might be a more useful technique, as it would probably decrease any negative effects of self-reporting. The following recommendations were made based on these findings: 1) Nursing practice in triage rooms should be a primary duty. The role of emergency nurses in the triage process should be improved using the evidence from the current research study. 2) Nursing administrators should be concerned about the necessity of improvement of the triage skill of emergency nurses, as this has a great impact on the quality of care and patient safety. 3) Further research should be conducted to test the effectiveness of educational programs and training courses on triage knowledge and triage skill for emergency nurses. Patient outcomes should be measured in order to help evaluate the effectiveness of nursing practice in triage areas.

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References


