

Factors related to Emergency Room Discharge Destination among Patients with Trauma*

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Abstract

Purpose: To investigate the relationships between age, physiological deterioration, co-morbidity and emergency room discharge destination among patients with trauma.

Design: Descriptive correlation design.

Methods: The sample composed of 300 patients with traumatic injuries in emergency department, Bach Mai Hospital in Hanoi, Vietnam. Data were collected from the patient's hospital chart. Spearman's Rho was employed to test the relationships among studies variables.

Main findings: Approximately 60% of patients with traumatic injuries (59.7%) were admitted in hospital, while 35.4% received surgery and/or admitted to intensive care unit. About 40.3% received treatment and were discharged from emergency department to home. Physiological deterioration as measured by Modified Early Warning Score, age, and co-morbidity were positively correlated with emergency room discharge destination ($r_s = .38$, $r_s = .14$, $r_s = .16$, $p < .05$).

Conclusion and recommendations: Modified Early Warning Score should be used to classify trauma injuries patients on their arrival at the emergency department. Hence, the patients can receive appropriate treatment at the right time. Co-morbid diseases should be routinely assessed in all trauma injuries patients on arrival at the emergency room.

Keywords: trauma, Modified Early Warning Score, physiology deterioration, co-morbidity, emergency room discharge destination

J Nurs Sci. 2017;35 Suppl 1:31-38

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ปัจจัยที่มีความสัมพันธ์กับปลายทางการจำหน่ายจากห้องฉุกเฉินของผู้ป่วยบาดเจ็บ*

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาความสัมพันธ์ระหว่าง อายุ การเปลี่ยนแปลงทางสรีระ และโรคร่วมกับปลายทางการจำหน่ายจากห้องฉุกเฉินของผู้ป่วยบาดเจ็บ

รูปแบบการวิจัย: การวิจัยเชิงสหสัมพันธ์

วิธีดำเนินการวิจัย: กลุ่มตัวอย่างประกอบด้วยผู้ป่วยบาดเจ็บจำนวน 300 คน ที่เข้ารับการรักษา ณ ห้องฉุกเฉินของโรงพยาบาลbcmay กรุงเทพมหานคร โดยเก็บข้อมูลจากเวชระเบียนของผู้ป่วย วิเคราะห์ความสัมพันธ์ระหว่างตัวแปรด้วยการใช้สถิติ Spearman's Rho

ผลการวิจัย: กลุ่มตัวอย่างร้อยละ 59.7 ได้รับการรักษาตัวในโรงพยาบาล ในจำนวนนี้ร้อยละ 35.4 ได้รับการรักษาด้วยการผ่าตัดและรับการรักษาตัวในหอผู้ป่วยหนัก ผู้ป่วยร้อยละ 40.3 ได้รับการรักษาแบบผู้ป่วยนอก และได้รับการจำหน่ายกลับบ้าน การเปลี่ยนแปลงทางสรีระ ซึ่งประเมินโดย Modified Early Warning Score (MEWS) อายุของผู้ป่วย และการมีโรคร่วม มีความสัมพันธ์ทางบวกกับปลายทางการจำหน่ายจากห้องฉุกเฉิน ($r_s = .38$, $r_s = .14$, $r_s = .16$, $p < .05$)

สรุปและข้อเสนอแนะ: ผู้ป่วยบาดเจ็บฉุกเฉินทุกคนควรได้รับการประเมินภาวะการเปลี่ยนแปลงทางสรีระด้วย Modified Early Warning Score และได้รับการประเมินโรคร่วม เมื่อมาถึงห้องฉุกเฉิน เพื่อใช้ในการตัดสินใจในการรักษาที่ถูกต้องภายในเวลาที่เหมาะสม

คำสำคัญ: การบาดเจ็บ คะแนน MEWS การเปลี่ยนแปลงทางสรีระ โรคร่วม ปลายทางการจำหน่ายผู้ป่วยจากห้องฉุกเฉิน

J Nurs Sci. 2017;35 Suppl 1:31-38

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Background and Significance

Nowadays, many central hospitals in Hanoi, Vietnam are suffering from critical patients overload. Especially at the emergency room (ER), in which there are various groups of patients with emergency illnesses visiting to receive urgent and advanced treatment.¹ Every day, there are over 300 patients with traumatic injuries come to emergency unit at Bach Mai Hospital, most of them are very severe with single organ or multiple organs injuries. Patients who have severe multiple organs trauma, will lead to alteration of vital organ functions such as respiratory distress, hypovolemic shock, cardiogenic shock, severe pain, and alteration of consciousness.^{2,3}

Immediately on patients' arrival, they need to be classified their severity of illnesses (triage) by nurses, so that proper management can be performed.⁴ Initial triage is the essential function of the ER; the purpose of triage is to screen and prioritize incoming patients as well as to identify those who cannot wait to be treated.⁴⁻⁶ The triage nurse performs a brief assessment and assigns a triage acuity level to each patient according to the urgency of required medical treatment, which is a proxy measure of how long an individual patient can safely wait for a medical screening examination, advanced investigation, specific treatment, and decision about where to send or discharge the patients from ER to obtain further and proper treatment or so call discharge destination.^{6,7}

Normally, patients' severities are categorized into five levels including: 1) patients requiring immediate treatment to save life, 2) emergent patients, patients who require treatment within 4 minutes after ED arrival, 3) urgent patients, patients who can wait for more than 4 minutes but they require continuous monitoring, 4) semi-urgent patients, patients who can wait for treatment for longer than 30 minutes because they demonstrate minor illness with minor alteration of vital sign, and 5) non-urgent patients refers to ones who demonstrate minor illness without alteration of

vital sign, they can wait for medical diagnosis for longer than one hour. However, the non-urgent patients have to receive medical diagnosis within 2 hours. Patients in this group might receive treatment or discharge from ER without any treatment.⁶ The goal of the severity categorization is quickly classified patients according to priority of emergency with the principle "put the patients in the right place, right time, right reason, to receive care from the right doctors".⁶ Accurate patients' acuity classification can decrease patients' mortality and morbidity, decrease patients overcrowded at the ER, leading to decrease waiting time and increase patients' satisfaction.^{6,7}

There are various scales to assess physiological deterioration or the severity of patients' injury, for example: Abbreviated Injury Scale (AIS), Injury Severity Score (ISS), Modified Early Warning Score (MEWS), and Glasgow Coma Scale (GCS).^{8,9} One useful tool for classify patients according to their physiological deterioration that have been widely accepted to use in acute care settings and ER is the MEWS.⁹ The primary purpose is to prevent delay in intervention or transferring critically ill patients to intensive care units.^{8,10,11} The MEWS can be used in decision making on hospital admission or can be used to predict mortality and morbidity of acute care patients accurately.^{9,12} Nurses in ER can use the MEWS to triage and monitor patients in order to make decision about their severity and care needed. Accordingly, the results from MEWS can be used to predict patients discharge destination from ER.⁹⁻¹²

The presence of co-morbidity indicates the presence of chronic diseases other than the one that require emergency treatment at the time. Co-morbidity is another important factor that affects emergency room discharge destination. The co-morbidities commonly found among adult patients are hypertension, diabetes mellitus, hyperlipidemia, coronary heart disease, and stroke. Patients with multiple co-morbid diseases are at risk of developing more

physiological deterioration and require close monitoring with care services.¹³

Another important factor that affects trauma patients' discharge destination from emergency room is the age of patients. Elderly patients usually have physiological deterioration due to normal aging process, for example, impaired immune system, decreased blood vessel elasticity and bone density.^{14,15} Elderly patients with traumatic injuries are more likely to become more severe and require hospital admission or admission to intensive care units, and also increase mortality rate.¹⁶ On the other hand, they usually received under-triage on emergency room arrival because their vital signs will not show remarkable alteration from normal range. Lehmann and the others stated that when the elderly patients arrived at ER they often received less attention from rapid trauma evaluation which led to increased mortality due to delayed treatment.¹⁵

In Vietnam, research in the area of emergency room triage is still received little attention, so that there is no scientific evidence to support or give direction on emergency care. In particular, the study regarding emergency room discharge destination is not existed. Therefore, the researcher would like to explore characteristic of patients, physiological deterioration, co-morbidity, and their correlation to discharge destination in traumatic injury patients. The results can help nurses understand the existing problems and use evidence from research to improve the quality of care in trauma patients at emergency room.

Objective

To investigate the relationships between age, physiological deterioration, co-morbidity and emergency room discharge destination among patients with trauma.

Hypothesis

Age, physiological deterioration, co-morbidity were related to emergency room discharge destination among patients with trauma.

Methodology

Population and Sample

Population of this study included patients with trauma injury who came to receive treatment at trauma emergency room in Bach Mai Hospital, Hanoi, Viet Nam.

Sample was selected from the population with the inclusion criteria: 1) aged 18 years and older, 2) was able to communicate in Vietnamese language.

The sample size was calculated using G*power program to determine the minimum number of participants needed for correlational design. The level of significance was set at $\alpha = .05$, Power $1 - \beta = .80$ and Test of hypothesis (two-tail). The effect size was calculate from correlation between age and discharge outcome¹⁷ ($r_s = .16$). So the sample size was calculated to be 301 patients.

Research Instruments

Four instruments were used for data collection.

1. Demographic data and health information record form.

2. The Modified Early Warning Score (MEWS): MEWS was used to collect five physiological variables; systolic blood pressure, heart rate, respiratory rate, body temperature, and level of consciousness. Each variable coefficient was a score range from 0-3 points based on the severity of symptoms; a score of 3 meant highest severity. The possible total scores ranged from 0 to 14. The higher score reflect the more severity of physiological deterioration.

3. The Co-morbid Diseases Check List: It was developed by the researcher. The scale composed of items of common chronic diseases and other diseases that occur before the injury at this time. The check list on each disease item was "yes" (1 score) and "No" (0 score), then summed up to be a total score of co-morbidity.

4. The Record Form for Patient's Discharge Destination: It comprised 3 items; (1) discharged home after receiving treatment or investigation, (2) admitted in a general ward in the hospital,

and (3) received surgery and or admitted in the intensive care unit. The score ranged from 1 to 3.

All questionnaires were translated into Vietnamese by a Vietnamese English teacher who works at the English center of Bach Mai Hospital. The translation process was approved on its accuracy by the English center of the hospital. After translation, they were verified by 5 experts from the department of surgical, the Dean of trauma department, doctors, head nurse and a senior registered nurse. All experts approved the instruments with minor changes. MEWS was widely instrument for measuring physiological deterioration of patients in acute care settings. The permission to use this scale is not required. Because, MEWS is a standard scale, the calculation of the scores relies on the vital signs of patients so that this instrument was not tested for its reliability. However, to confirm the reliable of measurement, the researcher used the same medical equipment to measure vital signs of the sample. The equipment was belonged to the research setting and was regularly check on its accuracy by the technicians of the hospital.

Protection of Human Subjects

This project was approved by the Institutional Review Board (IRB) of Faculty of Nursing, Mahidol University, Thailand (COA No.IRB-NS2016/343.0205) and IRB of Vietnam National University, Vietnam. The researcher recruited subjects as standard process specified by the IRB. The issues of independently to make decision to consent both verbal and written, anonymity, and confidentiality were warranted.

Data Collection Process

Data collection process was described below:

1. After getting permission to collect data from the Bach Mai Hospital, the researcher met the director of Bach Mai Hospital, the head of nursing department, and the head nurse of trauma department, and explained the purpose and procedure of data collection.

2. In this study, data was collected from emergency room record sheet (patients' charts) which include all data needed for the study.

Data Analysis

Data were analyzed using the computer statistical package with the statistical significant level at .05. Descriptive statistics, frequency, percentage, mean, standard deviation, were used to describe the general characteristics, characteristics related to traumatic injuries of the subjects, and studied variables. The researcher tested the variables for their normal distribution in which all variables were not normal distributed. Accordingly, Spearman's Rho Correlation (r_s) was employed to test the relationship between independent and dependent variables.

Findings

General characteristics of the subjects

More than half of subjects were male (63.0%), age ranged from 18 to 91 years with the average age was 39.95 years (SD = 18.6 years). About 51.3% were married, finished high school education (34.3%), and resided in Hanoi (75.3%). In regard to the socioeconomic status, 24% of subjects were industrial workers, and 67% earned monthly incomes from 100-300 USD. About 57.7% had governmental insurance while the rest did not have any kind of insurance and had to self-pay for the treatment expense. About 43.7% had previous illness before ER visit, and hypertension was most frequently found (27.7%), 13.3% had history of allergy, 14.0% received pre-hospital treatment before ER arrival, 23.0% patients were regular smokers, and 14.0% were regular alcohol consumer.

Characteristics of injuries/Trauma

The highest percentage (56.7%) of subjects was road traffic injury; the highest percentage (50.5%) of injury area was bone fracture; with 47.0% were diagnosed as injury. (Table 1)

Table 1: Characteristics of injuries/Trauma (n = 300)

Injury Characteristics	Number	Percentage
Type of injury		
Physical assault	80	26.7
Road traffic injury	170	56.7
Fall	45	15.0
Burn	5	1.7
Injury area (more than one areas were reported)		
Brain	110	36.7
Chest	52	17.3
Head, face, neck	149	49.7
Abdomen	45	15.0
Bone fracture	151	50.5
Diagnosis		
Injury	141	47.0
Fracture	88	29.3
Multiple fractures	31	10.3
Burn	4	1.3
Brain injury	36	12.0

Emergency room discharge destination

More than a half of the subjects (59.7%) had to admit to the hospital while 35.4% had to receive surgery and/or admitted to ICU. About 40.3% of them received treatment and were discharged home.

Correlation between age, physiological deterioration (MEWS), co-morbidity, and emergency room discharge destination

Three variables including age, physiological deterioration (MEWS), and co-morbid disease were correlated with emergency room discharge destination ($r_s = .14$, $r_s = .38$, $r_s = .16$, $p < .05$). (Table 2)

Table 2: Correlation between age, physiological deterioration (MEWS), co-morbidity, and emergency room discharge destination (n = 300)

Variable	Discharge destination
Age	.14*
Physiological deterioration (MEWS)	.38*
Co-morbidity score	.16*

* $p < .05$, Spearman's Rho Correlation

Discussion

Results of this study supported the proposed hypothesis that age, physiological deterioration (MEWS), and co-morbidity were related to emergency room discharge destination significantly. The result was congruent with previous studies among elderly patients with

emergency illnesses. Aged patients who suffered with one main chief complain, their illnesses would be more severe comparing with patients who were younger. Moreover, they were more likely to show higher rate of morbidity and mortality after injury.^{16,18} Result of the present study showed that age was confirmed as an

independent predictor of outcome in injuries, people with higher age had higher likelihood to transfer to the ward or having surgery or being admitted to ICU. Regarding co-morbidity, the study found that trauma patients suffering more co-morbidity were more likely to be transferred to the in-patient ward or had surgery or needed to receive close monitoring in ICU rather than discharging to home.¹³ Co-morbidity is an important factor that might affect emergency room discharge destination in emergency trauma adult patients. The relations between emergency room discharge destination in emergency adult patients and severity of physiological deterioration has been well-documented. Previous studies found that increasing MEWS were correlated with increasing the level of severity of emergency room discharge destination.^{7-9,11,12} This study is among the first study applied this instrument to screen the health status of trauma patients in Vietnam. The result regarding MEWS was consistent with previous evidences. MEWS were used to predict the outcome of emergency room discharge destination such as released back home, ordinary patient wards of hospital, treatment in critical care units or death.¹¹

Conclusion including Implication

From evidences found in this study, it can be summarized that traumatic injury patients visiting emergency room require closely attention. In particular, those with older age with co-morbid disease, and showed the poor alteration in their physiological deterioration scores should receive close monitoring throughout their stay in emergency room. This evidence is useful to improve the triage system in the emergency department in Bach Mai Hospital. It helps to prioritize incoming patients and to identify those who cannot wait to be seen. The triage nurse can use the evidences of this study to perform a brief, focused assessment

and classify the patients according to their severity. Hence, trauma patients will obtain the right treatment on the right time. Multi settings research should be conducted to add more samples and more variety of settings in Vietnam. The results from the multi settings research can be used to test psychometric property of MEWS in Vietnamese context.

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