FACTORS RELATED TO EMERGENCY ROOM DISCHARGE DESTINATION AMONG PATIENTS WITH TRAUMA

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ABSTRACT

In Vietnam, research in the area of emergency room triage still received little attention and there is no scientific evidence to support or give direction on emergency care. In particular, studies regarding emergency room discharge destination do not existed. This research aimed to study the relationships of age, physiological deterioration, co morbidity with emergency room discharge destination among patients with trauma. This was a descriptive correlational study conducted among 300 patients with sustained traumatic injuries and attended clinic in the trauma department, Bach Mai hospital in Hanoi, Vietnam. Data was collected from the patients' chart and Spearman's rho was employed to test the relationships between age, physiological deterioration (measured by MEWS) and co morbidity to emergency room discharge destination. Majority of the patients were male (63.0%). About 43.7 % of them had previous illness before ER visit and hypertension was the co morbid disease most frequently found (27.7%). The majority of patients sustained road traffic injury (56.7%). Bone fracture and head, face, neck injury were the major injury areas with 50.5% and 49.7%, respectively. The mean of MEWS was 1.7 (SD± 1.91). About 38.7 % of the sample showed pain level of greater than 8 on 0-10 NRS with the mean of 8.28 (SD ± 1.06). Majority of the participants (81.7%) had Glasgow coma scores between 13-15, with the mean scores of 13.77 (SD ±2.76). Most of them (59.7%) had been admitted in the hospital while 35.4 % received surgery and or admitted to intensive care unit (ICU).About 40.3% of the sample received treatment and were discharged. MEWS Score, co morbidity and pain score were positively correlated with emergency room discharge destination while Glasgow coma score was negatively correlated with emergency room discharge destination. From the results of this study it is recommended that MEWS should be utilized to classify trauma emergency patients to appropriate service to reduce workload and improve the service in emergency department. Patients should be assessed for pain level for proper pain management. Co morbid diseases as well as Glasgow coma scores should be routinely assessed in all patients on arrival at the emergency room.

KEY WORDS: TRAUMA/MEWS/ PHYSIOLOGY DETERIORATION/ CO – MORBIDITY/EMERGENCY ROOM DISCHARGE DESTINATION.

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CHAPTER I
INTRODUCTION

1.1 Background and significance of the study

Now a day, many central hospitals in Hanoi are suffering from a serious patient overload. Especially emergency departments in major hospitals in which there are various groups of patients in emergency illnesses visiting to receive urgent and advanced treatment (Cuong, 2009). Those patients visit the hospital due to emergency illnesses both from trauma and non-trauma conditions. In Bach Mai hospital, there are two separated units for providing treatment for patients in emergency illnesses. One department is called emergency department in which provide the treatment for non trauma emergency patients. While the other one is called trauma surgical department in which providing treatment and surgery for patients with trauma and surgical emergency. Every day, there are over 300 patients sustaining traumatic injuries come to trauma emergency unit (Source VN express updated, May 2015), most of them are very severe with single organ or multiple organs injuries. In Vietnam there is an evidence to support that about 180,000 patients visiting trauma emergency unit with traumatic injuries. These numbers are similar to what have found in the USA (192,000 people per year)(*CDC updated, February 2014*). Comparing with the total population between Vietnam and USA, the ratio of people sustaining trauma injuries in Vietnam is tremendous higher.

When the patients having severe trauma which can damage many body organs, it will lead to the alteration of signs and symptoms such as respiratory distress, hypovolemic shock, cardiogenic shock, severe pain, and alteration of consciousness (Born, 2003). However, there are evidences to show that some patients who come to the emergency room do not receive immediate care so that triage system is needed (Manesh, Montan, Lennquist, & ortenwall, 2010). Initial Triage is the essential function of the emergency department because it helps reduce overload of patients. The purpose of triage in the emergency department (ED) is to prioritize incoming

patients and to identify those who cannot wait to be seen. The triage nurse performs a brief, focused assessment and assigns the patient a triage acuity level, 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 emergency room to obtain further and proper treatment or so call discharge destination (Elias & Damle, 2015).

Discharge destination is needed in emergency department (Camberg, 1997), when assess the patient with trauma, all patients require further screening in order to determine the level of injury severity, organ of injuries and any other related problems such as internal bleeding (Elias & Damle, 2015). This screening would categorize the severity of illness according to the urgency of medical treatment requirements to treat and solve abnormalities and save lives. Normally, patients' severities are categorized into five levels include 1) patients requiring immediate treatment; 2) emergent patients, 3) urgent patients, 4) semi-urgent patients and 5) non-urgent patients (Gilboy, Tanabe, Travers, & Rosenau, 2012). The classification of patients will help critically ill trauma patients receive advanced treatment promptly and emergency department can arrange and allocate appropriate human resources. The goal of the emergency classification is quickly classified patients according to priority of emergency with the principle "Put the patient in the right place, right time, right reason by "right doctors specialist perform" (Gilboy et al., 2012). Therefore, triage measurement is very important to help patients from dying and complications from severe trauma.

There are a lot of scales to assess physiological deterioration of the patients namely: Abbreviated injury scale (AIS), Injury severity score (ISS), glasgow coma scale (GCS) (Bele et al.,2012). A useful tool for triage, identify and classify patients according to their physiological deterioration that have been widely accepted to use in emergency room are Modified Early Warning Score (MEWS). The Modified Early Warning Score (MEWS) is a simple, physiological score that may allow improvement in the quality and safety of management provided to surgical ward patients. The primary purpose is to prevent delay in intervention or transfer of critically ill patients (Gardner-Thorpe, Love, Wringhtson, Walsh, & Keeling, 2006). Mews can be used in decision making on hospital admission or can be used to predict

mortality and morbidity of acute care patients accurately (Burch, Tarr, & Morroni, 2008). Moreover, MEWS can be identified hospitalised patients in need of a higher level of care such as intensive care unit too (Groarke JD, 2008) (Gottschalka, Warnerb & Wallis, 2012) . It is one of the scales that have been widely used among patients with physiological deterioration (Burch et al., 2008). Nurses in emergency room can use 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 emergency room like ICU, inpatient ward or home. However, there are other factors associated with patients discharge destination such as patients' age (Ahn, 2015) and co morbidity (St-Louis, 2015; Godbolt, 2013).

The presence of co-morbidity indicates the presence of chronic diseases other than those that are the main cause for patients to require emergency treatment at the time. The majority of co-morbidities found in ordinary people who receive hospital treatment are internal illnesses or symptoms. Co-morbidity is another important factor that affects emergency room discharge destination in emergency adult patients. The main co-morbidities commonly found are hypertension, diabetes mellitus, hyperlipidemia, coronary heart disease and stroke. Patients with co-morbidities will face complications during treatment and cause the pathology of the primary illness to be more severe (Cousins et al., 2013) (Di Iorio, Cillo, Cirillo, & De Santo, 2004 , e.g., disruptions to the functions of the body's systems, such as of the cardiovascular system, respiratory system and renal system, than patients without any co-morbidity. Furthermore, patients with co-morbidity will require treatment in special-care units.

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. Accordingly, the researcher would like to explore characteristic of patients, physiological deterioration, co morbidity and their correlation to discharge destination in trauma injury patient. The result can help managers, nurses see the existing problems in order to improve and enhance the quality of examination and treatment in trauma emergency department.

1.2 Research question

1.2.1 Are age, physiological deterioration and co-morbidity related to emergency room discharge destination in trauma patients?

1.3 Purpose of the study

To identify if age, physiological deterioration and co-morbidity are related to emergency room discharge destination among patients with trauma.

1.4 Hypothesis

1.4.1 Age is positively related to emergency room discharge destination in trauma emergency adult patients.

1.4.2 Physiological deterioration is positively related to emergency room discharge destination in trauma emergency adult patients.

1.4.3 Co-morbidity is positively related to emergency room discharge destination in trauma emergency adult patients.

1.5 Framework of the study

The researcher used the framework of this study from literature review as well as the physiological change of patients sustaining traumatic injuries as a framework of this study. After sustaining traumatic injuries, patients will experience physiological change which reflected by changing of their vital signs including their heart rate, systolic blood pressure, respiratory rate, body temperature and their level of consciousness. These alterations can be detected by a specific scoring system such as MEWS (Thorpe, 2006)

However, there are two important factors related to the change of physiological deterioration which eventually effect patients discharge destination. Those include patients' age and co morbidity. Patients with older ages comparing with patients with younger ages are at risk of physiological dysfunction when they

experience traumatic injuries (Caterino & Moseley, 2013). Similarly to co morbidity, patients who have underlining chronic illness such as heart diseases, chronic respiratory diseases, diabetes, hypertension or chronic kidney disease would have more risk than those who do not have any co morbidity (Brattstrom, Granath, Rossi, & Oldner, 2010).

The relationship among independent variable and dependent variable is illustrated in the following conceptual framework.

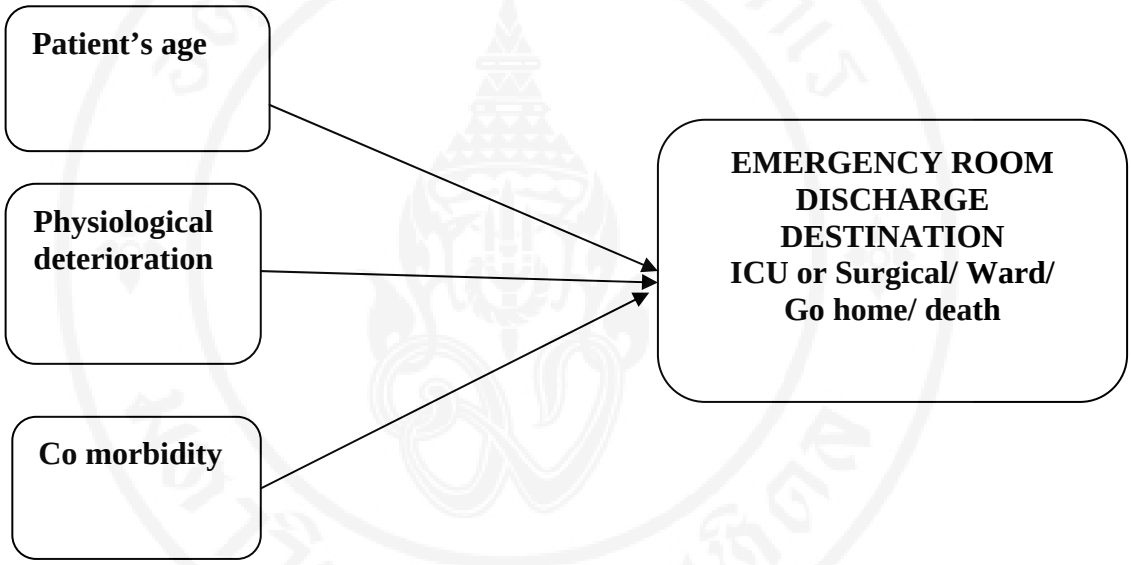

Figure 1.1 Framework of this study

1.6 Scope of the study

This study aims to assess factors related emergency room discharge destination in patients with trauma who come visits trauma department, Bach Mai hospital, Hanoi, Vietnam.

Time to collect data of patients from August to October, 2016

1.7 Expected outcomes and benefits

1.7.1 Nurses can use the MEWs to classify trauma patients in emergency room more accurately.

1.7.2 Nurses as well as other health care teams can use this result and scale to develop guideline for triage patient in Trauma emergency department.

1.7.3 The other researcher can use results of this study to initiate further studies related to trauma management.

1.8 Definition of terms

1.8.1 Emergency room discharge destination

Emergency room discharge destination refers to the setting in which the trauma emergency patients are transferred to for further appropriate treatment. In this study, the discharge destination is classified into 4 categories emergency room discharge destination according to set criteria of four destinations, namely, discharged to home, hospitalization in the general patient ward, treatment in the critical care unit or surgery, death. We use Instrument to assess include 6 part.

Part 1: General information of the patients: there are 10 items.

Part 2: Information related to illness and treatment: there are 11 items

Part 3: Modified early warning score (Mews): there are 5 items.

Part 4: Numerical Rating Scale (NRS) : There are 10 score.

Part 5: Glasgow coma scale: There are 15 score.

1.8.2 Patient's age

Patient's age refers to the real age in year on the emergency room visit day. The number of months of the age over than 6 months will be counted as 1 full year.

1.8.3 Physiological deterioration

Physiological deterioration refers to the physiological changes after patients sustaining traumatic injuries. The deterioration will be responded by alterations of the patients' vital sign (Sarah Rominski, 2014). In this study

physiological deterioration will be measured by the Modified Early Warning Score (Subbe CP 2003). It contains five parameters, namely, systolic blood pressure, heart rate, level of consciousness, respiratory rate and body temperature.

1.8.4 Co-morbidity

Co-morbidity refers to patients' past medical illnesses. In this study, co-morbidity will be measured by using the patients' record couple with asking the patients or the relatives about the chronic illness condition such as diabetes, hypertension, heart disease, respiratory disease, renal disease or any diseases the patients have before the occurrence of this present injury. The researcher developed co morbidity scale to assess the patients have trauma injuries depend on disease of patients each disease we give 1 score. If the patients have 3 diseases, the researcher gave 3 score. After that the researcher would calculate the score of co morbidity of patients.

CHAPTER II
LITERATURE REVIEW

This chapter the related literature will be presented as foundation for the research study. Contents of the literature review will cover 6 parts including the following topics and the conclusion part. Details in each topic will be presented to make clear understanding of the study.

2.1 Patients with trauma in emergency phase

2.1.1 Incidence of trauma

2.1.2 Type of trauma

2.1.3 Physiological change after trauma

2.1.4 The problem in emergency period and management.

2.2 Classification system in trauma patients

2.2.1 Overview knowledge about trauma classification system

2.2.2 Type of classification system

2.2.3 Physiological deterioration and MEWS

2.3 Discharge destination

2.3.1 Concepts related to discharge destination

2.3.2 Discharge destination of trauma patients from emergency room

2.4 The relationship between physiological deterioration and discharge destination

2.4.1 Pain level and its association with discharge destination among patients with trauma emergency

2.4.2 Glasgow coma and its association with discharge destination among patients with trauma emergency

2.5 The relationship between patients age and discharge destination

2.6 The relationship between co morbidity and discharge destination

2.7 Conclusion

2.1 Patients with trauma in emergency phase

2.1.1 Incidence of trauma

Trauma is defined as "an injury or wound to a living body caused by the application of external force or violence" (Thuy, 2009). Acute trauma can occur with the sudden, one-time application of force or violence that causes immediate damage to a living body. In Vietnam injury study findings showed that the general injury rate is 5449.7/100,000 population. The mortality rate from injuries is 88.4/100,000 population (Thuy, 2009) a three-fold in comparison with the mortality rate caused by communicable diseases, and is lower than the mortality rate caused by chronic diseases. Every year, in the world there are at least 5.5 million people dead and nearly 100 million people permanently disabled by injuries. This is the 4th of queuing for 10 causes of death most. In many countries, the number of injuries was hospitalized which accounts for 10-30% of the total number of patients, estimated damage of thousands of billion dollars, accounting for 5-6% of national income (World Health Organization, 2015). Each year in USA, trauma accounts for 41 million emergency room visits and 2 million hospital admissions. The economic burden of trauma is more than $585 billion annually and more than 192,000 people lose their lives to trauma. The figure also demonstrated that almost all of them are in the productive age accordingly, trauma bring the burden to every country in the world more than other diseases or illnesses.

Bach Mai hospital is the biggest hospital located in the middle of Hanoi. Trauma emergency department is where the reception and treatment of trauma and surgical patients 50 - 70 patients per day. Within this number, there are 40% to 50 % of patients who sustained traumatic injuries. They are suffering from road traffic accidents, injuries related to work, fall from height, physical assault and household accident. These patients require special treatment by expert physicians and nurses to make quick decisions and accurately to save their lives and prevent further injuries as well as some avoidable complications. However, the patients' health outcomes are depending upon their severity of injuries, duration of injuries before receiving an appropriate treatment, quality of treatment and the expertise of nurses and physicians (Moskop & Iserson, 2007; Travers, Waller, Bowling, Flowers, & Tintinalli, 2002).

2.1.2 Type of trauma

Trauma has been classified into two main broad divisions depending on the intent: unintentional injuries and intentional injuries. Unintentional injuries include road traffic injuries, falls, burns or accidental contact with heat and hot substances, poisoning, and drowning. The cause of unintentional injuries is random and can be called as an accident. Intentional injuries include interpersonal violence, homicide in all forms, terrorism, spousal abuse, self-inflicted /suicides and some fighting sports such as boxing and wrestling (Pless & Hagel, 2005, WHO, 2013). Trauma is also classified based upon the place of trauma: domestic injuries, injuries at public places, and the settings of injuries: recreational injuries and occupational injuries (including industrial and agricultural injuries) (WHO, 2015). Moreover, trauma can be categorized in two broad types by mechanism: blunt or penetrating. Mechanism of trauma provides the significant information about its severity and management (Beebe, Funk, & Scadden, 2010).

Trauma pattern can be predicted by mechanism of trauma and is influence by the circumstance during the occurrence and the victims'age (American College of Surgeons, 2004). Blunt and penetrating trauma have different epidemiological, management paradigms, and outcomes (Haider, Chang, Haut, Cornwell III, & Efron,2009). From the study of Demetriades, Kimbrell, Salim, Velmahos, Rhee, & Preston (2005) in all traumatic deaths in trauma center level I and trauma center level II in the Los Angeles trauma system during a 3-year period. The result showed that 20.4% of patients who sustained penetrated patients were admitted to the hospital. The most common mechanism of trauma was gunshot wound (45.9%), trauma from motor vehicle crash (19.9%) and pedestrian (13.9%). Majority deaths (42.7%) occurred in 20-40 years age group. Penetrating trauma patients showed significantly mortality rate on scene than blunt trauma patients (24.8% versus 15.8%). Fifty percent of death occurred on scene. Sixty four and thirty five percent significantly died 1 hour after trauma in penetrating and blunt trauma patients respectively (Demetriades, et al., 2005).

Although penetrating trauma showed higher mortality rate in the early phase of trauma, blunt trauma showed its significance in the later phase. Blunt trauma occurred more than 80% and blunt chest trauma occurred two-thirds of multiple

trauma patients (Papathanasopoulos, Nikolaou, Petsatodis, & Giannoudis, 2009). Blunt trauma is the impact of energy to the body or tissue and the result may obvious or hidden (Chapleau, Burba, Pons, & Page, 2008, Beebe, Funk, & Scadden, 2010, Haider, Chang, Haut, Cornwell III, & Efron, 2009). Different degrees of force and energy that transfer to the body provide difference effect (Haider, Chang, Haut, Cornwell III, & Efron, 2009). Motor vehicle or bicycle crash, collisions, falls, fights are the examples of blunt trauma (Chapleau, Burba, Pons, & Page, 2008, Beebe, Funk, & Scadden, 2010, Haider, Chang, Haut, Cornwell III, & Efron, 2009). Blunt trauma is a major cause of vascular injury especially blunt thoracic aortic injury and severe traumatic brain injury (TBI) as well. Ninety nine percent of blunt thoracic aortic injury died on scene and first hour of injury (Chapleau, Burba, Pons, & Page, 2008).

2.1.3 Physiological change after trauma

When the patients having severe trauma which can damage many body organs (Born, 2003), it will lead to the alteration of signs and symptoms such as respiratory distress, hypovolemic shock, cardiogenic shock, severe pain, and alteration of consciousness. However, there are evidences to show that. Initial Triage is the essential function of the emergency department because it helps reduce overload of patient. The purpose of triage in the ED is to prioritize incoming patients and to identify those who cannot wait to be seen. The triage nurse performs a brief, focused assessment and assigns the patient a triage acuity level, 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 emergency room to obtain further and proper treatment or so call discharge destination(Elias & Damle, 2015).

2.1.4 The problem in emergency period and management.

Trauma patients need rapid assessment the problem from injuries and need rapid management to save life. Then advanced trauma life support (ATLS) set the priority to assess the victims from airway, breathing and circulation. Details are explained as follow:

2.1.4.1 Airway is the first priority to assess for the obstruction. If the airway is obstructed it meant that the oxygen cannot delivery to the vital organ. Airway has many parts such as mouth, esophagus or trachea etc. Tracheobronchial injuries are laryngeal trauma and bronchial injury. Laryngeal trauma shows crepitus, subcutaneous emphysema, and hoarseness. Bronchial injury shows hemoptysis, subcutaneous emphysema, pneumothorax, and persistent air leak. Both of injuries need urgent maintenance of airway and tracheostomy (University of Texas Medical Branch Galveston, Texas, 2013). Esophageal trauma show sign of pneumothorax without obvious cause, blood in mouth or on nasogastric aspiration or food was in chest tube drainage system. Open airway and operative methods such as cricothyroidotomy or tracheostomy is needed (University of Texas Medical Branch Galveston, Texas, 2013). Airway problems need immediate decisions in management, worsens outcome and more difficult to management if the clinical had deteriorated by delay in providing the definitive airway.

2.1.4.2 Breathing is the secondary priority assessment to provide care. Breathing problem is challenging for healthcare provider to protect hypoxia or further ventilation condition that induced by the injuries. Direct injury by blunt trauma or penetrated injuries damages to the structure of the chest such as rib, sternum, lung, heart, vascular or combine (Richter & Ragaller, 2011). Tension pneumothorax, open pneumothorax, hemothorax, and flail chest are the most problems of trauma. First, tension pneumothorax is the one-way valve air leak in a closed chest and air is forced into thoracic cavity resulting in creation of positive intrathoracic pressure. Results show the collapse of lung, shift of mediastinum to opposite side, decreased venous return, and compression of contralateral lung. Sign and symptom show tracheal deviation, respiratory distress, unilateral decrease or absence of breath sounds, distended neck veins, and cyanosis or shock. The patients need decompression of thorax and placement of chest tube urgently (University of Texas Medical Branch Galveston, Texas, 2013).

Second, open pneumothorax show chest wall defect, sucking chest wound, collapsed lung, and respiratory distress. The patients need close of defect with an occlusive dressing. If chest pressure builds up, 3 sides dressing allow formation of flutter valve. Chest tube insertion and definitive operative closure of

defect usually required (University of Texas Medical Branch Galveston, Texas, 2013). Third, hemothorax is a result of blunt or penetrating trauma that the blood presents in thoracic cavity. Absent or decreased breath sounds and dullness to percussion were found and follow by the sign and symptom of shock. IV fluid and blood need to replace the depletion of volume, insertion of chest tube, and operative intervention (University of Texas Medical Branch Galveston, Texas, 2013). Last, flail chest is the result from multiple rib fractures and the part of chest wall loses bony continuity with rest of thoracic cavity. Asymmetrical motion of chest wall disturbs normal respiratory physiology. Poor air exchange and respiratory distress present. Oxygen and adequate ventilation need to urgent management. If the patient had large flail segment, operative stabilization is needed (University of Texas Medical Branch Galveston, Texas, 2013). If respiratory rate is 10-29/minute with good bilateral air entry and O_2 saturations more than 95% when reassessment then go forward to the next step.

2.1.4.3 Circulation, all trauma patients was assumed to have blood loss and still be the second cause of death after a trauma (David, Spann, Marcotte, Reynaud, Fontaine, & Lefe`vre, 2013). There is also evidence to support that patients with injury suffer from vascular injuries, particularly injuries of the thoracic artery. Fifty-seven percent of the aforementioned dies on-scene, while 37% dies within the first four hours (Chapleau, Burba, Pons, & Page, 2008). Factures involving pelvic and vascular injuries are the leading cause of hemodynamic instability because of massive blood loss eventually leading to hemorrhagic or hypovolemic shock (David et al., 2013). Patients with hypovolemic shock always have problems with volume depletion and insufficiencies of oxygen diffusion to the cells of the vital organs (Gunst, Ghaemmaghami, Gruszecki, Urban, Frankel, & Shafi, 2010). Accordingly, the delay of appropriate treatment will lead to temporary or permanent organ failure or fatal complications (WHO, 2013a, Antonelli et al., 2007). Type of shock depends on etiology, characteristic patterns of dysfunction and compensation is present. Normally shock has been classified to hypovolemic, obstructive, cardiogenic, or distributive. In order to understand the proper patients' management types of shock commonly found in patients in the early stage will be explained below.

2.1.4.4 Hemorrhagic shock is inadequate tissue perfusion from acute blood loss and mostly present in trauma patients (Anderson & Watson, 2013).

When significant blood loss occurs, body intends to preserve volume blood flow to the cells of the vital organs and send the signal to the cells to expend internal energy stores. The wall of arteries in the large intrathoracic was reduces tension by the lower blood flow then baroreceptors and adrenergic reflexes are activated. Sympathetic fibers from the satellite and regional ganglia stimulate heart and peripheral arteries respectively. American College of Surgeons (2004) defined a different classification of blood loss by the physiological responses. The important physiological parameters to recognize and treat in trauma patient are blood pressure, pulse rate, mental status, peripheral perfusion, respiratory rate, and urine output (Kelley, 2005).

The basis of hemorrhagic shock separate into 4 classes. Class I refers to the blood loss that represents up to 750 ml or 0-15% of total blood volume. This class demonstrates a minimal physiological change such as mild anxiety or slightly decreased urine output but vital sign does not change because the volume of the hemorrhage is small so that the body can compensate well (Garrioch, 2004, University of Texas Medical Branch Galveston, Texas, 2013). Class II refers to blood loss from 750 to 1,500 ml or 15-30% of total blood volume. In this class, vital sign change; heart rate elevates, diastolic pressure rises and decreases in the pulse pressure. Cool extremities and digital cyanosis are the direct result of the vascular tree was stimulated by sympathetic nerve because of vasoconstriction induced. Moderate tachycardia occurs because lacking oxygenation in tissue and lactic acid rising stimulate the respiratory centre (Garrioch, 2004, University of Texas Medical Branch Galveston, Texas, 2013). Class III refers to blood loss up to 30-40% of total blood volume. In this phase the volume depletion occur and lead to insufficiencies of tissue oxygenation with sparing blood flow to the vital organs (Garrioch, 2004, Gunst, Ghaemmaghami, Gruszecki, Urban, Frankel, & Shafi, 2010, University of Texas Medical Branch Galveston, Texas, 2013). Class IV refers to blood loss over 40% of total blood volume. Blood pressure cannot be detected, the pulse is hardly to be palpated, decreasing GCS and vital organ perfusion is failing leading to the life-threatening conditions. Fifty percents mortality rate will occur within fifteen minutes (Garrioch, 2004, University of Texas Medical Branch Galveston, Texas, 2013). Without prompt and proper management, patients who suffer with this stage of shock cannot survive.

2.1.4.5 Other shock. Obstructive shock is the result of the condition of blood flow was blocked into the heart or out of the heart. There for cardiac output is very low and systemic vascular resistance increases. Most, pericardial tamponade and tension pneumothorax are the causes of obstructive shock (Anderson& Watson, 2013). Cardiogenic shock is the result of cardiac dysfunction. The heart could not pump enough blood flow to the vital organs. The less of cardiac output show the less mean arterial pressure (MAP) because blood pools into the precardial spaces (Anderson & Watson, 2013). Distributive shock is mostly result from neurogenic shock such as spinal cord injury (Anderson& Watson, 2013). Patients with spinal cord injury show hypotension and bradycardia because sympathetic pathways were disrupted. Then vasodilatation and decreased systemic vascular resistance (SVR) were happen (Mack, 2013).

After trauma, however, circulation remains the second-leading cause of death (David et al., 2013). Bleeding from ruptured arteries or veins and bone fracture, especially due to pelvic fractures from the high energy impact of accidents are also a significant vascular injury (David et al., 2013, Frevert et al, 2008, Papathanasopoulos, Nikolaou, Petsatodis, & Giannoudis, 2009). Blood loss needs to be rapidly detected and accurately treated (Frevert et al, 2008). Most health care providers use the Advanced Trauma Life Support (ATLS) concept to help and evaluate the outcome several times. If hemodynamic status cannot be maintained and physiological compensatory mechanisms have failed, a sudden collapsed of the circulatory system will occur (Frevert et al, 2008). Subsequently, multiple organ dysfunction and shock are inevitable, which leads to a high mortality rate (Antonelli et al., 2007).

In regards to patients sustaining trauma, the clinical outcome reflecting health status during access to health services in the emergency phase is whether or not the patient is in shock. The initial step in the evaluation of patients with hypovolemic shock and hemodynamic instability by hemorrhage can be assessed by vital signs. When a set of vital signs is taken, the providers should use the value as a baseline to compare because before the condition improves, vital sign need to measure every five to fifteen minutes (Laskowski-Jones, 2009). ATLS guideline, the criteria to activate trauma team is systolic blood pressure (SBP) of less than 90 mmHg. For trauma patients with acute hemorrhage vital signs, particularly systolic blood pressure can be

used to predict clinical outcomes (Hasler, Nuesch, Juni, Bouamra, Exadaktylos, & Lecky, 2012, Lalezarzadeh, Wisniewski, Huynh, Loza, & Gnanadev, 2009, McNab, Burns, Bhullar, Chesire, & Kerwin, 2013). On the other hand there is evidence supports that hemorrhage and shock is late finding if SBP less than 90 mmHg (Bruns, Gentilello, Elliott, & Shafi, 2008). According to the studies in prehospital and ED setting of Bruns et al. (2008) and Eastridge et al. (2007) show that mortality rate increased if patients have SBP less than 110 mmHg. Because when patients have severe hemorrhage, compensatory mechanisms function with the carotid-cardiac baroreflex response to increase heart rate and supply blood volume to vital organs (Schafer et al, 2013). Nevertheless, measuring only SBP is inadequate for assessing outcome, because low SBP comes after DBP has already decreased (Liu et al., 2012, Schafer et al, 2013). The study of Liu et al. in 2012 showed the main outcome predictors in trauma patients to be SBP<90 mmHg, DBP<60 mmHg, and HR>120 BPM. There are many studies support the use of patients'consciousness as one indicator for assessing patients' severity while some studies recommended the use of body temperature.

In addition, mental status, peripheral cyanosis, and oliguria are markers of tissue hypoperfusion that physical examination findings are helpful (Antonelli et al., 2007). Mental status or level of conscious (LOC) reveals the decrease cerebral perfusion. Early stages of shock, agitation starts to show and LOC gradually reduces until patient is unconscious (Antonelli et al., 2007, Laskowski-Jones, 2009). Poor peripheral perfusion happens when hemodynamic dysfunction and capillary refill time delay more than 4.5 second (Kaplan, McPartland, Santora, & Trooskin, 2001, Antonelli et al., 2007, Lima, Jansen, van Bommel, Ince, & Bakke, 2009. The study of Lima, van Genderen, Klijn, Bakker, & van Bommel (2012) showed the result that skin cooling resulted in a significant decrease in Sat O_2 from 82% (80–87) to 72%. Moreover, urine output is a marker of kidney perfusion. When the volume was depletion, blood flow was spared to the vital organs (Gunst, Ghaemmaghami, Gruszecki, Urban, Frankel, & Shafi, 2010, University of Texas Medical Branch Galveston, Texas, 2013).Then renal has been reduces blood flow. In severe case, urine output is less than 0.5 ml/kg/hr. So, during resuscitation, urine output should be monitored by Foley catheter for accurate monitor (Antonelli et al., 2007).

In summary, it can be stated that while assessing patients with trauma in emergency phase, one single vital sign cannot be used as an indicator. In contrary, the summation of each vital sign into the scoring system is strongly recommended.

2.2 Classification system in trauma patients

In order to provide effective care for trauma patients, the classification system is vital. Classification system among patients with trauma refers to the approach to determine trauma patients by their injury severity so that nurses can make proper decision making for patients who come to trauma emergency.

The study of Chen et al. (2010) explored the factors that effect to judgment of triages nurse accuracy in ED. According to the finding, year of nurse experience in ED, triage education' hours, hospital level, and triage mode of delivery were significantly affected to the judgment. Hours of triage education, type and content of the triage cause, and triage training before were significantly affected to triage accuracy ratings. Especially, if nurses were trained in Advanced Cardiac Life Support (ACLS) and Emergency Trauma Training Course (ETTC), the scores of triage accuracy was increase more than other courses training ($t = 5.34$, $p < 0.001$).

2.2.1 Overview knowledge about trauma classification system

An accurate method for quantitatively summarizing injury severity has many potential applications. The ability to predict outcome from trauma (ie, mortality) is perhaps the most fundamental use of injury severity scoring, a use that arises from the patient's and the family's desires to know the prognosis. More recently, physicians suggested that injury severity scoring can provide objective information for end-of-life decision-making and resource allocation. Trauma mortality prediction in individual patients by any scoring system is limited and is in general no better than good clinical judgment. Therefore, decisions for individual patients should never be based solely on a statistically derived injury severity score. However, scoring systems can serve to estimate quantitatively the level of acuity of injured patients that are applied to adjustments in hospital outcome assessments.

Field trauma scoring also is used to facilitate rational pre hospital triage decisions, thereby minimizing the time from injury occurrence to definitive management. Similarly, physicians suggest that it can enhance appropriate use of air transportation and timely transfer of severely injured patients to trauma wards. Trauma scoring also is used for quality assurance by allowing evaluation of trauma care both within and between trauma centers, a contentious and controversial area that is likely to only increase in importance.

2.2.2 Type of classification system

Trauma triage is the use of trauma assessment for prioritising of patients for treatment or transport according to their severity of injury. Primary triage is carried out at the scene of an accident and secondary triage at the casualty clearing station at the site of a major incident. Triage is repeated prior to transport away from the scene and again at the receiving hospital.

The primary survey aims to identify and immediately treat life-threatening injuries and is based on the 'ABCDE' resuscitation system:

- **A**irway control with stabilization of the cervical spine.
- **B**reathing.
- **C**irculation (including the control of external haemorrhage)
- **D**isability or neurological status.
- **E**xposure or undressing of the patient while also protecting the patient from hypothermia.

Priority is then given to patients most likely to deteriorate clinically and triage takes account of vital signs, pre-hospital clinical course, mechanism of injury and other medical conditions. Triage is a dynamic process and patients should be reassessed frequently, the following is one example of triage sieve which is used in the UK:

- **Priority 1 (P1) or Triage 1 (T1): immediate care needed -** requires immediate life-saving intervention. Colour code **red**.
- **P2 or T2: intermediate or urgent care needed -** requires significant intervention within two to four hours. Colour code **yellow**.

- **P3 or T3: delayed care -** needs medical treatment, but this can safely be delayed. Colour code **green**.
- **Dead** is a fourth classification and is important to prevent the expenditure of limited resources on those who are beyond help. Colour code **black**.

Triage systems are most often used following trauma incidents but may be required in other situations, such as an influenza epidemic. Once further resources are available to hand, the patients will undergo a further, more detailed triage based on vital signs - eg, respiratory rate. One such score is called the Revised Trauma Score.

2.2.3 Physiological deterioration and MEWS

During the past decade, scoring systems and evaluation instruments have been employed to assess physiological changes in severely ill patients, including patients with emergency injuries receiving service in emergency rooms. The aforementioned instruments emphasize assessment of key vitals indicating the functions of important organs in the body. According to the literature review, the (Morgan RJM WF 1997)most widely used instrument is the Modified Early Warning Score (MEWS)(Subbe CP 2003). MEWS is developed from the Early Warning Scores (EWS). It contains five parameters, namely, systolic blood pressure, heart rate, level of consciousness, respiratory rate and body temperature. The EWS was created by Morgan(Morgan RJM WF 1997), a British anesthesiologist, in 1997 for use in monitoring changes in function of the body's essential organs in order to determine whether patients require emergency medical treatment. Later on, the EWS became widely used within only a short amount of time since assessment results obtained from patients using EWS could be communicated between nurses providing close patient care and doctors charged for providing treatment. Nurses could use the EWS to assess and monitor patients. When EWS scores increase, it shows that patients are at risk and require emergency treatment from doctors.

The MEWS has been employed most widely in assessing the severity of physiological deterioration in severe patients, critical patients and emergency patients due to its high accuracy, specificity and prediction scores. Scores assessed by MEWS are comparable to scores used in emergency patient screening and sorting accurately. In 2008, Groarke et al. used MEWS (Groarke JD 2008) to assess newly admitted

patients in emergency units. It was found that patients with high MEWS scores upon admission are up to 3.35 times more likely to receive treatment in the intensive care unit (ICU) and 1.82 times more likely to be admitted to the CCU with a mortality rate of up to 2.19 times higher. The aforementioned could be called a predictive study on emergency room discharge destination using MEWS assessment scores as predictive factors of emergency room discharge destination, e.g., released back home, ordinary patient wards of hospital, treatment in critical care units or death. The study of Burch (Burch VC 2008) found that patients with MEWS = 3-4 are 1.7 times more likely to be hospitalized and 4.6 times more likely to die (Burch VC 2008).

2.3 Discharge destination

Discharge destination is needed in emergency department (Camberg, 1997), when assess the patient with trauma, all patients require further screening in order to determine the level of severity, This screening would categorize the severity of illness according to the urgency of medical treatment requirements to treat and solve abnormalities and save lives. Normally, patients' severities are categorized into five levels include 1) patients requiring immediate treatment; 2) emergent patients, 3) urgent patients, 4) semi-urgent patients and 5) non-urgent patients (Gilboy et al., 2012).

Transitions of care between providers are vulnerable periods in healthcare delivery that expose patients to preventable errors and adverse events. Patient discharge from the ICU to a medical or surgical hospital ward is one of the most challenging and high risk transitions of care. Approximately 1 in 12 patients discharged will be readmitted to ICU or die before leaving the hospital. Many more patients are exposed to unnecessary healthcare, adverse events and/or are disappointed with the quality of their care.

Patients admitted to the ICU are of the highest acuity requiring management with life support technologies and aggressive interventions to sustain life and progress towards a clinically stabilized condition. Approximately 1 in 10 patients admitted to an acute care facility is admitted to an ICU. Transition of care is extremely common with 90% of ICU patients being eventually discharged to medical or surgical

hospital wards. With millions of hospitalizations in acute care facilities in most countries each year, hundreds of thousands of patients will be admitted to ICU and experience challenging and high risk transfers to hospital wards.

2.4 The relationship between physiological deterioration and discharge destination

The relations between emergency room discharge destination in emergency adult patients and severity of physiological deterioration as mentioned above, it was found that higher patient age affect physical and physiological changes in various organs inside the body, e.g., arterial type, connective tissue, respiratory organs, organs responsible for food digestion and absorption, brain, liver, kidneys, nervous system, immunity, and metabolism. When emergency injuries and illnesses occur, the injury response processes occur less effectively in the elderly. In other words, vital signs change in the elderly differently. For example, when facing infection, patients older than 55 years may experience hyperthermia more slowly than younger patients as a result of deficiency in the hypothalamus' function impairment (Gilboy, 2005)

Similarly, a study conducted by Vicentea,Sjo¨ Strand, Sundstro¨m, Svenssonb & Castrena (2013) on 94 emergency patients aged 65 and over who required treatment at an emergency unit. The aforementioned group of patients needed more specialized care than younger patients because they were fragile patients with high dependency, even if injuries are no intense or if there were few physiological changes. Due to their physical or societal care conditions, patients older than 55 years should be hospitalized and assessed for vital sign, functions of the vital organs and other examinations because of their risk to physiological deterioration is higher than younger patients because this group of patients have frailty along with other co-morbidity that cause a regression in the functions of important organs such as the heart, arteries, lung, kidney, brain and spine (Marco et al., 2013).

Therefore, when emergency injuries and illnesses occur, symptoms are usually intensify and require hospitalization, or if critical symptoms occur, treatment in special care units is needed (Marco et al., 2013).

However, according to the literature review and in practice, no medical facilities in Viet nam employs the Modified Early Warning System(Burch VC 2008) in assessing the physiological deterioration severity of emergency patients,. Furthermore, no studies have been conducted in Viet Nam on issues related to the use of MEWS and emergency room discharge destination. For the aforementioned reasons, research is required to study and analyze variables to determine whether variables such as the physiological deterioration severity measurement instrument (Modified Early Warning Score), age and co-morbidity are correlated with emergency room discharge destination in emergency adult patients admitted to emergency rooms for treatment in order to upgrade patient screening quality for better standardization, effective emergency assessment, monitoring changes and prognosis to determine whether or not emergency patients require hospitalization in patient wards, in the intensive care unit or discharge home.

2.4.1 Pain level and its association with discharge destination among patients with trauma emergency

Pain level of subjects in this study will be measured by Numerical rating scale (NRS). NRS is a common pain scale being used in clinical practice as well as in clinical research. This pain scale was developed byMcCaffery in the year 1968 (Bijur, , Latimer, Gallagher, 2003) and has been tested for its reliability in various group of patients including patients with acute and chronic pain showing the alpha Chronbach ranging from .8 to .91 (Koneti & Jones, 2016). Recently, NRS is recommended for pain assessment in trauma patients both in pre hospital care and emergency room (Scholten, et al, 2015). NRS is a rating scale showing number reflecting severity of pain from 0 to 10 in a horizontal line. Subjects will be asked to verbally rate their pain on this scale with “0” equal to no pain and “10” equal to worst possible pain. This scale is routinely used in emergency trauma department to measure pain level among patients with trauma (GILLIAN A. HAWKER, 2011). Nurses who are on their duty are responsible to assess patients’ pain level and record in the patients’ charts.

In order to use this scale, nurses will properly instruct the subject in how to rate their pain using the following statements:

1. I would like you to rate your pain on a scale from zero to ten.

2. 'Zero' means you have no pain at all.

3. 'Ten' means the worst possible pain you can image.

4. What number would you give to your pain?

The values on the pain scale correspond to pain levels as follows:

1 – 3 = mild pain

4 – 6 = moderate pain

7 – 10 = severe pain

Data regarding pain level will be recorded among patients who demonstrate very well consciousness and able to verbally communicate with the nurses.

Trauma is a major cause of mortality throughout the world. In recent years, major advances have been made in the management of trauma, the end result of which has been reduced mortality and enhanced function. Improved pain management has not only led to increased comfort in trauma patients.

2.4.2 Glasgow coma and its association with discharge destination among patients with trauma emergency

The Glasgow coma scale (GCS) was developed to examine the level of clinical consciousness (Teasdale, 1974). The GCS has been widely used by prehospital and emergency care personnel to aid in trauma triage. Ranging from 3 (no response) to 15 (normal), the total GCS is the sum of three components that describes a patient's best motor response, verbal response and eye opening to stimuli (Table 5). GCS scores of 3–8, 9–12 and 13–15 denote severe, moderate and mild head injury, respectively. The patient's level of consciousness was assessed with the GCS, where 13–14 points indicates mild injury, 9–12 points indicates moderate injury, and 3–8 points indicates severe injury. The level of these disorders was considered as mild (13–15 points), moderate (9–12 points), unconsciousness (6–8 points), decorticate (5 points), and decelerate (4 points).

A scale used for assessment of the final results is the GOS, where 5 indicates convalescence, 4 indicates mild disability, 3 indicates serious disability, 2 indicates a permanent vegetative state, and 1 indicates death. GOS assesses the

patient's postoperative condition, level of self-reliance, and ability to perform social and professional roles. It is the scale most commonly used for assessment of the outcome of intensive care and for long-term monitoring of the recovery process after head and nervous system injuries. It is a relatively simple measurement tool, is used worldwide, and facilitates comparison between reports, including GOS outcomes.

2.5 The relationship between patients age and discharge destination in patients with trauma.

Age and its association with discharge destination among patients with trauma emergency. Older age is associated with high rates of morbidity and mortality after injury.

Age is suggested as a triage criterion for transfer to a trauma center, despite poor outcomes after similar injury regardless of trauma center level. The effect of differential triage based on age to a trauma center has not been evaluated. We hypothesized that there would be a difference in the admission rates of geriatric patients compared with the rest of the adult trauma population independent of injury severity

Age affects the severity of trauma and has potentially significant impact on mortality with older age (Bala et al., 2013, Chiara, Mazzali, Lelli, Mariani, & Cimbanassi, 2013, Swaroop, Straau, Agubuzu, Esposito, Schermer, & Crandall (2013). Among age groups of 40-64, 65-74, 75-84 and 85 years and older, studies have shown increased mortality risk at 2.67, 8.41, 17.40 and 34.98, respectively (Hannan, Waller, Farrell, & Rosati, 2004). From the study of Chiara, Mazzali, Lelli, Mariani, & Cimbanassi in 2013, Lombardia, a region of Northern Italy showed mortality rate increase with age, if the patients older than 75 years the fatality rate up to 50%. Moreover, increasing age show increasing rate of hospital and ICU-LOS and reimbursed DRG significantly.

According to the study of Zarzaur, Croce, Magnotti, and Fabian (2010), blunt trauma using only the shock index (SI) (HR/SBP) can predict shock in the young age groups. In the old age groups, however, age multiplied by SI was a better predictor of the outcome. The older patient group had significantly poor outcomes and higher

mortality rates than the younger patient group, especially among older patients who had signs of shock, cardiac arrest and greater injury severity; ISS > 25, or GCS< 9 (Giannoudis, Harwood, Court-Brown, & Pape, 2009, Jacoby, Ackerson, & Richmond, 2006, Taylor, Tracy, Meyer, Pasquale, & Napolitano, 2002). Furthermore, according to the study of Swaroop et al, (2013), the hypotensive penetrating thoracic injury patients who were over 50 years old were 1.03 times more likely to die than those who had pre-hospital times of less than 60 minutes (OR: 1.03; 95% CI; 1.02 to 1.04, P < 0.001).

Jacoby, Ackerson, & Richmond (2006) studied about outcome from serious injury in older adults. The result showed that older injured adults had increased mortality than younger. The study enhances to study of Taylor, Tracy, Meyer, Pasquale, & Napolitano (2002) study. Taylor et al. (2002) studied blunt trauma in older patients. The results show that older patients had higher mortality rates in all level of severity significantly. Moreover more than 65 % studies indicated that age was an independent predictor of increased in-hospital mortality two to five times when compared to younger adults. Among age groups progression 40-64, 65-74, 75-84, and 85 years and older showed increased mortality risk to 2.67, 8.41, 17.40, and 34.98, respectively (Hannan, Waller, Farrell, & Rosati, 2004). From the study of Albaugh, Kann, Puc, Vemulapalli, Marra, & Ross, (2000), increasing every 10- year of age, patients older than 55 years had mortality rate increased 132% in flail chest injuries. Bala, Willner, Klauzni, Bdolah-Abram, Rivkind, Gazala, et al. (2013) found the strongest independent predictors of mortality in elderly severe trauma were age ≥80, low GCS, elevated INR, pre-existing CRF and the requirement for intubation on admission. Moreover the mean number of co- morbidities per patient increased significantly with age. Nonetheless, Arizona State Trauma Registry (2011) report that 86% from 46 of deaths by under triaged were elderly ≥65 years. Age is confirmed as an independent predictor of outcome in injuries situation.

2.6 The relationship between co morbidity and discharge destination

Co-morbidity and it is association with discharge destination among patients with trauma emergency.

The presence of co-morbidity indicates the presence of chronic diseases other than those that are the main cause for patients to require emergency treatment at the time. The majority of co-morbidities found in ordinary people who receive hospital treatment are internal illnesses or symptoms. Co-morbidity is another important factor that affects emergency room discharge destination in emergency trauma adult patients (Chen et al., 2012). The main co-morbidities commonly found are hypertension, diabetes mellitus, hyperlipidemia, coronary heart disease, chronic kidney disease and stroke. Patients with co-morbidities will face complications during treatment and cause the pathology of the primary illness to be more severe (Cousins et al., 2013), e.g., disruptions to the functions of the body's systems, such as of the heart, lungs and kidneys, than patients without any co-morbidity. Furthermore, patients with co-morbidity will require treatment in special-care units. Therefore, hospital stay duration is affected and the rate of occurrence of complications during hospitalization increases along with mortality rate (Cousins et al., 2013; Gilboy et al., 2012). According to the literature review of Esper and Martin (2011), critical patients with co-morbidity have a higher rate of mortality, longer hospitalization and higher occurrence of complications than patients without co-morbidity. Therefore, co-morbidity is another important factor influencing decisions for hospital treatment. When assess the patients with co – mobidity, many previous literatures suggest the use of Charlson co-morbidity index (CCI). The CCI was calculated based on all patient's co morbidities, only the co-morbidity with the highest weight and a single randomly selected co-morbidity. The CCI is a system for classification of severity than uses recorded data on secondary diagnoses to assign a weight to morbidity, thereby generating the patient's risk of death. Base on this table of CCI, if the patients have more than 2 diseases include so that the severity of patient is higher than the patients don't have co-morbidity. However, there is a debatable issue regarding the using of Charlson co-morbidity index. Those studies stated that the illnesses as proposed in co-morbidity index cannot cover all common chronic illnesses among patients who routinely come for the treatment in emergency room including the trauma emergency patients.

2.7 Conclusion

Emergency room discharge destination in trauma emergency adult patient an importance role in health of the patients. There are a lot of factors related to emergency room discharge destination among patients with trauma include: knowledge and experience of nursing, machine, work instrument and source of experience nurse in hospital. Triage categories can be used to evaluate the trauma severity in patients in the emergency department. In all, 80.4% patients were accepted as non-emergency patients in hospital admissions. These patients increase the consistency and cost of the emergency department.

Moreover, they should be referred to first- or second-level health centers instead of third-level health centers. In our country, there are limited number of studies about this subject; therefore, more detailed studies should be conducted to evaluate the role of triage categories in trauma severities and mortality rates.

There are a lot of article talk about use scale to triage the patient with trauma injury and the effect of used many scale to assess patient. Its improve the quality of treatment, reduce medical errors and shorten the duration of patient's treatment. Besides that, some papers showed that there are some scale used to assess the patient with trauma injury. Therefore, health staff play an importance role in identify factors that related with discharge destination in patients with trauma emergency. Co-morbidity and age were both independently significant predictors of length of hospitalization over and beyond that which is expected based on the severity of the injuries. With an aging population, this phenomenon should severely affect resource utilization in trauma center in the near future.

CHAPTER III
METHODOLOGY

In this chapter, research design, population and sample of the study, studied instruments and their validity and reliability, data collection procedure, human right protection, data analysis and assumption of the statistic used in this study was consecutively presented.

3.1 Research design

The study was a descriptive correlational research aimed to study the thessociation between factors related to emergency room discharge destination among patients with trauma. Who received treatment at the trauma emergency ward, Bach Mai Hospital, Hanoi, Vietnam.

3.2 Population and sample of the study

3.2.1 The population and sample of this study

The population of this study included patients who have Trauma injury admitted to Trauma emergency department in Bach Mai Hospital, Hanoi, Viet Nam.

3.2.2 The sample of the study

Sample was selected from the population according to the following criteria**:**

The inclusion criteria are as follow:

(1) Age of 18 and or older

(2) Patients with trauma include burn patient

The exclusion criteria of the subjects are as follows:

(1**)** The patients who die before arrival to emergency room**.**

Sample size:

The researcher uses power of t test analysis method for calculating sample size**:**

$$n = Z^2_{1-a/2} \frac{p(1-p)}{d^2}$$

n: sample size,

Z: the statistic corresponding to level of confidence (Z_1-α=1.96); α = 0.05.

p: expected prevalence, choosing from same studies by the researchers (p = 0.3)

d: precision (corresponding to effect size). The level of confidence usually aimed for is 95% (Pourhoseingholi MA, Vahedi, & Rahimzadeh, 2013)

N = 300 patients

3.3 Setting

The researches were conducted at the trauma emergency department in Bach Mai hospital, Viet Nam. Trauma department received the patients have trauma injury 24 hours. There are about 100 patients per day who are come to examine in the trauma department. At the emergency room, there are 3 nurses and 2 doctors who triage the patients and exams and give the direct treatment. The services include triage patient, collect vital signs, collect the patient information, use scale to assess the patients. Therefore, the researcher had the plan to collect data every day.

3.4 Instruments

The instruments used for data collection included 5 parts as follows:

Part 1: General information of the patients

The record form was created by the researcher and contains data on the name, gender, age, address, level of education, income, Marital status, weight, height, BMI, treatment entitlement, occupation, food and drug allergies, history of smoking,

history of alcohol consumption, main symptoms prompting hospital visit, transportation, pre-hospital emergency treatment and initial diagnosis in emergency rooms, where hospital to transfer, drugs used before.

Part 2: Modified Early Warning Score (MEWS)

Mews**:** Early warning scoring tools was employed to used to aid recognition of deteriorating patients, and are based on physiological of five variables, namely, systolic blood pressure, heart rate, respiratory rate, body temperature (in Celsius) and level of consciousness. Each variable coefficient was set for a scoring range of 0-3 points based on the severity of patient symptoms in which a score of three means highest severity. The possible total scores of MEWS range from 0 to 14. The higher score reflect the high severity of physiological deterioration. The MEWS record form was developed by Subbe (Subbe CP, 2003). Scores evaluated from MEWS have a sensitivity of 62 percent, specificity of 85 percent and prediction power of treatment in the ICU and mortality rate in patient wards of up to 4.06 times. The AUC score is 0.80 (95% CI 0.72-0.88) (Reini, Fredrikson&Oscarson, 2012)

Part 3: Co morbidity Scale

In this study co morbidity was measured by using co morbidity scale record form developed by the researcher. The scale composed of the items of common chronic disease including heart disease, respiratory disease, kidney disease, diabetes, hyperlipidemia, neurological disease, hypertension and other diseases that occur before patients sustaining the injury at this time. The category on each disease items was divided into 2 items, “yes” refers to having the co morbidity and “no” refers to not having the co morbidity. For the “yes” answer the “1” score was given while the “no” answer the “0” score was given. In addition to this, the details of each disease such as duration of illness, the treatment, the medication will be recorded.

Part 4: Numerical Rating Scale (NRS)

Pain level of subjects in this study was measured by Numerical rating scale (NRS). NRS is a common pain scale being used in clinical practice as well as in clinical research. This pain scale was developed by McCaffery in the year 1968

(Bijur, , Latimer, Gallagher, 2003) and has been tested for its reliability in various group of patients including patients with acute and chronic pain showing the alpha Chronbach ranging from .8 to .91 (Koneti & Jones, 2016). Recently, NRS is recommended for pain assessment in trauma patients both in pre hospital care and emergency room (Scholten, et al, 2015). NRS is a rating scale showing number reflecting severity of pain from 0 to 10 in a horizontal line. Subjects was asked to verbally rate their pain on this scale with "0" equal to no pain and "10" equal to worst possible pain. This scale is routinely used in emergency trauma department to measure pain level among patients with trauma. Nurses who are on their duty are responsible to assess patients' pain level and record in the patients' charts.

In order to use this scale, nurses were properly instruct the subject in how to rate their pain using the following statements:

1. I would like you to rate your pain on a scale from zero to ten.
2. 'Zero' means you have no pain at all.
3. 'Ten' means the worst possible pain you can image.
4. What number would you give to your pain?

The values on the pain scale correspond to pain levels as follows:

1 – 3 = mild pain

4 – 6 = moderate pain

7 – 10 = severe pain

Data regarding pain level was recorded among patients who demonstrate very well consciousness and able to verbally communicate with the nurses

Part 5: Glasgow Coma Scale

The Glasgow coma scale (GCS) was developed to examine the level of clinical consciousness (Teasdale, 1974).The GCS has been widely used by prehospital and emergency care personnel to aid in trauma triage. (Champion, 1992).Ranging from 3 (no response) to 15 (normal), the total GCS is the sum of three components that describes a patient's best motor response, verbal response and eye opening to stimuli (Table 5). GCS scores of 3–8, 9–12 and 13–15 denote severe, moderate and mild head injury, respectively

The patient's level of consciousness was assessed with the GCS where 13–14 points indicates mild injury, 9–12 points indicates moderate injury, and 3–8 points indicates severe injury. The level of these disorders were considered as mild (13–15 points), moderate (9–12 points), unconsciousness (6–8 points), decorticate (5 points), and decelerate (4 points).

3.5 Instrument Validity and Reliability

3.5.1 Instrument Validity

The instrument of this study including questionnaire demographic data of the patients, the Modified early warning scale and Co morbidity Scale. All of scale are translate into Vietnamese by English teacher. They were verified by 5 experts including: The Dean of trauma department, doctors, head nurse and nurse after that they were use to test 30 patients in ER to assure their understanding of the contents.

3.5.2 Instrument Reliability

MEWS, NRS and GCS were tested for reliability by Cronbach's' alpha coefficient. The researcher was use these instruments in 30 patients similarly to the studied subjects (patients with trauma injury receiving care in emergency department) to test instrument reliability

3.6 Data collection

3.6.1 The data collection was conducted in the following sequences:

1) After getting the approval and receiving permission from IRB on data collection, the researcher was meet director of hospital, head of nursing department and head nurse of trauma department in order to explain to the purpose and the procedure of data co lIection.ln this study, data was collected from emergency room record sheet (patients' charts) which include all data needed for the study..

2) After that, the research assistant self- introduce, make a relationship with the patients. For the confusion patient, the researcher was make a relationship with patients about the objective of study, data collection procedure and asks patient to sign consent form. The patients were volunteered in the study. The researcher collected some demographic data from medical record form.

3) The researcher organized private room to interview the patients or asked them to do questionnaire by themselves. Then, researcher uses four questionnaires for data collection. Questionnaires were I) Demographic data questionnaire, 2) Mews scale, 3) Co mobidity scale, 4) Glasgow coma scale, 5) Pain scale. The patients answered the questions in the context of an interview which lasted about 10-15 minutes.

3.7 Protection of human rights

In this research, the researcher strictly concerned on human rights and ethical issues throughout the research process by:

3.7.1 The researcher collected the data after receiving approval from Institutional Review Board of Nursing faculty, Mahidol University and Institutional of Review Board of SMP, Hanoi National University.

3.7.2 The researcher self - introducedto the participants at Trauma department, informed the patients about the research objective and all data collection process. The researcher explained the purpose of the study, the research procedure, benefits, risks, types of questionnaire, length of time to complete the questionnaires, and the right to refuse participation in the study anytime**.** If the patients withdraw from the research project and will not influence on their treatment or caring process. After patients agreed to join in the research process, they were invited to sign their name in the consent form.

3.7.3 This research did not cause any risk to the patients' physical health. The data collection process might take time about 10 to 15 minutes. Although the patients did not get any benefit from this research but the results were expected to produce benefit for other patients who have the same health care problem as the sample.

3.7.4 All contents were kept confidential, only the researcher and the research team were able to get access to the data. Any content related to data that presented in the thesis or any publication would be deleted from the database and would not be used as any part of the research. In this research all patients who agreed to join in the study did not withdraw themselves.

3.7.5 In case of further questions or more explanation, the participants were told that they were able to ask the researcher at anytime throughout the research process.

3.7.6 After the participants clearly understood the research process and agreed to join in the research, they were invited to sign their name in the consent form.

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3.8 Data analysis

Using computer program

1) The descriptive statistics in term of frequency, percentage, mean, standard deviation, and range was used to describe study variables, including emergency room discharge destination, patient's age, physiological deterioration, co-morbidity in patients with Trauma emergency.

2) Spearman's rho product moment correlation coefficient was used to examine association between emergency room discharge destination and patient's age, physiological deterioration, co-morbidity in patients with Trauma.

3.9 Assumption for statistic test

For the Pearson product - moment correlation coefficient the assumptions are as follows:

1. Each variable should be continuous. If one or both of the variables are ordinal in measurement, then a Spearman correlation could be conducted instead.

2. Absence of outliers refers to not having outliers in either variable. Having an outlier can skew the results of the correlation by pulling the line of best fit formed by the correlation too far in one direction or another. Typically, an outlier is

defined as a value that is 3.29 standard deviations from the mean, or a standardized value of less than ±3.29.

Normality of variables: In statistics, normality tests are used to determine if a data set is well-modeled by a normal distribution and to compute how likely it is for a random variable underlying the data set to be normally distributed. One application of normality tests is to the residuals from a linear regression model.

CHAPTER IV
RESULTS

This research aimed to study the factors related to emergency room discharge destination among patients with trauma. Data were collected from patients' hospital charts using data collection form. The results are presented in the following topics; general characteristics of the sample, sample's health status, characteristics of injuries, sample's MEWS scores, pain scores and Glasgow coma score, sample discharge destination, and the correlation among patients' age, MEWS, pain scores, Glasgow coma score, co morbidity and emergency room discharge destination.

4.1General characteristics of the sample

Total sample include 300 patients sustained trauma. The majority of patients were male (63.0%) with the age ranged from 18 to 91 years. The average age was 39.95 years (SD= 18.6 years). The majority of the sample were married (51.3%), finished high school education (34.3%) and resided in Hanoi(75.3%). In regard to the sample socioeconomic status, 24 % of them were industrial workers, and 67 % earned monthly incomes from 100-300 USD. The majority of them (57.7%) had governmental insurance while the rest did not have any kind of insurance and had to pay for the treatment expense by themselves (table 4.1).

Table 4.1 General characteristic of the sample (n = 300)

Characteristics	Number	Percentage
Gender		
Male	189	63
Female	111	37
Age (year)		
18 – 30	121	40.3
31 – 40	58	19.3
41 – 60	71	23.7
Upper 60	50	16.7
Min: 18		
Max: 91		
Mean ± SD: 39.95 ± 18.16		
Address		
Hanoi	226	75.3
Other Provinces	74	24.7
Type of transportation to ER		
Self transportation	194	64.7
By ambulance(115 emergency)	53.	17.7
Transferred from other hospital	53	17.7
Marital status		
Married	154	51.3
Single	115	38.3
Separated	1	0.3
Divorced	6	2
Widowed	23	7.7

Table 4.1 General characteristic of the sample(n = 300) (cont.)

Characteristics	Number	Percentage
Educational Level		
Primary and Secondary school	46	15.3
High school	103	34.3
2-year certificate (college)	71	23.7
Bachelor degree	69	23
Higher than Bachelor degree	11	3.7
Occupation		
Private employee	46	15.3
Farmer	40	13.3
Industrial worker	72	24
Civil servant	31	10.3
House keeper	9	3
Retired from work	31	10.3
Others	71	23.7
Income per months		
Under 100 USD	48	16
From 100-300 USD	201	67
Upper 300 USD	51	17
Insurance		
Government insurance	173	57.7
Out of pocket	127	42.3

4.2 Sample's health status

About 43.7 **%** of the patients hadprevious illness before ER admission and hypertension was the disease most frequently found (27.7%) only 13.3% had history of allergy, 14.0% receivedpre-hospital treatment before ER arrival. Regarding behaviors, 23.0% patients were regular smokers and 14.0% were regular alcohol consumer (table 4.2).

Table 4.2 History of illness and behaviors (n = 300)

Illness characteristic	Number	Percentage
Having illness before ER admission		
No	169	56.3
Yes	131	43.7
Type of illnesses (n = 131)*		
Hypertension	83	27.7
Heart disease	30	10.0
COPD	7	2.3
Renal disease	13	4.3
Diabetes	30	10.0
Others (Rheumatoid, Lupus, Hepatitis, lung cancer, stomach cancer)	39	13.0
History of allergy		
No	260	86.7
Yes	40	13.3
Pre-hospital treatment		
No	258	86.0
Yes	42	14.0
Smoking		
Often	69	23.0
Sometime	85	28.3
Never	146	48.7
Alcohol		
Often	42	14.0
Sometime	111	37.0
Never	147	49.0

*some patients had more than one disease

4.3 Sample's characteristics of injuries

The majority of sample sustained road traffic injury **(**56**.**7**%).** Half of the sample **(**49**.**7**%)** had head, face and neck injury**.** Bone fracture and head, face, neck injury were the major injury areas with 50.5% and 49.7%, respectively (table 4.3).

Table 4.3 Types of injury and injury area (n= 300)

Injury characteristic	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		
Brain	110	36.7
Chest	52	17.3
Head, face, neck	149	49.7
Abdomen	45	15.0
Bone fracture	151	50.5
Burn	10	3.3

Bleeding (66.7%) was the major symptom of patients. In regard to the diagnosis, most of sample (47.0%) were diagnosed in general diagnosis as "injury" while 53% received specific diagnosis as having fracture, multiple fracture, burn and brain injury (table 4.4).

Table 4.4 Presented symptoms on ER arrival and diagnosis (n = 300)

Clinical characteristics	Number	Percentage
Symptoms		
Nausea	53	17.7
Vomiting	66	22.0
Headache	125	41.7
Giddy	93	31.0
Diarrhea	1	0.3
Bleeding	200	66.7
Dyspnea	21	7.0
Chest pain	39	13.0
Diagnosis		
Injury	141	47.0
Fracture	88	29.3
Multiple fracture	31	10.3
Burn	4	1.3
Brain injury	36	12.0

4.4 The sample's Modified early warning score (MEWS), Pain scores and Glasgow coma score

MEWs, pain scores and Glasgow coma scores are classified and presented in their frequency (table 4.5). Minimum, maximum, mean with standard deviation are also presented. The results reveal that majority of sample had MEWS between 0-3, with the minimum scores of 0 and the maximum scores of 12. The mean of MEWS is 1.7 (SD± 1.91). About 38.7 % of the sample showed pain level of greater than 8 on 0-10 NRS with the mean of 8.28(SD ±1.06). Majority of sample (81.7%) had Glasgow coma scores between 13-15, with the mean scores of 13.77 (SD ±2.76).

Table 4.5 Modified early warning score (MEWS), pain scores and Glasgow coma score (n = 300)

Scores	Number	Percentage
Modified early warning score (MEWs)		
0-3	258	86.0
4-6	34	11.3
>6	8	2.7
Min = 0		
Max= 12		
Mean ± SD = 1.7 ± 1.91		
Numerical Rating Scale (NRS)		
< 8	184	61.3
> 8	116	38.7
Min = 2		
Max= 10		
Mean ± SD = 8.28 ± 1.06		
Glasgow coma score		
< 8	19	6.3
8-12	36	12.0
13-15	245	81.7
Min = 3		
Max = 15		
Mean ± SD = 13.77 ±2.76		

4.5 Emergency room discharge destination

The majority of sample **(**59**.**7**%)** had to admit to the hospital while 35**.**4 **%** had to receive surgery and or admitted to ICU**.**About 40**.**3**%** of sample received treatment and were discharged home **(**table 4**.**6**).**

Table 4.6 Emergency room discharge destination (**n=300**)

Discharge destination	Total (n)	%
Go home	121	40.3
Ward	73	24.3
Surgical or ICU	106	35.4
Death	0	0.0

4.6 Correlation between age, MEWS, co morbidity, pain, Glasgow coma scores and emergency room discharge destination

All variables in this study were tested for their normal distribution and the results showed that all variables did not have normal distribution. Accordingly, Spearman's rho was employed to test correlation among studied variables. Results of table 4.7 show that age, MEWS Score, co morbidity and pain score are positively correlated with emergency room discharge destination while Glasgow coma score is negatively correlated with emergency room discharge destination (table 4.7).

Table 4.7 Correlation between age, physical deterioration, co-morbidity and emergency room discharge destination using Spearman's rho **(**n=300**)**

	Age	**MEWs score**	**Co-morbidity**	**Pain score**	**Glasgow coma score**
Mews score Correlation coefficient	-0.030				
Co-morbidity Correlation coefficient	0.617**	0.081			
Pain score Correlation coefficient	0.014	0.343**	-0.017		
Glasgow score Correlation coefficient	-0.012	-0.654**	-0.091	-0.362**	
Discharge destination Correlation coefficient	0.137**	0.375**	0.164**	0.370**	-0.441**

CHAPTER V
DISCUSSION

This chapter, the researcher will present the discussion on research findings in 3 items as following; 1**)** Demographic and clinical characteristics of the patients, 2**)** Discharge destination of the patients, and 3**)** The relationship between age, MEWS Score, co morbidity, pain score, Glasgow coma score and discharge destination**.**

5.1 Demographic and clinical characteristics of the patients

Results of this study showed that most of patients were male (63.0%) with the age ranged from 18 to 91 years. The average age was 39.95 years (SD= 18.6 years). Similarly with previous studies which found that men were more likely to experience accidental injuries than women (Hang, Bach, & Byass, 2005;Nguyen, Nguyen, Morita, & Sakamoto, 2008).Likewise the studies done by Le & Blum (2011) which revealed that young people had higher rate of injury and trauma than ones who are elder and many injuries in particular road traffic injuries were commonly found among young men (Le & Blum, 2011). The reason might because men were more likely to expose to hazards such as high risk occupations or had more risk behaviors in riding motorcycle or driving a car which lead to higher possibilities of being injured in comparison with women. Ngo et al. (2012) also indicated that in Vietnam the majority of deaths caused by road traffic injuries were from 15 to 29 years old, and most of them used motocycles when they had injuries(Ngo et al., 2012). Road traffic injuries in Vietnam had not only higher burden of disease but also high economic burden. A study of Nguyen et al. (2013) found that among the patients admitted hospital due to injuries, those experienced traffic accident accounted for the largest proportion, and their treatment cost was also the highest compared to other injuries (Nguyen, Ivers, Jan, Martiniuk, & Pham, 2013). Huong et al. suggests that road traffic accidents were

the primary cause of injuries (T. L. Nguyen et al., 2008).Relevant to WHO report in 2015, many countries in Asia still have tremendous problems with road traffic injuries which lead to country burden and economic growth (World Health Organization, 2015; Al-Shorbaji et al., 2015).This finding reflected the urgent need of injury prevention among young population in Vietnam. The policy for speed limit and road safety should be declared and used to regulate and control road traffic injury. This policy is relevant with WHO recommendations in that road traffic injury should be reduced by promoting road safety behaviors and by national law and regulation (World Health Organization, 2015).

Modified Early Warning Score (MEWS)

In the study, the findings revealed that majority of sample had MEWS between 0-3, with the minimum scores of 0 and the maximum scores of 12. The mean of MEWS is 1.7 (SD± 1.91). The results mean that most of patients needed to be under careful consideration and observation.

MEWS instrument was employed in this study to measure the physiological changes among trauma patients (Teresa A. Williams a & Ho, 2016). In literature, the most widely used instrument to measure the key indicators of functions in the body is MEWS(Morgan RJM WF, 1997; Subbe CP, 2003). It evaluates five parameters, namely, systolic blood pressure, heart rate, level of consciousness, respiratory rate and body temperature, which are essential to assess the severity of physiological deterioration in severe patients, critical patients and emergency patients due to its high accuracy, specificity and prediction scores.

Glasgow coma scale

The GCS is a popular instrument to measure the physical functions in the situation of prehospital and emergency care personnel to aid in trauma triage (Champion, 1992). The GCS can describe a patient's best motor response, verbal response and eye opening to stimuli. GCS scores of 3–8, 9–12 and 13–15 denote severe, moderate and mild head injury, respectively. In our study, the majority of sample (81.7%) had Glasgow coma scores between 13-15, with the mean scores of

13.77 (SD ±2.76), which means that they had mild injury when admitted to the hospital.

5.2 Discharge destination of the patients

The majority of patients (59.7%) had to admit to the hospital while 35.4% had to receive surgery and or admitted to ICU. About 40.3% of sample received treatment and were discharged home. There is no cases of death found during the study period. The results indicated that majority of patients who sustained injuries required close and continuous monitoring because they were at risk to develop some emergent health problems such as hypovolemic shock, neurogenic shock, cardiac arrest or respiratory failure at any time (Anderson & Watson, 2013). In this study bleeding or blood loss (66.7%) was the major symptom of patients because majority of them (50.5%) had bone fracture. Prominent alteration in conscious was found among 18.3% of patients along with 12% of brain injury patients. Head, face and neck were injury area mostly found (49.7%) and brain injury accounted for 36.7%. The characteristics of injuries indicated that traumatic injury patients presented at emergency department required close monitoring until they became more stable in their vital sign. Moreover, some symptom such as headache (41.1%) should be continuous monitored because it might be the sing of post concussion syndrome. This finding lead to the fact that continuous care after hospital discharge is vital.

Transitions of care between providers are vulnerable periods in healthcare delivery that expose patients to preventable errors and adverse events. Patient discharge from the ICU to a medical or surgical hospital ward is one of the most challenging and high risk transitions of care (Rubano &Shapiro, 2016). Approximately 1 in 12 patients discharged will be readmitted to ICU or die before leaving the hospital. Many more patients are exposed to unnecessary healthcare, adverse events and/or are disappointed with the quality of their care. Patients admitted to the ICU are of the highest acuity requiring management with life support technologies and aggressive interventions to sustain life and progress towards a clinically stabilized condition. Approximately 1 in 10 patients admitted to an acute care facility is admitted to an ICU. Transition of care is extremely common with 90% of ICU patients being

eventually discharged to medical or surgical hospital wards (So, Ong, Wong, Chung, & Graham, 2015).

It is very important to note that in regard to the diagnosis, most of sample (47.0%) were diagnosed in general diagnosis as “injury” while 53% received specific diagnosis as having fracture, multiple fracture, burn and brain injury. Non -specific diagnosis might lead to in appropriate treatment and care so that patients would be at risk of developing more deteriorate health status. Specific diagnosis as well as specific scoring system should be taken into consideration when providing service in emergency room.

5.3 The relationship between age, MEWS Score, co morbidity, pain score, Glasgow coma score and discharge destination.

Results of this study were fulfilled the hypothesis that those factors were correlated to emergency room discharge destination. Specifically, age, MEWS Score (physiological deterioration), co morbidity and pain score were correlated with the increased level of severity of emergency room discharge destination (from go home to death) while Glasgow coma score was negatively correlated with the increased level of severity of emergency room discharge destination. These findings would partly contribute to the planning process in emergency department in order to promote the patients’ health and quality of life.

5.3.1 Age

Age was confirmed as an independent predictor of outcome in injuries. In this study, the finding indicated that people with higher age had higher likelihood to transfer to the ward or having surgery/ICU. It could be explained by the fact that older age was associated with high rates of morbidity and mortality after injury (Balaet al., 2013, Chiara, Mazzali, Lelli, Mariani, &Cimbanassi, 2013, Swaroop, Straau, Agubuzu, Esposito, Schermer, & Crandall (2013).Higher age altered the physical and physiological characteristics in various organs inside the body such as arterial type, connective tissue, respiratory organs, organs responsible for food digestion and absorption, brain, liver, kidneys, nervous system, immunity, and metabolism.A study

conducted by Vicentea et al. (2013) on 94 emergency patients aged 65 and over who required treatment at an emergency unit shows that this group needed more specialized care than younger patients because they were fragile patients with high dependency, even if injuries were not severe or there were few physiological changes(Marco et al., 2013).Balaet al. (2013) found the strongest independent predictors of mortality in elderly with severe trauma. In their study patients with ages equal to or over 80 years with low Glasgow coma score (GCS), depletion in blood coagulation, pre-existing chronic kidney disease and had the requirement for intubation on admission were ones who had highest risk of mortality rate. Moreover, the mean number of co- morbidities per patient increased significantly with age. A study ofJacoby et al. (2006)showed that older injured adults had increased mortality than younger. Similarly, Taylor et al. (2002) found that older patients had significantlyhigher mortality rates in all level of severity of blunt trauma. In addition, Albaugh et al. (2000) stated that with every 10 years of age, the risk of mortality would increase. Among patients with flail chest injuries whose ages were more than 55 years, the mortality would increase by 132%.

5.3.2 Co-morbidity

Regarding co-morbidity, the study found that trauma patients suffering more co-morbidities were more likely to transfer to the ward or had surgery/ICU rather than go home. Co-morbidity is an important factor that might affect emergency room discharge destination in emergency trauma adult patients (Chen et al., 2012). Among trauma patients, the common co-morbidities were hypertension, heart disease and diabetes. This finding was consistent with previous study. Chen et al. suggested that the main co-morbidities commonly found are hypertension, diabetes mellitus, hyperlipidemia, coronary heart disease, chronic kidney disease and stroke (Chen et al., 2012). Co-morbidities will lead to complications during treatment and cause the status of illness to be more severe (Cousins et al., 2013). Co-morbidities disrupted the functions of organs in the body's systems; therefore, patients having co-morbidities had a longer time for recovery than patients without any co-morbidity. In addition, patients who have severe co-morbidities have to admit to special-care units and require special medication. According to Esper and Martin (2011), critical patients with co-morbidities have a higher rate of mortality, longer hospitalization and higher

occurrence of complications than patients without co-morbidity. Therefore, controlling co-morbidities among trauma patients admitting to emergency department is very necessary.

5.3.3 MEWS (Physiological deterioration)

The relations between emergency room discharge destination in emergency adult patients and severity of physiological deterioration has been well-documented. This study found that increasing MEWS Score and Pain score were correlated with increasing the level of severity of emergency room discharge destination (from go home to death). (Bennett, Robertson, & Al-Haddad, 2015)

In our knowledge, according to the literature review and in practice, MEWS instrument has not been employed in Vietnamese health facilities to assess the deterioration of physiological severity of emergency patients (Burch VC, 2008). Furthermore, no studies have been conducted in Viet Nam on issues related to the use of MEWS and emergency room discharge destination. This study is among the first study applied this instrument to screen the health status of trauma patients. The result regarding to MEWS score was consistent with previous evidence. Globally, MEWS score has been 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. In 2008, Groarke et al. used MEWS (Groarke JD, 2008) to assess newly admitted patients in emergency units. It was found that patients with high MEWS scores upon admission were up to 3.35 times more likely to receive treatment in the ICU and 1.82 times more likely to be admitted to the CCU with a mortality rate of up to 2.19 times higher. The study of Burch (Burch VC, 2008)found that patients with MEWS=3-4 are 1.7 times more likely to be hospitalized and 4.6 times more likely to die (Burch VC, 2008).

5.3.4 Pain

In this study, we also found that the degree of pain was positively correlated with the level of severity of discharge destination among trauma patients. Pain has been considered a “double-edge sword”(Ahmadi et al., 2016). On the one hand, physicians could use pain indicator to measure the severity of injuries. On the other hand, severe

pain could lead to the deterioration of patients, especially those patients having co-morbidities such as elderly. Evidence worldwide suggests that providing the appropriate and timely pain management to trauma patients is not only the patient right, also it prompts early healing, reduces patient's stress response, shorten hospital length of stay, lowers costs, diminishes risk of chronic pain due to neuroplasticity, and ultimately reduces rate of morbidity and mortality(Aisuodionoe-Shadrach, Olapade-Olaopa, & Soyannwo, 2006; Cohen, Christo, & Moroz, 2004).

5.3.5 Glasgow Coma Scores

Regarding GCS, this indicator was negatively correlated with emergency room discharge destination. It should be noted that the score of GCS could be categorized into several groups namely: 13–14 points indicates mild injury, 9–12 points indicates moderate injury, and 3–8 points indicates severe injury. Moreover, the level of these disorders was considered as mild (13–15 points), moderate (9–12 points), unconsciousness (6–8 points), decorticate (5 points), and decerebrate (4 points). GCS is widely used to assess the outcome of intensive care and for long-term monitoring of the recovery process after head and nervous system injuries.A study of Cuthbert et al. (2011) suggested that GCS score accounted for 35% of the variances in discharges to home versus not home among patients with moderate to severe traumatic brain injury, which means higher GCS were positively associated to going home among those patients (Cuthbert et al., 2011).

5.4 Conclusion

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, had co morbid disease, had abnormal Glasgow coma score, had high level of pain and show the alteration in their physiological deterioration should receive close monitoring throughout their stay in emergency room. This evidence is useful to improve the triage function 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 evidence of this study to performs a brief,

focused assessment and assigns the patient a triage acuity level, 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 emergency room to obtain further and proper treatment or so call discharge destination (Elias & Damle, 2015).

CHAPTER VI
CONCLUSION

6.1 Conclusion of the study

This descriptive correlation study aimed to investigate the relationships between age, co-morbidity, physical deterioration and emergency room discharge destination among traumatic injury patients who visit emergency room for medical treatment. Data collection was conducted from August to October, 2016. The researcher uses power of t test analysis method for calculating sample size which yielded 300 samples. The research setting was the trauma department in Bach Mai hospital, Hanoi, Viet Nam.

After obtained approval from Institutional Review Board of Nursing faculty, Mahidol University and Institutional of Review Board of SMP, Vietnam National University, Hanoi, Vietnam. The researcher used 5 instruments; the demographic data questionnaire, the Modified early warning scores (MEWS scale), Co morbidity Scale, Pain Numerical Rating Scale (NRS), and Glasgow coma scale (GCS scale) to collect data. All instruments were tested for their validity and reliability as clearly explained in chapter 3. The 300 samples were recruited into the study according to the research inclusion criteria. The researcher collected data by herself from 7.00 am to 9.00 pm every day until the sample reached the target of the studied sample size. According to the conditions of patients, data had to be collected from patients' record chart with permission from the hospital director.

Data analysis was conducted by using SPSS computer program. The descriptive statistics were used to describe general information and study variables, including: age, physiology deterioration, comorbidity, pain level, Glasgow coma score and discharge destination.The assumption of Pearson' Product Moment Correlation was tested and it was found that all variables were not in normal distribution. Accordingly, Spearman's rho was used to examine correlation between age,

physiology deterioration, comorbidity, pain level, Glasgow coma score and discharge destination among the patients with traumatic injuries.

The findings are summarized as follows:

Within 300 patients, there were 63 % of male 37 % of female with the ages ranged from 18 to 91 years. The average age was 39.95 years (SD ±18.16 years).The most prominent age group was 18 - 30 years old with 40.3%. Most of the patients lived in Hanoi (75.3%) were married (51.3%)and had governmental insurance to cover their medical expense (57.7%).

About 43**.**7 **%** of the patients had previous illness before ER visit and hypertension was the disease most frequently found (27.7%). Only 13.3% had history of allergy, 14.0% received pre-hospital treatment before ER arrival. Regarding behaviors, 23.0% patients were regular smokers and 14.0% were regular alcohol consumer.

The majority of sample sustained road traffic injury **(**56**.**7**%).** Half of the sample **(**49**.**7**%)** had head, face and neck injury**.** Bone fracture and head, face, neck injury were the major injury areas with 50.5% and 49.7%, respectively.

Bleeding (66.7%) was the major symptom of patients. In regard to the diagnosis, most of sample (47.0%) were diagnosed in general diagnosis as “injury” while 53% received specific diagnosis as having fracture, multiple fracture, burn and brain injury.

MEWS, pain scores and Glasgow coma scores are classified and presented in their frequency. The results reveal that majority of sample had MEWS between 0-3, with the minimum scores of 0 and the maximum scores of 12. The mean of MEWS is 1.7 (SD± 1.91). About 38.7 % of the sample showed pain level of greater than 8 on 0-10 NRS with the mean of 8.28(SD ±1.06). Majority of sample (81.7%) had Glasgow coma scores between 13-15, with the mean scores of 13.77 (SD ±2.76).

Regarding ER discharge destination, the majority of sample **(**59**.**7**%)** had to admit to the hospital while 35**.**4 **%** had to receive surgery and or admitted to intensive care unit **(**ICU**). .**About 40**.**3**%** of sample received medical treatment including wound sutured, pain medication or intravenous fluid therapy and were discharged home**.**

Age was positively correlated with emergency room discharge destination at ($r = .137$, $p = .017$), MEWS Score had positively correlated with emergency room discharge destination($r = .375$, $p < .000$),co morbidity had positively correlated with emergency room discharge destination($r = .164$, $p < .000$), pain score had positively correlated with emergency room discharge destination($r = .370$, $p < .000$) while Glasgow coma score had negatively correlated with emergency room discharge destination ($r = -.441$, $p <0.00$).

Results of this study fulfilled the hypothesis that those factors were related to emergency room discharge destination. Specifically, age, MEWS Score, co morbidity and pain score were correlated with the increased level of severity of emergency room discharge destination while Glasgow coma score was negatively correlated with the increased level of severity of emergency room discharge destination. The findings from this study reflect the significance of using various scoring system in emergency room especially in patients with traumatic injuries.

6.2 Implications of Research Findings

6.2.1 Implications for nursing practice

1) MEWS scores should be used to classifyseverity of patients who sustain traumatic injuries at emergency room. This scale can be used to triage trauma patients in emergency situation because parameters in this scale are very common and can be obtained from usual practice.

2) Numerical pain scale should be routinely used to assess pain level in traumatic injury patients presented at emergency room because in this study pain was found to be prominent symptom. Patients with moderate to severe pain should be properly managed.

3) Elderly patients sustaining traumatic injuries should receive more attention because they are at risk for admission to the hospital.

4) Nurses should assess traumatic injury patients who visit emergency room for their comorbidity. Patients with high numbers of comorbid diseases should receive closely monitor on their hemodynamic parameters as well as their conscious.

5) Glasgow coma score should be routinely used for evaluating traumatic injured patients' conscious.

6) Clinical practice guidelines for comprehensive assessment emergency traumatic injury patients should be developed and used to improve patients care and patient safety in emergency room.

7) Training program on using scoring system for emergency room nurses should be developed and uses for training to improve nurses' competencies.

6.2.2 Implications for further study

1) Scoring system should be used for data collection in emergency patients both in trauma and non- trauma to compared the emergency room discharge destination between these 2 groups of patients.

2) Multi settings research should be conducted to add more sample and more variety of settings in Vietnam. The results from the multi settings research can be used to test psychometric property of MEWS and other related scales.

3) Quasi experimental research should be conducted to test effectiveness of the training program to improve nurses' competencies related to using scoring system in emergency patients.

4) The effectiveness of clinical practice guidelines can be evaluated by one group pre- test and post-test observational research.

5) MEWS scores in Vietnamese version should be used in larger group emergency patients to test for its psychometric property.

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APPENDICES

APPENDIX A
LIST OF THE EXPERTS

1. Dr Hoang Van Dung, MD
   Deputy head of Bach Mai Medical College in Hanoi city, Vietnam
2. Dr Hoang Gia Du, MD
   Dean of Trauma emergency department in Bach Mai hospital. in Hanoi city, Vietnam
3. Bacherlor Ngo Minh Hong
   Head nurse of Surgical department in Hanoi city, Vietnam
4. Bacherlor Bui Minh Thu
   Heard nurse of Bach Mai Hospital. in Hanoi city, Vietnam
5. Ms Do Hong Loan, MD
   English teacher in Bach Mai Medical College.

APPENDIX B

MAHIDOL UNIVERSITY

Since 1888

The Institutional Review Board
Faculty of Nursing, Mahidol University
Tel 0-2441-5333 Ext 2531-32

Document No. 0517.0510/IRB-NS 450
Date May 3, 2016
Subject Result of research project considerations after the revision
Dear Chair, Master of Nursing Science Program in Adult Nursing (for Vietnamese Nurses)

According to the student named Mrs. Nguyen Quynh Cham has submitted the research project entitled Factors related emergency room discharge destination among patients with trauma protocol no. IRB-NS2016/18.0703 at the Institutional Review Board, Faculty of Nursing, Mahidol University on the (date) May 2, 2016 the IRB committee have examined and found the research protocol and all the research documents are revised according to the suggestions of the IRB. The IRB committee have made the decision and the results are as follows:

☒ Approve.
On the date May 2, 2016
Please look at the guideline for the research conduct post approval.
The document is attached together with the COA

Fongcum Tilokal

(Associate Professor Dr. Fongcum Tilokskulchai)
Chair, Institutional Review Board

Copy to Assistant Professor Dr. Orapan Thosingha
Mrs. Nguyen Quynh Cham

CERTIFICATE OF APPROVAL
From
Institutional Review Board Faculty of Nursing Mahidol University

COA No.IRB-NS2016/343.0205

Title of Project:	**FACTORS RELATED EMERGENCY ROOM DISCHARGE DESTINATION AMONG PATIENTS WITH TRAUMA**
Project Number:	**IRB-NS2016/18.0703**
Principle Investigator:	**Mrs. Nguyen Quynh Cham**
Name of Institution:	**Faculty of Nursing Mahidol University**
Approval includes	1) IRB-NS Submission form version received date 2 May 2016 2) Case Record Form version received date 2 May 2016

Institutional Review Board Faculty of Nursing Mahidol University is in full compliance with International Guidelines for Human Research Protection such as Declaration of Helsinki, The Belmont Report, CIOMS Guidelines and the International Conference on Harmonization in Good Clinical Practice (ICH-GCP)

Date of Approval: **02 May 2016**

Date of Expiration: **01 May 2017**

Signature of Chair:
Fongcum Tilokskul
(Associate Professor Dr. Fongcum Tilokskulchai)
Chair

Signature of Dean, Faculty of Nursing
Yajai Sitthimongkol
(Associate Professor Dr. Yajai Sitthimongkol)
Dean, Faculty of Nursing

Office of Institutional Review Board Faculty of Nursing Mahidol University Room 503 Faculty of Nursing, Mahidol University 999 Phuttamonthon 4 Road, Salaya, Nakhon Pathom 73170, THAILAND Tel: (662)-441-5333 Ext. 2531, 2532

Guideline for the research conduct post approval

The Institutional Review Board, Faculty of Nursing, Mahidol University

1. Use only documents with the stamp from the Institutional Review Board, Faculty of Nursing, Mahidol University (IRB-NS) for conducting the research (e.g., Instruments/ Questionnaires, Informational letter, Informed consent form)

2. If the investigator wishes to make any changes on the research protocol, the "Protocol Amendment Form" and all amended documents are required to submit to the IRB-NS for considerations before continuing the research.

3. If the serious adverse events or the suspected unexpected serious adverse events occur to the research participants, the "Adverse Event Report Form" is required to submit to the IRB-NS for considerations before continuing the research.

4. IF the research project is completed within 1 (one) year, the "Study Closure Form" is required to submit to the IRB-NS. If the project is needed to extend, the "Progress Report Form" is required to submit to the IRB-NS 1 (one) month in advance of the expiry date.

5. If the report for data collection is required, report as follows:

☑ Normal (Report at the renewal of the COA or at the project closure)

☐ Report at 25% of the data collection

☐ Report at 50% of the data collection

Date May 2, 2016

(Viet Nam Version)

KHOA Y DƯỢC
HỘI ĐỒNG ĐẠO ĐỨC
TRONG NGHIÊN CỨU Y SINH HỌC
Số: / KYD-HDDD

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

Hà Nội, ngày 16 tháng 08 năm 2016

GIẤY CHỨNG NHẬN
Chấp thuận của Hội đồng đạo đức trong nghiên cứu y sinh học

Căn cứ Quyết định số 89/QĐ-KYD ngày 22/10/2013 của Khoa Y Dược về việc thành lập Hội đồng đạo đức trong nghiên cứu y sinh học Khoa Y Dược nhiệm kỳ 2013-2018;

Căn cứ Quyết định số 235/QĐ-KYD ngày 23/10/2015 của Khoa Y Dược về việc điều chỉnh, bổ sung thành viên Hội đồng đạo đức trong nghiên cứu y sinh học Khoa Y Dược nhiệm kỳ 2013-2018;

Căn cứ Biên bản họp ngày 02/08/2015 của Hội đồng đạo đức trong nghiên cứu y sinh học Khoa Y Dược nhiệm kỳ 2013-2018;

Hội đồng đạo đức trong nghiên cứu y sinh học Khoa Y Dược chấp thuận về các khía cạnh đạo đức trong nghiên cứu đối với đề tài sau:

1. Tên đề tài: **Các yếu tố liên quan đến nơi cấp cứu ở người bệnh chấn thương được chuyển đến**
2. Người thực hiện nghiên cứu: **Nguyễn Quỳnh Châm** (Học viên cao học điều dưỡng ĐH Mahidol)
3. Địa điểm nghiên cứu lâm sàng: **Bệnh viện Bạch Mai**
4. Thời gian nghiên cứu: Từ tháng 08/2016 đến tháng 12/2016

Các tài liệu được chấp thuận bao gồm:

1. Đề cương nghiên cứu (tiếng Anh) phiên bản số 01 ngày 08/08/2016
2. Thông tin dành cho đối tượng nghiên cứu (tiếng Việt) phiên bản số 02 ngày 08/08/2016
3. Bản chấp thuận tham gia nghiên cứu (tiếng Việt) phiên bản số 02 ngày 08/08/2016
4. Bộ câu hỏi nghiên cứu (tiếng Việt)

Ngày chấp thuận: Ngày 16 tháng 08 năm 2016

Nghiên cứu viên chính phải tuân thủ việc báo cáo cho Hội đồng đạo đức trong nghiên cứu y sinh học Khoa Y Dược về các trường hợp có biến cố bất lợi, báo cáo tiến độ theo đúng các hướng dẫn và quy định hiện hành.

Nơi nhận:
- Bệnh viện Bạch Mai
- Nghiên cứu viên
- Lưu HĐĐD

CHỦ TỊCH

PGS.TS. Lê Thị Luyến

APPENDIX C

PARTICIPANT INFORMATION SHEET

- 2 MAY 2016
16-0703

IRB-NS Form No. 3.1

Participant Information Sheet

In this document, there may be some statements that you do not understand. Please ask the principal investigator or his/her representative to give you explanations until they are well understood. To help your decision making in participating the research, you may bring this document home to read and consult your relatives, intimates, personal doctor or other doctor.

Title of Research Project: Factors related to emergency room discharge destination among patients with trauma.

Name of Researcher: Nguyen Quynh Cham

Research Site-Office and its telephone number available for contact both in and out of the office hours:

The place of Bach Mai Hospital: 78 Giai phong Street, Dong Da District, Hanoi City, Vietnam. Code: 100,000

Phone number: (+84)912513284 (contact Mrs. Bui Minh Thu)

Source of Fund: No research funding

This research project aims to examine factors (age, physiology deterioration, co morbidity related to discharge destination among patients with trauma, which expects the following benefits:

1. Providing basic data about factors related discharge destination.
2. In the future, developing program by using this data to promote positive discharge destination.

However, in this study, the sample doesn't get any benefit directly but Trauma patients will get benefit in the future.

You are invited to participate in this research project because you have been diagnosis in Trauma patients and being age 18 years old or above

There will be 300 participants, and the research will last for 10 – 15 minutes for answer questionnaires and assess patient.

*To participate in this research is completely VOLUNTARY.

If you decide to participate the research project, you will go through the following procedure.

1. The researcher asks you to sign consent form
2. After head nurse introduce researcher to participants. Then, the researcher will self- introduce, make a relationship with the patients. For the confusion patient, the researcher will make a relationship with patients about the objective of study, data collection procedure and asks patient to sign consent form. The patients will be volunteer in the study. The researcher will collect some demographic data from medical record form.

Participant Information Sheet for version 5 date 10 August 2015

Approved by Institutional Review Board
Faculty of Nursing Mahidol University
Project Number IRB-NS 2016/16.0703
Date of Approval - 2 MAY 2016

IRB-NS Form No. 3.1

3. The researcher will organize private room to interview the patients or do questionnaire by themselves. Then, researcher uses four questionnaires for data collection. Questionnaires are 1) Demographic data questionnaire, 2) Mews scale, 3) Charlson co mobidity scale, 4) Glasgow coma scale, 5) Pain scale. The patients answered the questions in the context of an interview which lasted about 10-15 minutes. During you answer questionnaire for discharged destination, if there are any question that are uneasy of discomfort you have right not reply the question.

4. After using questionnaire, researcher will check all data again for complete.

5. During interview or use questionnaire, if patients don't want to participate in this study they can stop in any conditions. The patients will get the same standard care after withdraw from the study. There are no any effects for caring.

6. If the patients have unstable conditions for example dyspnea, shock, the researcher will stop interview. The researcher will immediately contact with doctors who have response to take care the patients. The researcher will take care until patients already stable.

If you do not participate in this research project, you will receive a standard assessment and treatment.

If you have any questions about this research please feel free to contact the researcher, **Mrs. Nguyen Quynh Cham via mobile telephone: (+84) 904466862.**

You do not get any money or payment for participating in this research.

If relevant information arises about benefits and risks of the research project, the researcher will inform the participant immediately and without concealment.

Your information will be kept confidential, it will not be subject to an individual disclosure, but will be included in the research report as part of the overall results. Individual information may be examined by a researcher, the ethics committee, etc.

You have the right to withdraw from the project at anytime without prior notice. And the refusal to participate or the withdrawal from the research project will not at all affect the proper service or treatment that he/she will receive.

This research project is approved by The Institutional Reviews Boards, Faculty of Nursing (IRB-NS) at the office of IRB-NS room 503 5th floor, Faculty of Nursing, Mahidol University, 999 Phuttamonthon 4 Road, Salaya, Nakhon Pathom 73170 Thailand Tel 0066 2 441 5333 ext 2531, 2532 Fax 0066 2 441 5333 ext 2531,

Email: nsirbnursing@mahidol.ac.th, ns.irbnursing@gmail.com

Approved by Institutional Review Board
Faculty of Nursing Mahidol University
Project Number IRB-NS 2016/NS.0703
Date of Approval - 2 MAY 2016

IRB-NS Form No. 3.1

Then submit document and result to SMP-IRB institutional review board of Vietnam National University, 144 Xuan Thuy street, Cau giay District, Hanoi city, Vietnam. Code: 100000, telephone number: (+84)437450118. Fax: (+84)437450146. Mobile phone number of IRB: (+84)983297654 (Contact Mr. Nguyen Hoang Long)

On the condition that I am not treated as indicated in the information sheet distributed to the subjects, I can contact the Chair, or the representative of the IRB-NS at the contact address presenting above.

I thoroughly read the details in this document.

Signature..... Participant

(.....)

Date.....

PARTICIPANT INFORMATION SHEET (Viet Nam Version)

Thông tin dành cho đối tượng nghiên cứu *Phiên bản 02/ ngày 08 tháng 08 năm 2016*

BẢN THÔNG TIN DÀNH CHO ĐỐI TƯỢNG NGHIÊN CỨU

Trong tài liệu này sẽ có một số vấn đề mà ông / bà có thể không hiểu. Hãy hỏi người và đại diện của bà ấy để đưa có được một sự giải thích đầy đủ cho đến khi ông (bà) hiểu rõ ràng vấn đề. Ông/bà có thể mang tài liệu này về nhà để đọc hoặc hỏi ý kiến người thân và các bác sĩ trước khi quyết định có tham gia vào nghiên cứu hay không.

Tên của đề tài nghiên cứu: Các yếu tố liên quan đến nơi cấp cứu ở người bệnh chấn thương được chuyển đến.

Tên người nghiên cứu: Nguyễn Quỳnh Châm

Địa chỉ và điện thoại liên hệ trong và ngoài giờ hành chính (Đại diện của người nghiên cứu): Bệnh viện Bạch Mai: 78 đường Giải Phóng, Quận Đống Đa, Hà Nội, Việt Nam. Mã: 100000. Điện thoại: (+84)438683731 Fax: (+84) 438691607

Nguồn hỗ trợ: Không có

Mục đích của nghiên cứu: nghiên cứu này nhằm đánh giá các yếu tố liên quan đến quá trình phân loại bệnh nhân tại khoa cấp cứu chấn thương.

Lợi ích của nghiên cứu:

1)Việc nghiên cứu này cung cấp dữ liệu cơ bản về các yếu tố liên quan đến phân loại người bệnh tại khoa cấp cứu chấn thương.

2) Trong tương lai, nghiên cứu này phát triển để giúp cải thiện công tác phân loại bệnh nhân tại khoa cấp cứu ngoại khoa.

Tuy nghiên cứu này không mang lợi ích ngay cho người bệnh đến khám nhưng sẽ mang lại nhiều lợi ích cho những người chấn thương tương tự trong tương lai.

Ông (bà) được mời tham gia chương trình nghiên cứu bởi vì Ông (bà) có chấn thương và được khám cấp cứu tại khoa cấp cứu chấn thương và trên 18 tuổi.

Sẽ có khoảng 300 người tham gia, và buổi nghiên cứu sẽ có phần Hỏi- đáp – khám diễn ra trong vòng 10-15 phút

* Việc tham gia hoàn toàn TỰ NGUYỆN.

Nếu Ông (bà) quyết định tham gia đề tài, Ông (bà) sẽ phải đi qua những quy trình sau:

1. Nhà nghiên cứu sẽ yêu cầu Ông (bà) ký vào bản đồng ý tham gia nghiên cứu.

2. Sau khi điều dưỡng trưởng giới thiệu người nghiên cứu với người tham gia nghiên cứu. Sau đó, người nghiên cứu phải tự giới thiệu bản thân và tạo mối quan hệ với người bệnh. Đối với người bệnh đặc biệt, người nghiên cứu phải tạo mối quan hệ với người bệnh và giải thích mục đích của nghiên cứu và cách thu thập số liệu và nói người bệnh ký vào phiếu chấp thuận tham gia nghiên cứu. Người bệnh phải hoàn toàn tự nguyện khi tham gia nghiên cứu. Người nghiên cứu sẽ thu thập một số thông tin cơ bản người bệnh từ hồ sơ bệnh án.

3. Người nghiên cứu sẽ sử dụng một phòng riêng để phỏng vấn người bệnh sau đó người nghiên cứu sử dụng 5 bộ câu hỏi để thu thập thông tin người bệnh. Các bộ câu hỏi bao gồm 1) Thông tin chung về người bệnh 2) Thang điểm cảnh báo sớm về những vấn đề nguy hiểm, 3) Bệnh lý kèm theo, 4) Đánh giá ý thức người bệnh, 5) Đánh giá mức độ đau. Người điều dưỡng phỏng vấn và khám người bệnh cụ thể từ 10-

15 phút. Trong quá trình người bệnh trả lời các câu hỏi phỏng vấn. Nếu có bất kỳ câu hỏi nào hoặc người bệnh không thoải mái người bệnh có quyền không trả lời.

4. Sau khi đã phỏng vấn toàn bộ câu hỏi, người nghiên cứu sẽ kiểm tra lại một lần nữa để hoàn thành.

5. Trong quá trình phỏng vấn, nếu người bệnh không muốn tham gia nghiên cứu người bệnh có thể rút khỏi nghiên cứu bất kể lúc nào. Người bệnh sẽ được chăm sóc bình thường theo đúng quy trình của bệnh viện và sẽ không có bất kỳ trở ngại nào sau khi rút khỏi nghiên cứu.

6. Nếu người bệnh cảm thấy mệt mỏi: Khó thở, shock, người nghiên cứu phải dừng phỏng vấn. Người nghiên cứu phải thông báo ngay lập tức cho bác sỹ, người mà sẽ điều trị cho người bệnh.

Nếu Ông bà không muốn tham gia nghiên cứu, ông bà sẽ nhận được sự chăm sóc bình thường theo đúng quy trình của Bệnh viện.

Nếu Ông (bà) có bất kỳ câu hỏi nào về dự án, hãy gọi điện tới **Bà Nguyễn Quỳnh Châm Số điện thoại: +84 904466862**

Ông bà sẽ không phải trả tiền khi tham gia nghiên cứu

Nếu có thông tin về lợi ích cũng như rủi ro của nghiên cứu này, người nghiên cứu sẽ thông tin cho người tham gia ngay lập tức.

Thông tin của Ông (bà) sẽ được bảo mật tuyệt đối. Thông tin cá nhân của Ông (bà) sẽ được thẩm định, kiểm tra bởi nhà nghiên cứu, ủy ban đạo đức.

Ông (bà) có quyền rút khỏi nghiên cứ bất cứ lúc nào mà không cần báo trước và điều này sẽ không ảnh hưởng tới các dịch vụ chăm sóc và điều trị mà Ông (bà) nhận được.

Đề tài nghiên cứu này được chấp thận bởi Hội đồng đạo đức trong nghiên cứu y sinh, khoa Điều Dưỡng tại văn phòng tầng 5 phòng 504, Đại học Mahidol. Đường Phuttamonthon 4, Salaya, Nakhon Pathom 73170 Thái Lan. Điện thoại: 66 2 441 5333 số máy lẻ 2531, 2532. Fax 0066 2 441 5333 số máy kẻ 2531. Email: nsirbnursing@mahidol.ac.th, ns.irbnursing@gmail.com

Tài liệu và kết quả sẽ được nộp cho Hội đồng Đạo đức Đại học Quốc gia Hà Nội, PGS. TS. Lê Thị Luyến, số điện thoại +84913597423, tòa nhà Y1, 144 đường Xuân Thủy, quận Cầu Giấy, thành phố Hà Nội, Việt Nam. Mã bưu chính: 100000, số điện thoại liên lạc: +84437450118, Fax: +84-4-37450146. Email: smp@vnu.edu.vn

Trong trường hợp Ông/Bà không được đối xử như cam kết trong bản thông tin này, Ông/Bà có thể liên lạc với Chủ tịch hoặc người đại diện của Hội đồng đạo đức trong nghiên cứu y sinh, khoa Điều dưỡng, Đại học Mahidol theo thông tin ở trên.

Tôi đã đọc kỹ và hiểu toàn bộ chi tiết nêu trong bản thông này.

Ngày.....

Họ tên, chữ ký người tham gia nghiên cứu

....

APPENDIX D
INFORMED CONSENT FORM

- 2 MAY 2016
18.0703

IRB-NS Form No. 4

Consent Form for Informed and Voluntary Participation in Research

Date ..... /...../.....

My name is ..... aged ..... years old

Now living at the address: No .....

Road/ street.....Sub-distric/commune.....

District:.....Provine/ City:.....

Postal code:.....Telephone number:.....

I give my consent to participate as a subject in the research project entitled:

Factors related emergency room discharge destination among patient with trauma.

In so doing, I am informed of the background and purpose of research project; its procedural details to carry out or to be carried out; its expected benefits and risks that may occur to the subjects, including methods to prevent and handle harmful consequences; and payment/ incentives, and expense. I thoroughly read the detailed statements in the information sheet given to the research subjects, I was also given explanations and my questions were answered by the head of the research project.

I consent to participate as a subject in this research project.

On the condition that I have any questions about the research procedures, or on the condition that I suffer from an undesirable side effect from this research, I can contact Mrs. Nguyen Quynh Cham via phone number (+84)904466862 or email: chamquynh881@yahoo.com

On the condition that I am not treated as indicated in the information sheet distributed to the subjects, I can contact the Chair, or the representative of the IRB-NS,

Tel 0066 2 441 5333 ext 2531, 2532 Email: nsirbnursing@mahidol.ac.th, ns.irbnursing@gmail.com

I am aware of my right to further information concerning benefits and risks from the participation in the research project and my right to withdraw or refrain from the participation anytime without any consequence on the service or health care I am to receive in the future, I consent to the researcher's use of my private information obtained in this research, but do not consent to an individual disclosure of private information. The information must be presented as part of the research results as a whole.

Approved by Ethics Review Board
Faculty
Project Number 2016/18.0703
Date of Approval - 2 MAY 2016

Version 5 date 10 August 2015

IRB-NS Form No. 4

I thoroughly understand the statement in the information sheet for the research subjects and in this consent form. I thereby give my signature.

Signature.....Participants/Proxy/

(.....) Date.....

Signature.....Person in Charge of Informing and Requesting a Consent/Head of (Mrs Nguyen Quynh Cham)

Research Project/Date.....

In case that the participant is not literate, the reader of all the statements for the participant is (Mr./Mrs./Ms.....), who gives his/her signature as a witness.

Signature.....Witness

(.....) Date.....

INFORMED CONSENT FORM (Viet Nam Version)

Bản chấp thuận tham gia nghiên cứu *Phiên bản 02/ ngày 08 tháng 08 năm 2016*

BẢN CHẤP THUẬN THAM GIA NGHIÊN CỨU

Ngày...../...../.....

Tên tôi là .....tuổi.....

Hiện sống tại địa chỉ: .....

Đường/ Phố :..... Phường/ xã.....

Mã ID : .....

Mã vùng: .....Số điện thoại: .....

Trước tiên, tôi xin gửi lời cảm ơn tới những nhà nghiên cứu đề tài: "**Các yếu tố liên quan đến nơi cấp cứu mà bệnh nhân chấn thương chuyển đến" .**

Trong quá trình trước khi tham gia nghiên cứu, tôi đã được thông báo về nội dung cũng như mục đích của nghiên cứu, chi tiết quá trình được thực hiện, những lợi ích và rủi ro có thể xảy ra đối với người tham gia nghiên cứu, bao gồm các phương pháp ngăn ngừa và giải quyết các tác hại không mong muốn có thể xảy ra cho người tham gia nghiên cứu. Tôi đã đọc kĩ các điều khoản chi tiết trong tờ thông tin được đưa ra bởi các nhà nghiên cứu, bên cạnh đó, các câu hỏi của tôi đã được giải đáp bởi đúng người thực hiện nghiên cứu.

Tôi đồng ý tham gia vào nghiên cứu này như một đối tượng nghiên cứu.

Nếu có bất cứ câu hỏi nào về nghiên cứu hoặc có vấn đề mới phát sinh trong quá trình nghiên cứu tôi có thể liên hệ với chị Nguyễn Quỳnh Châm số điện thoại : +84 0904466862. Email: chamquynh881@yahoo.com. (Số điện thoại liên lạc trên được kết nối 24/24 h).

Nếu tôi không được điều trị và chăm sóc như những gì đề cập đến trong bản thông tin dành cho đối tượng nghiên cứu tôi có thể liên hệ với hội đồng đạo đức, Khoa Điều dưỡng, Đại học Mahidol Thái Lan, đặt văn phòng tại tầng 5 phòng 504, Đại học Mahidol, đường Phuttamonthon 4, Salaya, Nakhon Pathom 73170, Thái Lan. Điện thoại: 0066 2 441 5333 số máy lẻ 2531, 2532. Fax 006624415333 số máy lẻ 2531. Email: nsirbnursing@mahidol.ac.th, ns.irbnursing@gmail.com

Tôi cũng có thể liên lạc với Hội đồng đạo đức trong nghiên cứu Y sinh học, Khoa Y Dược, Đại học Quốc gia Hà Nội. Địa chỉ: Tòa nhà Y1, số 144 phố Xuân Thủy, Quận Cầu giấy, Hà Nội, Việt Nam: điện thoại: 04-37450188; Fax +84437450146; Email: smp@vnu.edu.

Tôi nhận thức được quyền thông tin liên quan tới lợi ích và rủi ro của người tham gia nghiên cứu và quyền được rút khỏi nghiên cứu bất cứ lúc nào mà không gặp vấn đề gì về dịch vụ cũng như việc chăm sóc sức khỏe mà tôi sẽ nhận được trong tương lai. Tôi đồng ý cho bên nghiên cứu sử dụng thông tin cá nhân trong việc nghiên cứu, nhưng không đồng ý việc tiết lộ thông tin cá nhân với lý do khác. Thông tin phải được trình bày như là một phần của kết quả nghiên cứu. Tôi đồng ý tham gia vào nghiên cứu này.

Chủ nhiệm đề tài nghiên cứu **Người tham gia nghiên cứu**

APPENDIX E

INSTRUMENT

Instrument (English version)

Part 1 General information of the patients

The following questions related to your personal information. Please tick (√) or fill in blanks in the following questions:

ID.....

1. Age:

2. Gender: ☐Male ☐Female

3. **Weight (Kg)** **Height (m)** **BMI (kg/m^2)**

4. Location of residence:

5. Name of hospital before to Bach Mai hospital

6. Marital status:

☐ Married ☐ Single

☐ Separated ☐Divorced ☐ Widowed

7. What is your highest education level?

☐Primary school, Secondary school ☐High school

☐ Two years certificate, College ☐Bachelor (University)

☐Others (please specify) .....

8. What is your occupation?

☐Professional ☐Farmer

☐ Industrial worker ☐Official

☐ Home worker ☐Retired

☐Other jobs (please specify).....

9. How much of your income per month?

- Your income per month: .....VND

10. Do you have your health insurance? Yes ☐ No☐

Part 2: Information related to illness and treatment

1. Time/Date of Addition to hospital:
2. Where hospital to transfer (Referral):
3. Transportation:
4. Reasons to emergency care:
5. Injury area:

☐Brain ☐Chest
☐Head, face, neck ☐Abdomen
☐Bone Fracture ☐Burn
☐Other

6. Diagnosis:
7. Previous illness:
8. History of Smoking, alcohol:

Smorking: Often ☐; Sometime ☐; Never ☐

Alcolhol: Often ☐; Sometime ☐; Never ☐

9. Food and drug allergies:
10. Pre – hospital emergency treatment:
11. Symptoms of disease ☐Nausea ☐Vomiting

☐ Headache ☐Giddy ☐Diarrhea

☐ Blood bleeding ☐Trauma ☐Dyspnea

☐Allergies ☐Chest pain ☐ Pain

Part 3: Modified early warning score (Mews): assess 5 symptoms

Score	**3**	**2**	**1**	**0**	**1**	**2**	**3**
Respiratory rate (/minutes)		<9		9 – 14	15 - 20	21 - 29	>29
Heart rate (/minutes)		<40	41 – 50	51 – 100	101 - 110	111 - 129	>129
Systolic blood pressure (mmhg)	<70	71 - 80	81 – 100	101 – 199		>199	
Temperature (^{0}C)		<35		35 – 38.4		>38.4	
AVPU *				**A**	**V**	**P**	**U**

Total score……
Alert; Responds to Voice; Responds to Pain; Unresponsive

Time in:

Past 4: Numerical Rating Scale (NRS)

I would like you to rate your pain on a scale from zero to ten. 'Zero' means you have no pain at all. 'Ten' means the worst possible pain you can image. What number would you give to your pain?

0	1	2	3	4	5	6	7	8	9	10

No pain **The worst possible pain**

Part 5: Glasgow coma scale

5.1 Eye opening response……
5.2 Best verbal response……..
5.3 Best motor response……..
5.4 Total score……..

Part 6: Which co morbidity do you have?

6.1 Hypertension O no O yes ……..for how long?

Treatment: Always ☐; Sometime ☐; No ☐

6.2 Heart disease O no O yes ……..for how long?

Treatment: Allway ☐; Sometime ☐; No ☐

6.3 COPD O no O yes ……..for how long?

Treatment: Always ☐; Sometime ☐; No ☐

6.4 Renal disease O no O yes ……..for how long?

Treatment: Always ☐; Sometime ☐; No ☐

6.5 Diabetes ☐no ☐yes ……..for how long?

Treatment: Always ☐; Sometime ☐; No ☐

6.6 Others please describe:……

6.7 Which trauma or surgery do you have in the past?

6.8 Which medicines do you use in the past and now?

7. Discharge destination:

	Time out:			Discharge destination	
1.	MEWs scale	Result	Score	ICU	
	Respiratory rate(/ minutes)			Surgery	
	Heart rate (/ minutes)			Ward	
	Systolic blood pressure			Go home:	
	Temperature ($0^{O}C$)			- Without Px	
	AVPU			- With Px	
Total Mews:				Death	
2	Pain scale				
3	Glasgow coma scale				
4	Co morbidity				

INSTRUMENT (Viet Nam Version)

Bộ câu hỏi nghiên cứu *Phiên bản 02/ ngày 08 tháng 08 năm 2016*

BỘ CÂU HỎI NGHIÊN CỨU

Phần 1: Thông tin chung của người bệnh

Số thứ tự: ..... Mã bệnh án: .....

Mã ID:.....

Dưới đây là 10 câu hỏi liên quan đến thông tin cá nhân của người bệnh và thông tin liên quan đến bệnh tật của người bệnh. Làm ơn hãy sử dấu ✓ để điền vào ô trống.

1. Tuổi .....

2. Giới ☐ Nam ☐ Nữ

3. Cân nặng ..... (Kg) Chiều cao ..... (m) BMI (kg/m^2)

4. Nơi ở.....

5. Bệnh viện nào đã điều trị trước khi chuyển đến BVBM:

6. Tình trạng hôn nhân

☐ Đã lập gia đình ☐ Độc thân ☐ Ly thân

☐ Ly hôn ☐ Góa (chồng hoặc vợ)

7. Trình độ học vấn cao nhất

☐ Tiểu học, Trung học cở sở ☐ Trung học phổ thông

☐ Trung cấp, cao đẳng ☐ Đại học

☐ Khác (ghi cụ thể) .....

8. Nghề nghiệp

☐ Trí thức ☐ Nông dân

☐ Công nhân ☐ Nhân viên văn phòng

☐ Nội trợ ☐ Nghỉ hưu

☐ Công việc khác (ghi cụ thể).....

9. Thu nhập của bản thân và gia đình là bao nhiêu tiền trong một tháng:

Thu nhập của bản thân trên một tháng:.....VND

10. Bản thân có thẻ bảo hiểm y tế không? Có ☐ Không ☐

Phần 2: Những thông tin liên quan đến bệnh và điều trị.

1. Thời gian đến nhập viện:
2. Bệnh viện nào chuyển đến:
3. Phương tiện chuyển đến:
4. Lý do đến bệnh viện cấp cứu:
5. Vị trí tổn thương:

☐Não ☐Ngực
☐Đầu, mặt cổ ☐ Bụng
☐Gãy xương ☐Bỏng
☐Vị trí khác

6. Chẩn đoán:
7. Các bệnh trước đây đã mắc:
8. Tiền sử hút thuốc lá và uống rượu:

Hút thuốc: Thường xuyên ☐; Thỉnh thoảng ☐; Không bao giờ☐

Uống rượu: Thường xuyên ☐; Thỉnh thoảng ☐; Không bao giờ ☐

9. Dị ứng với thức ăn và thuốc: ☐ Có ☐ Không
10. Đã điều trị trước khi đến viện: ☐ Có ☐ Không
11. Triệu chứng bệnh ☐ Buồn nôn ☐ Nôn ☐ Đau đầu
☐ Chóng mặt ☐ Tiêu chảy ☐ Chảy máu ☐Chấn thương
☐ Khó thở ☐ Dị ứng ☐ Đau ngực ☐ Đau

Phần 3: Thang điểm cảnh báo sớm các vấn đề nguy hiểm (Mews)

Điểm	3	2	1	0	1	2	3
Nhịp thở (/phút)		<9		9 – 14	15 - 20	21 - 29	>29
Nhịp tim (/phút)		<40	41 – 50	51 – 100	101 - 110	111 - 129	>129
Huyết áp tâm thu (mmhg)	<70	71 - 80	81 – 100	101 – 199		>199	
Nhiệt độ (^{0}C)		<35		35 – 38.4		>38.4	
Đánh giá về ý thức				A	V	P	U

A: Đáp ứng; V: Đáp ứng với gọi P: Đáp ứng khi đau U: Không đáp ứng

Phần 4: Thang đánh giá mức độ đau (NRS)

Tôi muốn đo mức độ đau của bạn trên thước đo điểm đau từ 0 đến 10. "0" có nghĩa là không đau, "10" có nghĩa là bạn đau kinh khủng không thể chịu được. Số nào là số thể hiện mức độ đau của bạn?

0	1	2	3	4	5	6	7	8	9	10

Không đau **Đau kinh khủng**

Phần 5: Thang đánh giá tình trạng hôn mê (Glasgow)

5.1 Đáp ứng mở mắt…….

5.2 Đáp ứng lời nói tốt nhất:……

5.3 Đáp ứng vận động tốt nhất……..

5.4 Tổng điểm……..

Phần 6: Bệnh lý kèm theo nào bạn có?

6.1 Cao huyết áp ☐ Không ☐ Có Thời gian bao lâu:

Điều trị :Thường xuyên ☐ ; Thỉnh thoảng ☐ ; Không ☐

6.2 Bệnh tim mạch ☐ Không ☐ Có Thời gian bao lâu:

Điều trị :Thường xuyên ☐ ; Thỉnh thoảng ☐ ; Không ☐

6.3 Viêm phổi tắc nghẽn mãn tính ☐ Không ☐ Có Thời gian bao lâu:

Điều trị : Thường xuyên ☐ ; Thỉnh thoảng ☐ ; Không ☐

6.4 Bệnh thận ☐ Không ☐ Có Thời gian bao lâu:

Điều trị : Thường xuyên ☐ ; Thỉnh thoảng ☐ ; Không ☐

6.5 Tiểu đường ☐ Không ☐ Có Thời gian bao lâu:

Điều trị : Thường xuyên ☐ ; Thỉnh thoảng ☐ ; Không ☐

6.6 Những bệnh khác:……

6.7 Trước đây bạn có bị chấn thương hay trải qua phẫu thuật nào không?

Có ☐ Không ☐

6.8 Thuốc đã điều trị trước đây và hiện tại

Phần 7: Nơi chuyển đến:

	Thời gian trước chuyển:			**Phân loại**	
1.	**Thông số**	**Kết quả**	**Điểm**	**Khoa hồi sức**	
	Nhịp thở/phút			**Phẫu thuật**	
	Nhịp tim/phút			**Điều trị ngoại khoa**	
	Huyết áp tối đa			Về nhà: - Có kèm theo VT - Không kèm theo VT	
	Nhiệt độ (0^oC)			Chết	
	Mức độ ý thức				
	Tổng điểm Mews:				
2	**Mức độ đau**				
3	**Đánh giá tình trạng hôn mê**				
4	**Bệnh kèm theo**				

APPENDIX F
ADDITIONAL STATISTICAL ANALYSIS

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Outcome1	,266	300	,000	,763	300	,000
GlasgowG	,487	300	,000	,486	300	,000
Co_morbidity	,328	300	,000	,736	300	,000
MewscoreG	,508	300	,000	,420	300	,000
PainscaleG	,399	300	,000	,618	300	,000

a. Lilliefors Significance Correction

The test of Normality is not distribution so that we use Spearman's for statistic.

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