



(RESEARCH ARTICLE)



## The situation of pre-hospital care on emergency in hanoi through traumatic patients have been treated at Dong Da General Hospital in 2022

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### Abstract

**Introductions:** Pre-hospital care, especially for severe trauma which contributes to reduce the risk of morbidities and mortalities. We conducted a study for having an over view of the situation of pre-hospital emergency in Hanoi city through traumatic patients have been treated at Dong Da General Hospital, one of the second level hospitals in Hanoi.

**Materials and methods:** All traumatic patients have been admitted at the emergency department of Dong Da General Hospital during the period from March 2022 to October 2022, regardless of gender, age, had complete medical records, and including severe cases were discharged to die or dead in hospital. Data were collected by Epidata 3.1 and processed using SPSS 20.0 software.

**Results: Characteristics of target population:** A total of 236 cases of traumatic patients were enrolled, of them, the ISS scores in the mild range accounted for the majority of 97.0%; Lesion located in limbs and pelvis accounts for the largest proportion of 43.1%.

**Current situation of pre-hospital care:** Patients who did not receive first aid before coming to the hospital accounted for 71.6%, the first aid people were mainly accompanied by the person next to patient at the scene (65.7%). Transportation by ambulance accounts for only 1.7%, the average waiting time was 4.54 7.68 minutes. Patients receiving first aid to step Disability (D) accounted for the largest proportion with 59.7%, 34.3% of patients received first aid to step Exposure (E). Wound washing and bandaging are the two most commonly used techniques, accounting for 28.6%, with 1 patient requiring CPR accounting for 1.0%.

**Conclusions and recommendations:** Through the study of pre-hospital care for trauma showed that most patients were initially managed by the person accompanying the patient. A low percentage of ambulance transportation can be potentially high risk for the patient. We recommend strengthening the network of collaborators and communities for pre-hospital care in emergency.

**Keywords:** Traumatic injury; Injury; Pre-hospital care; First Aid

### 1. Introduction

Injuries due accidents are still a global problem, especially road traffic accidents, every 6 seconds there is a death due to an accident. The consequences lead to the global burden of disease, which is the leading cause of mortality and morbidities among young people, especially in developing countries with relatively high rates of injury and ranking the

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highest in the number of emergency cases in hospitals. According to the World Health Organization (WHO), the global burden of injury accounts for 80% in middle- and low-income countries (LMICs). These figures account for 90% of global deaths [1,2]. In Vietnam, according to a report in 2018 by the Vietnam Environmental Health Management Agency (VIHEMA): the total number of deaths was 34,071, the overall mortality rate was 35.68 for 100,000 inhabitants, which is a high level compared to other countries in the region [3].

One of the reasons for the high mortality rate is the lack of effective pre-hospital care services on emergency, which increases the risk of complications and death. The majority of injury-related deaths are out-of-hospital or within four hours of the accident [3,4]. It's estimated that if nations carry out well pre-hospital care emergency systems, the number of deaths can be reduced by 54-90% with 900 million - 2.5 billion disability-adjusted life years due to emergency causes. Currently, health systems in many countries, especially low- and middle-income countries, often only focus on treating specific diseases. Numerous studies both in the world and in Vietnam have shown that there are shortcomings in pre-hospital first aid because patients do not have timely or improper emergency access, increasing the risk of mortality and morbidity [2,4,5,6].

Dong Da General Hospital is a second-level hospital in the city, directly under the Hanoi Department of Health. According to a statistic released in November 2022 showed that there were 1,076 visits of traumatic patients at the Emergency Department of Hospital [7]. In order to understand the current situation of pre-hospital care emergencies related to trauma, we have conducted a study for an overview of the current pre-hospital care emergency situation in Hanoi, thereby suggesting recommendations for improving pre-hospital care emergency operations.

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## **2. research subjects and methodology**

### **2.1. Research subject and selection criteria**

All traumatic patients were admitted to the Emergency Department of Dong Da General Hospital during the period from 02/2022 to 08/2022, including deaths. The medical report was completed, including the autopsy report.

### **2.2. Research site**

Emergency Department, Dong Da General Hospital, Hanoi

### **2.3. Research methods**

Descriptive and prospective study. The tools to collect information was designed and the staff involved this project were well trained on data collection.

### **2.4. Research variables include**

#### *2.4.1. Demographic characteristics*

Age, gender, type of trauma, time to access medical care.

#### *2.4.2. Damage characteristics*

For Brain Trauma Assessment: Glasgow Coma Score (GCS) was used [8]

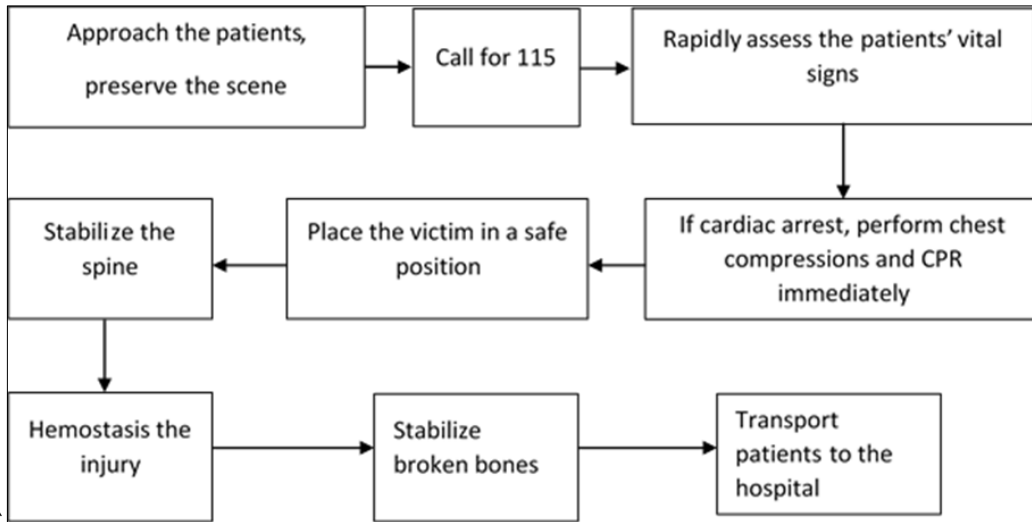
For Injury Severity Assessment: Injury Severity Score was used (ISS) [9]

Lesion location

#### *2.4.3. Features of first aid*

Classification and first aid at the scene according to Start Triage - Australia [10]

First aid according to the guidance of the Ministry of Health (2018) [11]



**Figure 1** Diagram of basic steps in first aid for traumatic patients

**2.5. Data processing**

Data were entered using Epidata 3.1 software and then processing using SPSS 20.0 software.

**3. Results**

**3.1. Demographic characteristics of research subjects**

During the study period, there were 236 traumatic patients who came to Emergency Department of Dong Da General Hospital enrolled. Information of research subjects is shown in the following tables.

*3.1.1. Demographic characteristics of research subjects*

**Table 1** Demographic characteristics of the research subjects (n=236)

Age group		Male (n=128)		Female (n=108)		Total (n=236)	
		N	Ratio (%)	N	Ratio (%)	N	Ratio (%)
Age group	0-14	14	10.9	11	10.2	25	10.6
	15 - 24	19	14.8	9	8.3	28	11.9
	25 - 34	32	25.0	18	16.7	50	21.2
	35 - 44	25	19.5	9	8.3	34	14.4
	45 - 59	25	19.5	19	17.6	44	18.6
	≥ 60	13	10.2	42	38.9	55	23.3
Total		128	54.2	108	45.8	236	100

## 3.1.2. Circumstances the accident occurred

**Table 1** Circumstances of accidents (n=236)

Description		(n)	(%)
Place of the accident	At home	110	46.7
	Schools	03	1.3
	Workplace	26	11.0
	On the road	49	20.7
	Playground	39	16.5
	Others	09	3.8
Activities in progress at the time of the accident	Work	47	19.9
	Study	01	0.4
	Play sports	18	7.6
	Leisure activities	112	47.6
	Participating traffic	49	20.7
	Others	09	3.8

## 3.1.3. B, Trauma severities

Brain injuries according to the Glasgow Coma Scale (GCS)

**Table 3** Coma levels according to GCS (n=236)

GCS	(n)	(%)
Mean ( $X \pm SD$ ) (score)	13.25±1.75	
Conscious (15 points )	22.7	96.2
Mild coma (9-14 points )	04	1.7
Moderate coma (6-8 points)	01	0.4
Deep coma (4-5 points)	04	1.7
Total	236	100%

Lesion location

**Table 4** Distribution of Lesion location (n=236)

Description	(n)	(%)
Head - face - neck	27	9.6
Chest	19	6.7
Abdomen	25	8.8
Limbs and pelvis	122	43.1
Soft tissues	90	31.8

Trauma severity according to ISS

**Table 5** ISS (n=236)

Description	(n)	(%)
Mild	229	97.0
Moderate	02	0.8
Severe	05	2.2

C, Pre-hospital care emergency situation

### 3.1.4. Transport the patients to the hospital

**Table 6** Transporting the patients

Description	(n)	(%)
Transporting means (n=236)	Ambulance	04 1.7
	Police car	03 1.3
	Taxi	32 13.6
	Car	48 20.3
	Motorcycle	142 60.2
	Others	07 3.0
Ambulance service providers (n=4)	Ambulance of Hanoi (115)	02 50.0
	Hospital	01 25.0
	Private	01 25.0
Person who takes the patients to hospital (n=236)	Healthcare staff	03 1.3
	First responder	01 0.4
	Accompanying person *	219 92.8
	Person nearby **	12 5.1
	Others	01 0.4
Position of patients when transporting (n=236)	Supine	16 6.8
	Sitting	213 90.3
	Fowler	01 0.4
	Walking with assistance	05 2.0
	Holding	01 0.4

\*Person who has accompanied the patients when the accident occurred; \*\*Person who first saw the patients at scene

### 3.1.5. Time of access and transportation of patients to the hospital

**Table 7** Time of access and transportations (n=236)

Description	Mean value (X ±SD) ; (Min-Max)
Waiting time for the car accessing the patients (minutes)	4.54 ±7.68; (0-60)
Transporting duration from the accident site to hospital (minutes)	13.61 ±10.06; ( 5 -60)

Person carrying pre-hospital first aid

3.1.6. Only 67/236 (28.4%) cases were received pre-hospital first aid. The characteristics of the pre-hospital emergency are shown in the table.

**Table 8** Characteristics of person who did the first aid at the scene (n=67)

Description	(n)	(%)
Healthcare staff	3	4.5
First aid provider	1	1.5
Accompanying person	63	94.0
Total	67	100.0

First aid techniques performed for the pre-hospital care.

**Table 9** First aid techniques performed before admission (n=67)

First aid techniques performed *	(n)	(%)
Clean the wounds	30	28.6
Bandage	30	28.6
<b>Immobilized bone fracture</b>		
With bandage	05	4.8
With splints	03	2.9
Cardiopulmonary resuscitation (PCR)	01	1.0
Airway management	01	1.0
Others	35	33.3

\*Techniques that performed as pre-hospital care, including at scenes and throughout transportation; Results of first aid at the emergency department

**Table 10** Results of management at the emergency department (n=236)

Result	(n)	(%)
Discharged	113	47.8
Hospitalized	123	52.1

#### 4. Discussion

According to statistics from the Ministry of Health in 2018, the whole country had 1,226,704 traumatic injuries, causing 9,745 deaths, accounting for 0.7% of the total number of accidents. Deaths from traffic accidents are still the leading cause, accounting for 47.9%, followed by drowning at 12.3%, suicide 11.5%, work accidents 6.8% respectively. Vietnam is one of the countries with the highest death rate due to accidents in the world. Improving the quality of first aid has been identified as an important issue for reducing morbidity and mortality [4,6]

In fact, the capacity of first aid in Vietnam in recent years has changed, but there are still many shortcomings needed to be resolved. According to a report on the situation of emergency at the scene of Military Medical Institute 103 in 2005, 91.9% of patients received first aid from passersby, 3.2% by themselves, and 4.9% received medical care. Meanwhile, one report on quality of first aid at Viet Duc University Hospital showed that 5.5% of bone fixation and 7.2% of hemorrhage control were not technically correct. In a study by JICA conducted in 2009, wound dressings were satisfactory 61.2% and 38.8% had bandages but were unsatisfactory, immobilized bone fractures were 51.4%

satisfactory and unsatisfactory was 48.6%. In addition, the capacity of the 115 emergency system is also limited in terms of resources and equipment [5,12]

Through the research results, there were some findings related to the situation of pre-hospital trauma care on emergency as follows:

#### **4.1. Demographic characteristics of trauma patients**

##### *4.1.1. Age*

In our study, the patients aged between 25-34 years old was highest (Table 1). In the study of Han Khoi Quang [13] at Binh Duong General Hospital from 2010 to 2011 in 14, 846 traumatic patients, the age group of 20-60 years old accounted for the highest rate with 77.5%, followed by the age group 14-19 years old (11.6%). Report on trauma care in Hanoi community in 2013 by Bui Van Hao [14] showed that the age group from 20 to 60 years old had the highest (56.9%).

##### *4.1.2. Gender*

Regarding the gender in our series, the patients are mostly men. Several studies of Vietnam and international colleagues showed that men, working ages, especially the age group from 20 to 50 years old accounts for a highest rate [3,5,12,13]. In our study, men accounted for 54.2% (Table 1).

##### *4.1.3. About accidents and injuries*

Among the types of injuries that we have collected, 90.3% of daily-life accidents, followed by traffic accidents with 6.8%, the lowest is the violence group, accounting for 0.4% (Table 2).

Studies have shown that traffic accidents are still the leading cause of death and emergency care in hospitals. According to statistics, for every 3 deaths caused by accidents due to other causes, there is 1 death due to traffic accidents. According to the World Health Organization, in low- and middle-income countries in the Western Pacific region, road traffic accidents, drowning and suicide are the leading causes of death, while in Africa, war is the leading cause of death, personal conflicts and road traffic accidents [3]

In Vietnam, the rate of injuries caused by traffic accidents is the leading cause of injuries, accounting for 38.5%; The death rate from traffic accidents is also the leading cause of death by accident, accounting for 57.3 %. In the study by Nguyen Dinh Dung et al., from February 2010 to June 2011 in Hanoi, found that the main causes of accidents are traffic accidents (36.4%), occupational accidents (33.2%), daily-life accidents (30.4%). This is similar to the study of Nguyen Huy Son and Hoang Van Dung at Thai Nguyen Central General Hospital (from January 2010 to June 2011): out of a total of 8,018 traumatic patients at the Emergency Department. There were: 5,821 traumatic patients with traffic accidents (72.6%), 33 patients due to occupational accidents (5.4%), 1,235 cases caused by daily-life accidents (15.4%), 529 cases with violence (6.6%) [15,16]

Also in the study, the main accident was occurred at home with 53.4%, 25% of the accidents occurred at leisure activities, 19.9% were at work. Approximately 50% of accidents occur while playing and moving in the road (14%) (table 2).

A study by Nguyen Dinh Dung, et al [15] in 370 patients with injuries who were treated at the Hospital for Textile companies of Hanoi from February 2010 to June 2011 showed that the most accident was occurred on the road (37.8%), at work (36.4%). The study of injury accident in Hanoi community 2013 by Bui Van Hao [14] also showed the similar situation: the place of accident occurred mainly concentrated in 3 areas: on the road (35.7%), at home (29.5%) and at work (16.9%).

##### *4.1.4. Trauma characteristics*

###### **Brain injury severity**

According to the Glasgow scale (GCS) of the patients in Table 3, out of 236 patients, 96.2 % were being conscious status (GCS 15 points) on admission; 1.7% with mild coma, 0.4% with moderate coma and 1.7% with deep coma. Our study is similar to the study of Vu Minh Hai [17] in patients with traumatic brain injury, the GCS scale recorded mostly mild (93.8%), only (4.3%) and (1.9%) moderate and severe, respectively.

Regarding the injury severity scale (ISS), most of patients in study are in the mild range of 97%.

#### Distribution of lesion parts

Injury in the limbs and pelvis accounted for the highest proportion, accounting for 43.1%, the lowest was in the face with 3.9% (Table 4). The proportion of limb injuries accounted for 34.63% in the study of Thai Huynh Duc et al [18], which is similar to ours. Besides, compared to the study of Tran Minh Hao [19] on traffic accident patients with soft tissue injuries accounting for the highest rate (65.8%), maxillofacial trauma (33.7%), limb fracture (19.8%), chest trauma (15.0%), traumatic brain injury (13.6%), the lowest was spinal injury and multiple trauma (1.7% and 1.9 %).

#### Injury severity score

According to Table 5, the majority of patients had minor injuries (40.0%-72.7%) depending on the injury location. According to a report by Tran Minh Hao [19], it was found that most of the accident patients who treated in the hospital had a mild level of 92.5%, with 6.2% at a moderate level, severe and very severe about 1.4%. Report by Huynh Kim Khoi [20], at Hau Giang General Hospital, the rate of traffic accident patients with mild level is 13.6%, moderate level is 57.2%, severe and more level is 39.2%.

## 4.2. Current situation of pre-hospital care for traumatic patients came to Dong Da General Hospital

### 4.2.1. Means of patient's transportation to hospital

The most common means of transport for patients to the hospital are motorbikes, accounting for 56.4%, and ambulances accounting for a low rate of 1.7%. Ambulance service operating by 115; hospital; private accounts for 50%; 25%; 25%, respectively. Most of the people who bring patients to the hospital are passerby, accounting for 92.8%, and medical staffs account for 1.3%. The position of patient when transporting is mainly sitting with the rate of 90.3% (Table 6). The mean period waiting for transportation to hospitals is  $4.54 \pm 7.68$  (minutes); There are cases patients do not have to wait for an ambulance, the longest waiting time is 60 minutes. Mean time to hospital is  $13.61 \pm 10.06$  (minutes); The shortest time was 1 minute, the longest time was 60 minutes (Table 7).

According to the report on the situation of first aid and emergency transportation in Vietnam by the Ministry of Health, the majority of patients are transported by available vehicles, which are motorbikes (including personal motorbikes and motorbike taxis). However, using an ambulance is only 4%. Due to the culture and knowledge that research shows that in all emergencies, people would want to use the fastest possible means. This could be life-threatening [21].

### 4.2.2. First aid before going to the hospital

The study results in Table 7 showed that the rate of patients receiving first aid before entering the emergency department of hospital accounted for 28.4%. This result is lower than the study of Tran Minh Hao, Vu Minh Hai [19] in 2016 on 184 patients with traffic accident, 39.7% of them were provided the first aid at the scene and much lower than the study of Tran Bui et al [22] in 2017 with 65.9% of patients receiving first aid or research by Pham Anh Tuan [23] with 61.6% of patients receiving first aid in two communes. However, our results are higher than in the study of Pham Thi My Ngoc [24] at the Emergency Department of Can Tho Central General Hospital in 2011, only 6.32% patients with traffic accident received the first aid at the scene. Thus, it can be seen that the situation of first aid for pre-hospital accounts for a low rate today in Vietnam. The lack of knowledge or the indifference of the community makes the rate of out-of-hospital emergencies still very low, leading to a high risk for patients.

## 4.3. First Aid Person

Table 8 shows that out of 67 patients who received first aid, only 4.5% of first aid provided by medical staff, 1.5% by first responder, and persons accompanying the patients account for 65.7%; consistent with the research survey in the localities of the Ministry of Health (nearly 70% of patients received first aid by community people). This result is similar to Pham Thi My Ngoc [25] with 17.4% of first aid provided by medical staff at the scene. However, the rate of medical staff giving pre-hospital first aid was higher than in Tran Bui's study [23] (12.7%) and also higher than in Le Vu Anh's report [25], more than 70% of trauma patients were provided the first aid by the patient's family, 14% were given first aid by medical staff and 9.2% were given first aid by other people (passersby).

## 4.4. First aid technique

In our study, cleaning the wounds and bandaging (Table 9) were the two most used techniques, accounting for the same rate with 28.6%, there was one case requiring (PCR) and one patient required airway management accounted for 1.0%. Similar to the study in Hanoi, Hung Yen, Thua Thien - Hue, Ho Chi Minh City and Dong Nai in 2011 [5,6,14], 68.3% of the



patients received bandages, 62.8% received hemorrhage control. In general, first aid in the community is mainly two forms of wound cleaning and bandaging. We found that the reason for this is suitable when people who are mostly non-medical workers, so when they see an accident, especially bleeding, they usually bandage or tie the wound tightly to stop the bleeding mainly. However, this also shows that people are also aware of first aid for accidents and nonetheless limit the aggravation of injuries, especially in cases with severe bleeding.

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## 5. Conclusion and Recommendations

Research shows the majority of patients were due to occupational accidents and minor trauma, however the rate of first aid provided by medical staff as well as transportation by ambulance was related very low, which can be potentially dangerous for severe trauma or traumatic brain injury. Therefore, we recommend that the pre-hospital care for traumatic patients should be expanded to related subjects such as taxi driver/ car driver, people from the community who are always at the scene first. They should know how to give first aid to patients when the accident happening. Pre-hospital emergency system, 115 emergency and transportation center should cover widely to districts and communes. Facilities and equipment, training of personnel for first aid should be strengthen and upgraded so that people know and trust them.

It is advisable to integrate the first aid program with the military and civil medicine, to coordinate with Red Cross, and to build dispatching system to ensure the fastest access to patients.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

The authors declare that they have no conflict of interest.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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