



(RESEARCH ARTICLE)



The situation of pre-hospital emergency care through traumatic patients have been admitted to emergency department of Viet Duc University Hospital in 2023

Chinh Nguyen Duc ^{1,2,*}, Anh Tran Tuan ^{1,2}, Hung Do Manh ¹, Hang Nguyen Thuy ¹, Quynh Dinh Van ¹ and An Le Vu Khanh ¹

¹ Viet Duc University Hospital, Vietnam.

² University of Pharmacy and Medicine, Vietnam National University, Hanoi.

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Abstract

Introductions: Pre-hospital Emergency Care (PEC), especially for severe trauma is playing an important role. The study was conducted to provide an overview of the situation of PEC in Vietnam through traumatic patients at Viet Duc University Hospital.

Materials and methods: A cross-sectional study enrolled all traumatic patients admitted to the Emergency Department of Hospital and had complete medical records, during the period from July to September, 2023, regardless of gender, age. Data were collected and processed using SPSS 20.0 software.

Results: Characteristics of target population: 343 cases of traumatic patients were enrolled, male was majority accounted for 71.4%; The age group from 15 to 59 years old accounted for highest proportion (63%), ≥ 60 years old (32.6%). The sites of accident were mostly occurred on road (64.3%), at home (23.9%) and working place (10.2%). The brain injury accounted for the highest proportion (55.4%), multiple injuries (54.8%), extremities injury (38.5%), maxillofacial injury (25.1%) and spine injury (21.0%).

Situation of PEC: First aid was mostly provided by first witness/accompanying person (64.5%), by community first aid provider (24.1%), only 11.4% provided by professional health worker. 8.7% patients were transported by taxi/car, 16.7% by unsafe ambulance, lacking official regulated medicine or equipment, or the health personnel did not know about the patient's medical history. Some first aid were not provided on scene including: airway management 22.2%, wound care and dressing 33.0%, collar to cervical spine 14.5%, extremities splint 34.9%. Additionally, many extremities splint and wound care, 24.5% and 37.5% respectively, were done improperly.

Conclusions and recommendations: The study showed some challenges such as improper first aid provision or unsafe transportation, which potentially cause unwanted risk for the patients. The author highly recommend the improvement of PEC according to the new law on this issue.

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

1. Introduction

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]. Vietnam is not exception. According to an annual report in 2020 by the Vietnam Environmental Health Management Agency (VIHEMA): The mortality in whole

* Corresponding author: Nguyen Duc Chinh

country was 424.005 cases, related to injury was 30.104 cases, accounted for 7,1 % and the rate was 31.53 per 100.000 inhabitant which was a high level compared to other countries in the region [1,2].

Points out that life-threatening conditions requiring immediate care face significant delays in reaching medical care in LMICs. Communicable and maternal conditions, chronic conditions, and injuries (both intentional and unintentional) cause 24.3 million deaths in LMICs and translate into a staggering 1,023 million DALYs (disability-adjusted life years). Prehospital care encompasses first responder care provided by the community—from the scene of injury, home, school, or other location—until the patient arrives at a formal health care facility – and paramedical care such as paid ambulance personnel or fire or police personnel [3,4,5]

In a study of Prehospital Emergency Care (PEC) has conducted at the Emergency Department (ED) in Dong Da (2022) by Pham The Hien, second class hospital in Hanoi City shown that the rate of trauma patients who did not receive the first aid at scene accounted for 71.6%, and it's mainly provided by the first witness at the scene 65.7%. Transportation by ambulance accounted for only 1.7%, the average waiting time was from 4.54 to 7.68 minutes [6]

Viet Duc University Hospital (VDUH), one of the leading centers of surgery and trauma care in Vietnam has received about 35.000 trauma patients at the ED in recent years [7]. Since the new law on Medical Examination and Treatment was issued by the Government in 2023 of which identified the role of PEC, one important part of Health Care System. Thus we have conducted that study to understand the current situation of PEC related to trauma, and thereby suggesting recommendations for improving PEC operations.

2. Material and method

2.1. Research subject and selection criteria

All traumatic patients were admitted to the ED of VDUH during the period from July to Sept, 2023.

2.2. Exclusion criteria

- None traumatic patients admitted to ED of VDUH;
- Patients with incomplete Medical Record.

2.3. Research site

Emergency Department - Viet Duc University Hospital, Hanoi, Vietnam

2.4. Research methods

Descriptive and prospective study. The research team designed tools to collect information, and trained medical staffs for data collection.

The data was collected at the ED upon admission of patients.

Research variables include:

- Demographic characteristics:
 - Age; gender,
- Accident and injuries:
 - Type of accident
 - Location of accident
 - Lesion location of patients
- First aid and first aid provider according to:
 - The guidance of the Ministry of Health on prehospital emergency care (2018) [8]
 - Law on Medical Examination and Treatment, No.15/2023/QH15 [9]

2.5. Data processing

The data were entered using Epidata 3.1 and processed using SPSS 20.0.

3. Results

During the study period, 343 traumatic patients admitted to Emergency Department of VDUH were enrolled. Information of research subjects was described in the following charts and tables.

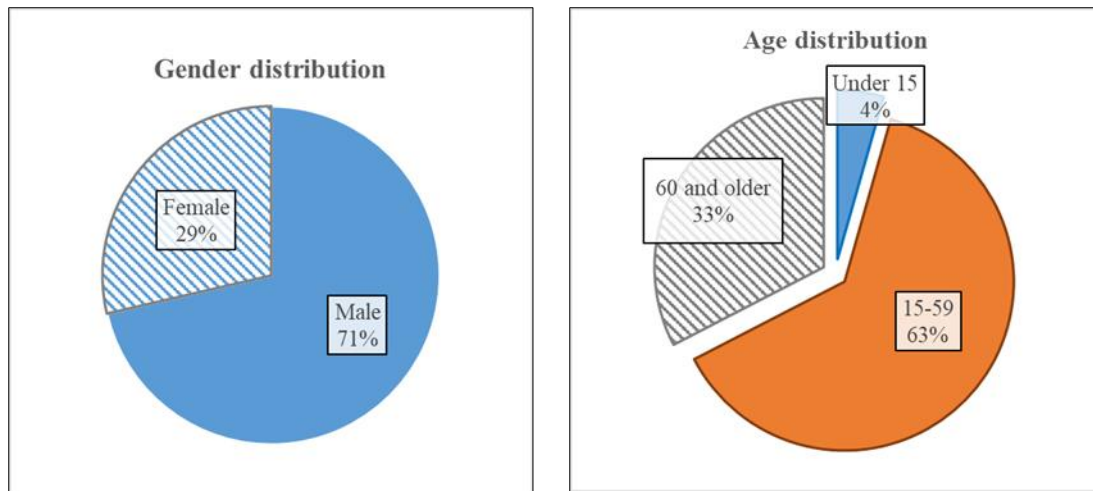


Figure 1 Gender and age group distributions

Table 1 Occurrence sites of accidents (n=343)

Accident site	(n)	(%)
Road traffic accident	217	64.3
At home	82	23.9
Working place	35	10.2
Office	5	1.5
School	1	.3
Other	3	.9
Total	343	100.0

Table 2 Characteristic of lesions (according to ICD.10)

Type of lesion		(n)	(%)
Multiple injuries	Yes	188	54.8
	No	155	45.2
Brain injury		190	55.4
Maxillofacial injury		86	25.1
Closed chest injury		58	16.9
Closed abdominal injury		54	15.7
Spine injury		72	21.0
Extremities		132	38.5
Pelvis fracture		27	7.9

Type of lesion	(n)	(%)
Vessel injury	9	2.6
Skin and soft tissue	28	8.2
Other	1	0.3

Table 3 Characteristics of person who did the first aid at the scene (n=220)

Personnel	(n)	(%)
Healthcare staff	25	11.4
First aid provider of community	53	24.1
Witness person at scene	142	64.5
Total	220	100.0

Table 4 First aid provided at scene *

Descriptions	(n)	(%)
Airway	99	28.9
<i>Not on scene</i>	22/99	22.2
Collar to cervical spine	76	22.2
<i>Not on scene</i>	11/76	14.5
Extremities immobilization (splints)	106	30.9
<i>Not on scene</i>	37/106	34.9
<i>Not correct</i>	26/106	24.5
Wound care and dressing	112	32.7
<i>Not on scene</i>	37/112	33.0
<i>Not correct</i>	42/112	37.5

*According to the report of hospitals which the patients were first transferred to

Table 5 Transportation

Transportation	Descriptions		
		(n)	(%)
<i>Mean</i>	115 ambulance *	14	4.1
	Hospital ambulance	299	87.2
	Taxi/car	30	8.7
	Total	343	100.0
<i>Safe transport</i>	115 ambulance	14/14	100
	Hospital ambulance **	249/299 *	83.3
	Taxi/car	None	
	Lacking of Medical report	57	16.7
	Total	343	100.0

*National emergency center

4. Discussions

Several studies have showed that 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. 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 LMICs, often only focus on treating specific diseases. On the other hand, 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 [4][10-12].

At the time of completing this article, Vietnam remained one of the countries with the highest death rate due to accidents in the world. Improving the quality of first aid had been identified as an important issue for reducing morbidity and mortality. In fact, the capacity of first aid in Vietnam in recent years had changed, but there were still many shortcomings needed to be resolved. In addition, the capacity of the 115 emergency system is also limited in terms of resources and equipment [6][10-14]

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

4.1. Demographic characteristics of trauma patients

4.1.1. Age

In our study, the age group from 15 to 59 years old accounted for the highest proportion (63%), following by ≥ 60 years old (32.6%) (Figure 1). In the study of Han Khoi Quang [15] 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 proportion at 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 [16] showed that the age group from 20 to 60 years old had the highest (56.9%), Phan The Hien [6] (Dong Da Hospital) showed the patients aged between 25-34 years old was highest, similarly to report of Nguyen Duc Chinh [14]

4.1.2. Gender

Regarding the gender in our study, the patients were mostly men. Several studies of Vietnam and international colleagues showed that men of working ages, especially of the age group from 20 to 50 years old accounts for the highest rate [6,14,15]. In our series, male gender was majority accounted for 71.4% (Figure 1).

4.1.3. About accidents and injuries

According to the World Health Organization, in LMICs in the Western Pacific region, road traffic accidents, drowning and suicide were the leading causes of death, while in Africa, war was the leading cause of death, personal conflicts and road traffic accidents [1]

In Vietnam, the rate of injuries caused by traffic accidents was the leading cause of injuries, accounting for 38.5%; Deaths caused by traffic accidents was also the leading cause among deaths by accident, accounted for 57.3%. In the study by Nguyen Dinh Dung et al.[17], from February 2010 to June 2011 in Hanoi, the main causes of accidents were traffic accidents (36.4%), occupational accidents (33.2%), daily-life accidents (30.4%). This was similar to the result of Nguyen Huy Son and Hoang Van Dung [18] 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 (72.6%) traumatic patients with traffic accidents, 33 cases of occupational accidents (5.4%), 1,235 cases caused by daily-life accidents (15.4%), 529 cases with violence (6.6%).

The study of injury accident in Hanoi community 2013 by Bui Van Hao [16] 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%). In our study, the sites of accident were mostly occurred in road (64.3%), at home (23.9%) and working place (10.2%) respectively (Table.1)

4.1.4. Lesion characteristics

Regarding the distribution of lesion features: Brain injury, multiple injuries and limb injury accounted for the highest proportion, 55.4%, 54.8% and 38.5% respectively (Table 2). The proportion of limb injuries accounted for 34.63% in

the study of Thai Huynh Duc et al [19], which was similar to our results. The study of Tran Minh Hao [20] on traffic accident patients, however, observed patients with soft tissue injuries accounting for the highest rate (65.8%), followed by maxillofacial trauma (33.7%), limb fracture (19.8%), chest trauma (15.0%), traumatic brain injury (13.6%), the lowest lesion type observed was spinal injury and multiple trauma (1.7% and 1.9% respectively).

In our study, besides of brain and limb injury, maxillofacial and spine injury accounted for 25.1% and 21.1%. However, as brain injury, that kind of injuries were complicated, with high risk of mortality and morbidity if first aid was not properly provided (Table 2).

4.1.5. Over view of situation of PEC

In our study the most observed mean of transportation was the hospital ambulance. However, 8.7% patients were still transported by public taxi or private car. Unsafe transportation was observed in 80 cases, accounted for 23.3% of the recorded population. Lack of proper medicine or medical equipment as in official regulations, or the accompanying medical personnel did not know about the patient's medical history adequately when handing over to VDUH ER team were the most observed shortcomings (Table.5).

In the report of Phan The Hien [6] (2022), the most common means of transportation were 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%, and 25% respectively. Most of the people who accompany patients to the hospital were passerby, accounting for 92.8%, and medical staffs account for only 1.3%.

According to the existing reports on the situation of first aid and emergency transportation in Vietnam by the Ministry of Health [10,21], the majority of patients were transported by on-site available vehicles, which were motorbikes (including personal motorbikes and motorbike taxis). However, using an ambulance only accounted for 4%. The report suggested, local culture and knowledge contribute to how people would want to find the fastest possible means in all emergency situations, which could be life-threatening to the victims. Thanh Tam Tran also concluded similarly in 2021 about the emergency care of traffic injury in four hospitals in Vietnam, two in Ho Chi Minh City and two in Hanoi. The above author pointed out that the *three-delay model* for road traffic injury in Vietnam had revealed important shortcomings to emergency care. Hospital care needed improvement to enhance patient experiences and trust. Socioculture affected each of the three delays factors and needed to address for future developments of the EMS system, especially for countries with limited resources such as Vietnam[12].

According to Bui Hai Hoang [11], the EMS resources in Hanoi did not meet the population's needs. The ambulance-to-population ratio (0.24 per 100,000 people in 2018) was much lower than the standards for urban areas in high-income countries (HICs), i.e., 2-3.3 per 100,000 people or ratios in some HICs at 0.8-3.2 per 100,000 people, even lower than that of neighboring LMICs in the early 2010s (0.3 in Bangkok, Thailand, and 0.6 in Kuala Lumpur, Malaysia). These shortcomings worsened over recent years because the amount of resources decreased while the population increased, possibly owing to insufficient budget allocation for medical vehicle and equipment maintenance and procurement and for staff recruitment and salary, despite the presence of adequate resources in tertiary care hospitals first aid before going to the hospital.

In the study of Pham the Hien [6] (2022) at Dong Da Hospital showed that the rate of patients receiving the first aid at scene accounted for 28.4%. This result was lower than the study of Tran Minh Hao and Vu Minh Hai [20] in 2016, 39.7% of road traffic accident victims were provided first aid on 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 accident patients receiving first aid in two rural communes. However, the study of Pham Thi My Ngoc [24] at the Emergency Department of Can Tho Central General Hospital in 2011 found only 6.32% patients with traffic accident received the first aid at the scene. Thus, it could be seen that the situation of first aid for pre-hospital accounts for a lower rate in Vietnam at the time of writing. The lack of knowledge or awareness of the community made the rate of out-of-hospital emergencies still very low, posing high risk for patients.

4.1.6. Person who provided the first aid

Pham The Hien [6] showed that out of 67 patients who received first aid, only 4.5% of first aid were provided by medical staff, 1.5% by first responder, and first aid provided by other accompanying persons accounted for 65.7%; this result was consistent with the research survey published by the Ministry of Health (nearly 70% of patients received first aid by community people). This result was also similar to Pham Thi My Ngoc [24] with only 17.4% of first aid provided by medical staff on the scene. However, the rate of medical staff giving pre-hospital first aid was higher than in Tran Bui's study [22] (at 12.7%) and also higher than in Le Vu Anh's report [25] with more than 70% of trauma patients were

provided first aid by the patients' family members, 14% were given first aid by medical staff and 9.2% were given first aid by other people.

In our study, the majority of people who provided the first aid on the scene was the witness of the accident or accompanying person, observed in 64.5%, 24.1% was provided by the first aid provider from community, however, only 11.4% was provided by professional health worker.

Since the new law on Medical Examination and Treatment, No.15/2023/QH15 [10] was issued, there would be more people who could legally perform the first aid on scene, granting victims better opportunities to receive proper first aid to survive.

4.1.7. First aid technique

Pham The Hien [6] reported that the wound care and bandaging were the two most used first aid techniques, accounting for the similar rate with 28.6%, there was one case requiring CPR and one patient required airway management, which accounted for 1.0%. Similar to another study across Vietnam, 68.3% of the patients received bandages, 62.8% received hemorrhage control. In general, first aid provided in the local community came mainly in two forms of wound cleaning and bandaging, the author suggested the people who first saw the accidents were mostly non-medical workers, who could only recognize the bleeding then proceed to bandage or tie the wound in hope of stopping the bleeding. However, research results also suggested that the common people were aware of other first aid technique for accident victims and such as to limit the aggravation of injuries, especially in cases with severe bleeding [18,19, 24,25]. Vu Minh Hai and Tran Hoang Tung [26] has conducted one study in Thai Binh province in 2020 about the emergency care for brain injury found that most of the first responders in the community, and the patient's family members, could be dangerous to the victims if not done properly. Additionally, lacking of information about the EMS/115 system, Vietnam culture led them to do so without knowing the consequences.

Our study observed some first aid techniques were provided on the scene namely: airway control (22.2%), collar to cervical spine (14.5%); extremities splint (34.9%), wound care (33.0%). However, 24.5% extremities splints and 37.5% wound care and dressing cases were improperly provided.

5. Conclusions

The study shown some challenges of PEC for trauma patient, especially the first aid technique at scene and transportation which can be potentially dangerous for severe trauma or traumatic brain injury. We recommended that the PEC should be expanded to related subjects such as taxi driver/ car driver, people from the community who might be the first on scene. They should know how to give proper first aid to patients when the accident happening ... PEC, 115 emergency centers should maintain wide coverage to districts and communes. Facilities and equipment, training of medical personnel for emergency response should be invested and upgraded so that common people know and trust them.

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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