

# *Mortality Due to Trauma in Patients Treated at Viet Duc Hospital During a 2-Year Period*

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## **Abstract**

**Objective:** To review and identify risk factors related to mortality among trauma patients treated at Viet Duc Hospital during a 2-year period.

**Materials and Methods:** A retrospective study was conducted on patients treated between 2010 and 2011. The data was collected on patients who died within 30 days from the date of injury, including those who died pre-hospital, in-hospital and those released to die at home. Information collected included: age, sex, cause of accident, time of death, and the Revised Trauma Score (RTS).

**Results:** There were 2,482 deaths - 3.9% of all trauma patients. Of these deaths, 337 occurred in the hospital, while 2,145 deaths occurred at home. The average ages for patients in these 2 groups were 36.4 and 38.2 years respectively. Most were men (83% and 80%, respectively). Road traffic accidents were the leading cause of death in 82% of all deaths. RTS were mostly (83%) less than 9. During the first 24 hrs, 77% died, and pre-hospital deaths occurred in 6%.

**Conclusion:** Trauma remains a major problem at Viet Duc Hospital. We recommend improving community education on injury prevention for high risk groups of young men. In addition, legislation and a change in the attitude of the policy-makers should be considered for preventing road traffic accidents.

**Keywords:** Trauma, mortality, Vietnam

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## **INTRODUCTION**

The World Health Organization has ranked trauma as one of the top five causes of death, and accounting for 30 to 50% of patient admissions globally. Injuries are responsible worldwide for the deaths of about 5 million people every year, or 16,000 deaths per day on average. In Southeast Asia, for every death due

to trauma, 20 are hospitalized, among the more than 100 patients visiting the hospital. All expenses on trauma care, including personal care as well as family and social care, were estimated at 2% of per capita GPD<sup>1,2</sup>.

In the last 10 years, trauma in Vietnam was ranked highest on causes of death among patients, even though

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the prevention of trauma at the national level has improved significantly. Vietnam is still one of the leading developing countries with high rates of morbidity and mortality due to trauma<sup>3</sup>.

Viet Duc Hospital is one of the leading surgical referral centers in the Northern part of Vietnam, receiving many injury-related cases annually. The main cause of death of patients treated at Viet Duc Hospital was injury-related. The aim of this study was to identify risk factors related to mortality among trauma patients.

## MATERIALS AND METHODS

A retrospective study was conducted on patients treated during the period between 2010 and 2011. Data were collected from all death records as well as autopsy reports, including records on pre-hospital deaths, records of deaths of patients released to die at home, but excluding records of patients who died due to other causes or who had incomplete records. To be included are deaths which occurred in the hospital within 30 days from the date of injury. The information collected included the following: age, sex, time of death, cause of accident, and the Revised Trauma Score (RTS).

## RESULTS

There were 64,455 trauma cases treated at the hospital during the study period, of which 36,544 were due to road traffic accidents (57%). There were 2,482 deaths, constituting 3.9% of all trauma cases. Of these, 337 died in the hospital, and 2,145 were mortally injured and released to die at home. Table 1 provides some baseline data of patients in the two groups. The

**Table 1** Age and sex of patients who died in the hospital or released to die at home.

	Total	Male	Average age, years (SD)
Released to die at home	2145	1716 (80%)	38.2 (18.0)
Death at the hospital	337	280 (83%)	36.4 (24.1)

data, both of patients released to die at home and of those who died in the hospital, showed that most deaths occurred in men.

Causes of injury included road traffic accident in 2,042 deaths (82%), occupational injuries in 117 (5%), injuries during leisure and sports in 318 (13%), and others injuries in 5 (1%). Parts of body injured are given in Table 2, in which a comparison between patients who died in the hospital and those who died at home is also shown.

There were 1,260 (51%) patients with RTS less than 6, and 787 (32%) with RTS between 6 and 9, and 435 (17%) with RTS of 9 or more. Most patients who died in the hospital died within the first 24 hours of injury (259 of 337 or 77%), 17% (59 of 337) died after 24 hours, and only 6% (9 of 337) died on arrival (pre-hospital).

## DISCUSSION

Statistics from the Vietnam Health Environment Agency showed that injury was the leading cause of death during the period from 2005 to 2009 and represented 15% of all deaths that occurred in hospitals in Vietnam. Motor vehicle accidents were the main cause of death, with high rates between 18 and 20 deaths per 100,000. This is 2.4 times higher than

**Table 2** Parts of body injured

	Died at home		Died in hospital	
	Number	Percentage	Number	Percentage
Head trauma	1,585	74	152	44
Multiple trauma	472	22	160	47
Abdominal trauma	23	1	9	3
Thoracic trauma	13	1	10	3
Spinal trauma	42	2	2	1
Limbs trauma	10	1	10	3

deaths due to drowning and poisoning, and 5 times higher than those due to suicide attempts and other causes. One VNIS study (VNIS 2010) conducted recently in Vietnam in association with the Public Health Schools, showed that nearly 35,000 deaths annually were due to injuries. This has declined significantly, from 88 deaths per 100,000 in 2001 to 38.6 per 100,000. However, this mortality rate is still relatively high compared to that of other countries<sup>3</sup>.

In the present study, injury-related deaths occurred in 3.9% of all trauma cases, a number similar to that of a research study in the Philippines, where the trauma-related deaths were at 4.7%. Another study from India investigated injury-related deaths in 11 villages from 1993 to 2002 and found that the death rate was at 11% of all deaths, and this was the third leading cause of death. Road traffic accidents were the leading injuries, with a proportion of 26% in men and 4% in women<sup>4,5</sup>.

Road traffic accidents cause up to 25% of trauma-related deaths. As high as in Vietnam, there were 12,000 people who died every year in Thailand, compared with 17,000 children and young people killed by traffic accidents in the US<sup>1,2,6</sup>. Motor vehicle-related mortality from 2000 to 2004 in Canada also showed that these accidents remain a leading cause of death among young people. In that report, there were 44,192 accident-related deaths; 32% of which (14,082) were the result of motor vehicle accidents. In the 15 to 24 years age group motor vehicle accident deaths (3,417) accounted for 70% of all accident deaths<sup>7</sup>.

The present study showed that trauma patients were mostly men (80% to 83%). The highest proportion of patients were young, and their average age was 36.4 years (the group who died in the hospital) to 38.2 years (the group released to die at home). These results were similar to those of other studies.

Occupational injuries were the second most common cause of trauma-related deaths in the present study. Khieu Thi Quynh Trang<sup>8</sup> has conducted a study on trauma-related deaths from 2005 to 2009 in Vietnam, and reported that there were 1,883 occupation-related deaths, which accounted for 5.3% of all trauma-related deaths. In the present study, occupational injuries caused 5% of all trauma-related deaths.

Previous studies at Viet Duc Hospital revealed that, despite proper intensive care provided to trauma patients, the mortality rate was relatively high due to

the serious nature of the injuries, almost all of which were a result of head trauma. According to the report of Cao Doc Lap (2001), head trauma was the leading cause of death at 50.8%. In the report of Do Ngoc Hieu, deaths due to head trauma occurred in 22.3% and 26.6% of multiple injuries. In the report by Nguyen Duc Chinh (2003) the occurrence of head trauma was as high as 76.2%<sup>9,10,11</sup>. Statistics from the US showed that there were 1.4 million head trauma injuries annually, and of these there were 50,000 deaths, 80,000 to 90,000 disabilities and nearly 235,000 cases hospitalized<sup>1</sup>. In another American study, head trauma and hemorrhage were the leading causes of trauma-related deaths<sup>12</sup>.

Do Ngoc Hieu et al.<sup>13</sup> have studied the trauma score among trauma patients, using the RTS methodology, which was based on blood pressure, Glasgow Coma Score for head trauma, and respiratory distress, to show that RTS scores below 6 was associated with a death rate of almost 100%. Patients with RTS scores between 7 and 9 had a mortality rate of 60 % to 90%. This finding implied that head trauma was the most serious injury, usually resulting in death. In the present study, head trauma was associated with the highest proportion of deaths in the group released to die at home.

A study from San Antonio<sup>13</sup> of 753 patients who died at the Trauma Center in 2003 found that 40% of the deaths occurred within a short time or upon arrival, and these were due to cardiac arrest in the Emergency Department. Head trauma accounted for up to 51% of these patients, with the Glasgow Score between 3 or 4. Similarly, a study from the Phillipines found that 63.7% died within the first 24 hours after arriving at the hospital, due to hemorrhage, and 25.8% died within 24 to 72 hours due to head injury. After 72 hours, deaths were due to severe infection or multiple organ failure<sup>5</sup>.

In the present study, 77% died in the first 24 hours due to serious bleeding or head trauma, with the Glasgow Score below 3. The RTS score was below 9 in 83% of all patients who died. Death occurring within one week were due to serious infections or multiple organ failure. In comparing the group who died in hospital with the group released to die at home, deaths in the first group were mostly caused by multiple injuries. However, head trauma was more common in the second group.

### CONCLUSION

Although the overall picture concerning trauma injuries is not as dismal as it used to be in the past, trauma remains a major problem in Vietnam. Deaths resulting from trauma injuries during the 2 years between 2010 and 2011 at Viet Duc Hospital numbered 2,482 cases or 3.9% of all trauma patients. They were mostly young men with an average age between 36.4 and 38.2 years. Road traffic accidents were the leading injuries (82%). Most (77%) died within the first 24 hours, and pre-hospital deaths occurred in 6%. The cause of death in the group of patients released to die at home was mostly head injury. Multiple trauma was the most common cause of death in the group that died in hospital.

Improving community education on injury prevention for the high risk group of young men is what is needed in order to reduce the incidence and mortality of trauma injuries. In addition, legislation and a change in attitude of the policy-makers should be considered for preventing road traffic accidents.

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