



# Trauma in Yemen: Distribution of Trauma in patients presented to Al-Thawrah General Hospital; Sana'a.

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## Abstract

Trauma in Yemen represents a major health problem where injured patients occupy 44% of general surgical and other surgical specialties beds, and one in 9 general hospital beds are occupied by trauma patients.

**Objectives:** To outline the effect of trauma on healthcare of a general hospital facilities, assess the types of trauma regarding to its morbidity and mortalities, and to discuss the feasible solutions to decrease trauma and its effects on Yemeni population.

**Patients & Methods:** Using the total number of trauma victims presented to a general hospital during one year with analyses to the types of trauma, mechanism of injuries, the efficiency of management and the complications of major trauma to address an increasing problem in Yemen.

**Results:** 2249 patients admitted to AL-Thawrah general hospital in Sana'a –Yemen after major trauma in one year, 83.24% were men and 16.76% women with a mean age of 40 years The common cause of trauma was road-traffic accidents (64%), followed by gunshot wounds (20%) , stab wounds & personal assaults (6.3%) and fall from a height (5.3%), with total mortalities 18.6% from trauma. Injuries were dominated by neuro-trauma (44%) ,skeletal trauma (30%) and visceral trauma(25%)respectively.

**Conclusion:** This study showed that trauma in Yemen is a major health problem affecting the nation, families and health services which needs application of effective trauma care system and preventive policies.

## Introduction:

Major trauma has become one of the leading causes of death in Yemen Non fatal accidents are more numerous, and some of them cause permanent disability. Successful and expeditious management with early definitive treatment is required to save lives and resources. Despite the annual increase in number of motor vehicle crashes, gunshot wounds and its fatalities, little has been done to address the problem of trauma and its serious fatalities, sequences on the Yemeni society especially the prehospital care. Unfortunately, there is no organized approach to trauma care or prevention except that ill equipped general hospitals, since no trauma centers or

qualified ambulance staff and equipments. Traumatized patients are transported by relatives or volunteers, sometimes takes a long time and journey to the nearest general hospital. The impact of these deficiencies become manifest in the findings that many of those trauma deaths can be prevented with creation of systemized approach to trauma care. The first cohort approximately 50% of trauma fatalities occurs in the immediate post injury period and they are caused by overwhelming injury to the brain heart or great vessels 1,2. In Yemen there is no accurate figures on the victims this phase. In the 2nd phase, mortality occurs within hours of injury and some of these deaths can be prevented by application of efficient

trauma systems. Some authors reported a reduction in preventable death rates from 20-30% to 2-9%<sup>3</sup>. The 3rd phase of trauma death occurs one day to one month post injury, and the death of this group usually caused by intractable head injury, sepsis, or multiple organ failure (MOF). Effective and aggressive trauma care might reduce the mortality and morbidity from injury. This study gives an idea about trauma impact on Yemeni society and address the problem in the three phases after trauma, the suggested measures to solve this problem and prevention policies.

### Materials & Methods:

This prospective study was carried out in AL-Thawrah modern general hospital Sana'a, which covered one year, January to December 2004. During that period the total number of trauma patients arrived to the hospital were 4113, of this number 2249 patient sustained major trauma and 1864 with minor trauma managed in the emergency department without hospitalization. There were 418 deaths occurred in the hospital because of major trauma. The data were collected from emergency room records, operative notes, patient files, and hospital death registry and by following-up patients at different surgical departments. Prehospital deaths were not included. To demonstrate the impact of trauma on hospital beds the public health services, this study performed in AL-Thawrah hospital, Sana'a, because it is the most crowded and it receives the highest percentage of trauma patients (tertiary referral hospital) from several governorates in Yemen.

### Results:

There were 14523 hospital admissions during the year 2004, of them 2249 patients (15.5%) sustained major trauma, admitted to surgical wards, representing 46% of total surgical admissions, as shown in figure 1. By six, 83.2% of the injured patients were men and 16.8% were women. The ages ranged between 1 and 80 years with a mean value of 40. The commonest age groups affected by trauma were children and young adults. The type of trauma outlined in table 1 shows that road-traffic accidents

(RTA) are the most common cause of injuries (64%), followed by gunshot wounds (20%), fall from a height (5.3%), stab wounds (4%) and personal assaults (2.5%). All traumatized patients delivered to the emergency room for triage, resuscitation and preparation for operations. Some critical patients admitted directly to operation theater, while others admitted to intensive care units for resuscitation and evaluation. Prehospital trauma care and data were deficient, so the prehospital deaths were excluded therefore the hospital mortality were 418 (18.6%) as showed in table 2. This study shows an annual increase in the numbers of trauma victims as shown in figure 2 which demonstrates the impact of trauma morbidity and mortality on Yemeni health services by comparing the rate of mortalities of 3-consecutive years.

### Discussion:

Figure 1 demonstrates the impact of trauma on public hospital beds while table 1 shows that trauma is an increasing national health problem needs effective measures to face this issue by organized approach to trauma care. Traumatized patients usually transported by the relatives or volunteers in variety of non medically-equipped vehicles with, sometimes, delay in reaching to the nearest hospital regardless of the available facilities. The use of rotorcraft transport to a specialized trauma center proved to save many lives in developed countries<sup>4</sup>, which are not available in Yemen. West et al<sup>5</sup> reported that more than 70% of the non CNS injury-related deaths are preventable and this rate was dramatically reduced to 4% after implementation of trauma centers in USA & Europe. In this study more than 69% of trauma-death was potentially preventable if patients are transported in a correct way to a properly designed trauma center or trauma team in a well-equipped hospital<sup>4,5</sup>. Comparison between three consecutive results of trauma-death studied over the years 1996, 1998 and 2004 in the same hospital indicated that RTA are the major cause of trauma and deaths<sup>6</sup>. Study from Saudi Arabia reported a relatively similar results for

RTA7. Gunshot wounds are the next cause of injuries and death. There is apparent reduction in fall from a height accident, but its mortality still 50% (fig. 2). This study shows that trauma is one of the leading causes of death in all age groups and our results are similar to results reported from USA8, although, here older children and youth are the most vulnerable victims of severe trauma, with a prominent increase in mortalities of gunshots between the age group 18 to 25 years old, table 4. In this study, there are 142 (34%) deaths happened within 24 hours, but 210 (50%) died during the first week of admission, 56(13, 4%) died between one week and one month and 6 victims (1.4%) died after one month of admission table 3. Road traffic accidents represented the first leading cause of death and disability, especially for children and young adults because of bad road safety, neglect in driving and less awareness of population to the impact of this major problem. Firearm composes the next mechanism of homicidal and accidental injury and death regarding that our civilian population is one of the most heavily armed society in the world which appears comparable to other reports 9. Head injury appears to be the most cause of death after trauma (due to 1ry, 2ry injury or both). The 2ry injury of the brain (the two hit theory) appears to be quite common after severe head injury even in trauma centers and leads to death in 51%10, 11. The possible causes of preventable death were severe bleeding, hypoxia, inadequacy of the initial management of the severely injured patients, delay in/or suboptimal surgical treatment and the miss correction of profound & prolonged shock with its pathophysiological results of MOF (2ry injury)12. Failure of rapid arrangement of blood required for resuscitation and operation is another contributory factor. The preventability of trauma death was assigned to one of four categories on the bases of its judgment: 1) Injury prevention, 2) Discovery and transport, 3) Secondary injury, and 4) Provider education. For each category the following question was addressed: "was there a deficiency or reasonable chance for survival ?

"10. For the 418 trauma-deaths involved in this study it was estimated that pre hospital deaths were more than one third of the hospital mortalities. The morbidity of trauma developed in 16% of the injured patients reported as: sepsis, DVT, embolism, empyema, fistulae, amputations and disability, table 5. These complications increased the mortalities which are considered preventable if patients transported rapidly and managed properly with creating a good trauma care as designed in trauma centers. Hospital infection still a major problem needs more efforts. Also, this demonstrates partially the size and seriousness of trauma on Yemeni patients, and evinces the importance of implementing preventive measures to reduce trauma and its complications. In our view the problems in trauma management in Yemen can be summarized as follows:

1. The long distance between the scene of accident and the place of a definitive care hospital.
2. The prominent time elapsed between leaving scene of injury to the site of definitive care, due to lack or absence of effective retrieval systems.
3. Inefficient intrahospital transfer.
4. Lack of designated major trauma hospitals to receive trauma patients.
5. Lack of experienced surgical trauma-teams.
6. Lack of efficient trauma transfer systems between governorates.

To minimize trauma and its consequences, especially car accidents and firearm injuries we suggest the following program:

- 1) The application of preventive measures such as drunken driving law, seat-belt and motorcycle helmet legislation.
- 2) Provision of designated major trauma hospitals or centers in the main cities Sana'a, Eden, Taiz, Hodidah, Hadhramout, Sadaa.....etc).
- 3) Establishment of regional trauma committees of interested individuals (Governors, Police, ambulance staff...), the function of these committees is to collect data, develop trauma

registry, and facilitate communication and application of trauma control measures.

- 4) Trauma education programs should be given to professional groups, physicians, surgeons,
- 5) Ambulance staff, nurses and paramedics. The trauma education is delivered at different level from basic resuscitation to more sophisticated levels.
- 6) Severely injured patients should be taken from the scene of trauma to the most proper hospital which may not always be the nearest hospital.

### Conclusion:

This study showed that trauma in Yemen is a major health problem affecting the nation, families and health services which needs the application of effective trauma care system and prevention policies.

Table (1) : Distribution of the causes of major trauma in 2249 patients

Type of trauma	No. patients	%
Traffic accidents	1433	63.7
Gunshot	449	20
Fall from a height	119	5.3
Explosions	39	01.7
Stab wounds	85	03.8
Major fighting	57	02.5
Electrical shock	10	00.4
Motorcycle accidents	17	00.8
Heavy object felt on victim	16	00.7
Work accidents	61	00.7
Eye injuries	5	00.2
Burns	3	00.13
Total trauma patients	2249	100

Table 2: Distribution of the site of major trauma caused death in 484 victims

System	No. pat	%
Head injury	265	54.7
Spinal cord injury	24	04.84
Visceral injuries	51	10.5
Chest injury	21	04.5
Limbs &vascular injuries	41	08.5
Fasciomaxillary injuries.	9	01.9
Multi Trauma	73	15.1
Total	484	100

Table (3): Distribution of time of death after trauma in 418 patients

Hospital time	No. patients	%
1-4 hours	Not recorded	?
4-24 hours	142	33.97
1 day-1 week	210	50.24
>1 week-1 month	56	13.40
>1 month	6	1.44

Table 4: Distribution of trauma deaths by age groups.

Age in years	No. patients	%
1-10	79	18.9
11-20	101	24.2
21-30	84	20.1
31-40	54	14.1
41-50	38	9.1
51-60	31	7.4
> 60	26	6.2

Table 5: Complications which increased hospital stay and mortalities

Morbidity after trauma	No. patients	%
Sepsis and septicaemia	293	13
Deep vein thrombosis	18	0.8
Empyema thoraces	36	1.6
Pulmonary embolism	7	0.3
G.I.T. Fistulae	18	0.8
Amputation	38	1.7
Permanent disability	72	3.2

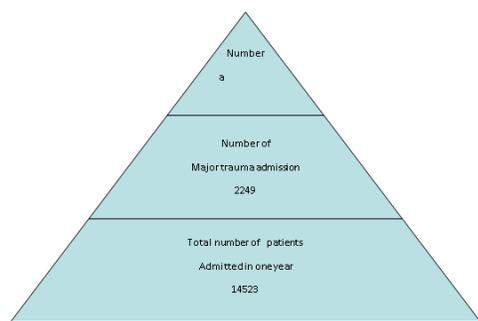


Figure 1 : Impact of trauma on general hospital in one year

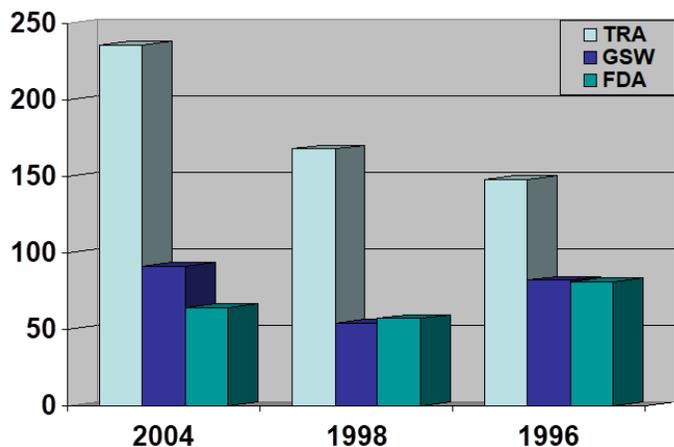


Fig. 2: Distribution of deaths by type of trauma; Comparison of 3 years.

TRA= Traffic-road accidents  
 GSW= Gunshot wounds  
 FDA= Fall from a height

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