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Pattern and Trend of Injuries Among Trauma Unit Attendants in Upper Egypt

Dalia G. Mahran,[1,*] Osama Farouk,[2] Mohammad H. Qayed,[1] and Amal Berraud[3]

[1]Department of Public Health and Community Medicine, Faculty of Medicine, Assiut University, Assiut, Egypt
[2]Department of Orthopedic Surgery, Assiut University Hospitals, Assiut, Egypt
[3]Ministry of Health, Hadhramout, Yemen

[*]*Corresponding author*: Dalia G. Mahran, Department of Public Health and Community Medicine, Faculty of Medicine, Assiut University, Assiut, Egypt. Tel: +20-1007120821, Fax: +20-882332278, E-mail: daliaym2001@yahoo.com

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Abstract

Background: Injury is a growing public health problem worldwide. Deaths due to injuries account for 10% of the world's mortality. More than 90% of the world's injury deaths occur in low and middle income countries. In Egypt, injury is a hidden epidemic and its related deaths are misclassified due to lack of accurate national data. Furthermore, as a research problem it has also been largely ignored in developing countries.
Objectives: To determine the pattern and trend of injury from January 2002 to December 2009 among attendants at trauma unit in Assiut university hospital in Upper Egypt.
Patients and Methods: A descriptive retrospective study was conducted at the trauma unit in Assiut university hospital in Upper Egypt. All registered injuries during January 2002 to December 2009 were included in the study.
Results: During January 2002 to December 2009, 213835 injured cases were admitted to the trauma unit. The number of attendants increased every year from 9.3% from the total cases in all study period in 2002 up to 15.3% in 2009 with a statistically significant difference (P = 0.000). Young adults aged 20 - 29 years were the most common group affected by injuries (22.2%). Male to female ratio was 3:1. Falls represent one half of injuries (49.6%) from all attended cases, followed by exposure to inanimate mechanical forces (19.5%) and transport accidents (18.3%). Falls were ranked as the leading cause of injuries, while transport accidents were the second cause in 2007 - 2009.
Conclusions: Trauma in Upper Egypt is an under-recognized problem, which requires prioritized attention. Increasing the awareness of community, making policies and establishment of a trauma system are important to decrease the burden of injuries.

Keywords: Pattern, Injuries, Trauma Unit, Egypt

1. Background

Injuries represent a major epidemic of non-communicable diseases in the present century. Injuries have the same epidemic pattern as any other disease that is an agent, host and environment interacting together leading to injury or damage (1).

Injury is a growing public health problem worldwide. Globally around 5.8 million people deaths were estimated from injuries in 2004. These deaths accounted for 10% of the world's mortality. More than 90% of the world's injury deaths occur in low and middle income countries (2). Globally, traumatic injuries account for 9% of mortality and 12% of the global burden of diseases for disability-adjusted life years (DALYs) lost (3).

Unintentional injuries (UIs) among children are a major and largely preventable cause of death and disability in low and middle income countries (LMICs) with preventive legislation hopelessly inadequate to protect this vulnerable population (4). Existing studies indicate that UI rates are significantly higher in LMICs compared to high income countries (HICs) (5).

The WHO–world bank report indicates that road traffic injuries (RTIs) will be the third leading cause of mortality by 2020, moving up from their present ninth position. Among those aged 5 - 29 years, RTIs are the second leading cause of death worldwide (6).

Injury is a hidden epidemic in Egypt and its related deaths is misclassified due to lack of accurate national data (7). However, development of effective injury prevention efforts depends on reliable data clarifying epidemiology and characteristics of injuries. In developed countries, such data are available from vital statistics registers and health care records.

However, such records are of limited value in developing countries (8). Injury as a research problem has also been largely ignored in developing countries (3). So it is a necessity in developing countries to establish a well-

organized central trauma registry center for all data related to trauma. This can provide applicable information for health care administrators, health education authorities, insurance companies, clinicians and researchers involved in handling of different aspects of trauma (9).

Although much work remains to be performed in high-income countries, greater attention is needed in less-developed countries, where injury rates are higher, few injury control activities have been undertaken and where most of the world's population live (10).

Total population in Egypt increased from 70,712,345 in 2002 to 79,716,200 in 2009 (11) and the population proportion in Upper Egypt and Red Sea governorates is about 25.8% of the total population in Egypt (12).

Since most traumatic injuries are preventable, comprehensive and accurate information about injuries are required for formulation of injury prevention initiatives to focus on programs and resources needed in Upper Egypt that lacks preventive policies.

2. Objectives

The purpose of this study was to determine the pattern and trend of injury from January 2002 to December 2009 in attendants at the trauma unit in Assiut university hospital in Upper Egypt.

3. Patients and Methods

3.1. Study Design

This was a descriptive retrospective study of all injuries attended at the trauma unit in Assiut university hospital during the study period.

3.2. Study Setting and Population

An average 70 - 90 injured cases attend the unit per day and about one third of them are hospitalized.

All injured cases attended the trauma unit or referred to it from other health facilities during January 2002 to December 2009 were included in the study.

3.3. Data Management and Data Analysis

Data was registered by clerks at the trauma unit reception from the injured patients' relatives. Then data entry was performed for registered data at the database office by well-trained persons. Multiple comparisons were performed on data between registered and computerized database every month; furthermore, a yearly report was made by the trauma unit team at the end of each year.

The data of all studied years were obtained from the database office at the trauma unit in May 2010. Data recorded in excel program. Coding of causes of injuries was performed using the tenth revision of the international classification of diseases (ICD-10) codes. In the ICD-10, external causes are classified under a series of alphanumeric codes as V01-Y98.

The study variables included age, sex and causes of injury. Age of cases was written by completed years. Data entry was performed by well-trained persons. Data entered the advanced Statistical Package for Social Sciences (SPSS) program version 16 for statistical analysis.

Descriptive analysis of data was performed (frequencies and percentages) and chi-square was used for comparison of qualitative data (chi-square for trend test was performed using the EPI info program). P value < 0.05 was considered as statistically significant and highly significant less than 0.001.

3.4. Ethical Considerations

The study protocol was approved by the ethical committee, faculty of medicine, Assiut university, Egypt. Data obtained from the database office of trauma unit were unnamed. Privacy and confidentiality of all information was maintained.

4. Results

Total injured cases attended the trauma unit at Assiut university hospital during January 2002 to December 2009 was 213835. The number of attendants increased every year from 9.3% from the total cases in 2002 up to 15.3% in 2009 with a high statistically significant difference (P = 0.000). The number of injuries increased annually throughout the eight years from 19869 in 2002 up to 32699 in 2009; 145817 of them were treated in the emergency department and discharged, accounting for slightly more than two thirds of the injured cases (68.2%). While 68018 of them were admitted, accounting for nearly one third of injured cases (31.8%) (Table 1, Figure 1).

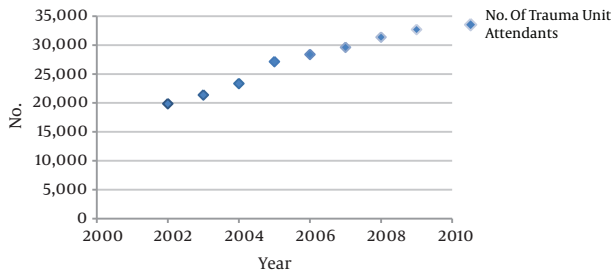

Figure 1. Trend of Trauma Unit Attendants in Assiut University Hospital, Upper Egypt, 2002 - 2009

Table 1. Distribution of Injury Cases at Trauma Unit in Assiut University Hospital, Upper Egypt, 2002 - 2009[a,b]

Injured Cases	Year								P Value[c]	Total
	2002	2003	2004	2005	2006	2007	2008	2009		
Treated and discharged	13312 (9.1)	14552 (10.0)	16373 (11.2)	19245 (13.2)	19809 (13.6)	19913 (13.7)	21230 (14.6)	21383 (14.7)	0.000	14581 (7 68.2)
Admitted	6557 (9.6)	6830 (10.0)	6983 (10.3)	7901 (11.6)	8579 (12.6)	9707 (14.3)	10145 (14.9)	11316 (16.6)	0.000	68018 (31.8)
Total	19,869 (9.3)	21382 (10.0)	23356 (10.9)	27146 (12.7)	28388 (13.3)	29620 (13.9)	31375 (14.7)	32699 (15.3)	0.000	213835 (100.0)
P value[d]	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001

[a] This data did not include those who died at the scene or during transport to hospital.
[b] Values are expressed as No. (%).
[c] Chi-square test for trend was used.
[d] Chi-square test was used.

Young adults aged 20 - 29 years were the most common group affected by injuries (22.2%), accounting for nearly one quarter of all injured cases, followed by age group 15 - 19 years (12.3%) and 30 - 39 years (12.2%), then declined to the lowest percent in age group of 70 years and over (Figure 2).

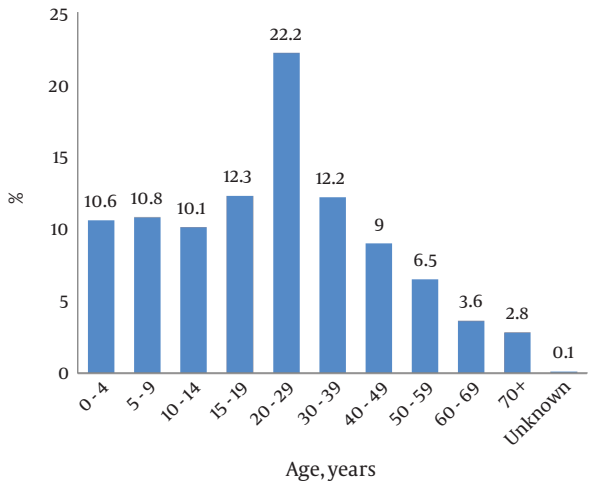

Figure 2. Distribution of Registered Injury Cases by Age Group at Trauma Unit in Assiut University Hospital, Upper Egypt, 2002 - 2009

Males comprised 73.5% of all injured cases, while 26.5% were females. Falls represented nearly one half of injuries (49.6%), followed by exposure to inanimate mechanical forces (injuries involving an object) (19.5%) and transport accidents (18.3%), while exposure to animate mechanical forces (injuries due to contact with animals or people, excluding assault) represented 0.9% (Figure 3).

Falls ranked as the first leading cause of injuries in 2002 - 2009 at the trauma unit. Transport accidents ranked as the third leading cause of injuries in 2002 - 2006 and became the second cause in 2007 - 2009.

Interpersonal violence and burn were the fourth and fifth leading causes of injuries respectively in 2002 - 2009. Gunshot injuries were the sixth leading cause of injuries in 2002 - 2003, then came to the seventh in 2004, to the eighth in 2005 - 2007 and returned back to the sixth leading cause of injuries in 2008 - 2009 (Table 2).

5. Discussion

Injuries are among the most serious health problems and it is estimated that 90% of them are preventable (13). Data about people characteristics at high risk for injury is a key to develop prevention strategies. Also it is important to understand how trends in causes of injury are changing. Aggregation of data over several years in this big trauma care center would give a reliable prediction about what is actually happening in injury problem among the Upper Egypt population.

This study points at injury as a sizable problem in Upper Egypt with a special concern to RTIs, interpersonal violence and gunshot injuries, as they are considered higher in severity and became earlier in ranking in the later years of the study.

In the present study, the number of injuries attended the trauma unit increased yearly during 2002 - 2009. This is in concordance with a study in India that revealed an increase in incidence of trauma in the same institute from 8.9% to 22.78% during 1981 to 2001. This finding also supports WHO prediction that trauma would rise from the ninth leading cause of death in 1990 to the third in 2020 worldwide (6).

The significant increase in the number of injured persons can be attributed to expanding network of highways as a part of national plans of development and investment in Upper Egypt during the last decade. In addition, it might be due to increased population and deficient injury prevention policies.

The study showed that slightly more than two thirds of injuries (68.2%) were treated and discharged while one third of them (31.8%) were admitted and this carries a great burden on this trauma care center.

In this study, most injuries were among males with a male:female ratio of 3:1. This is due to the fact that males are

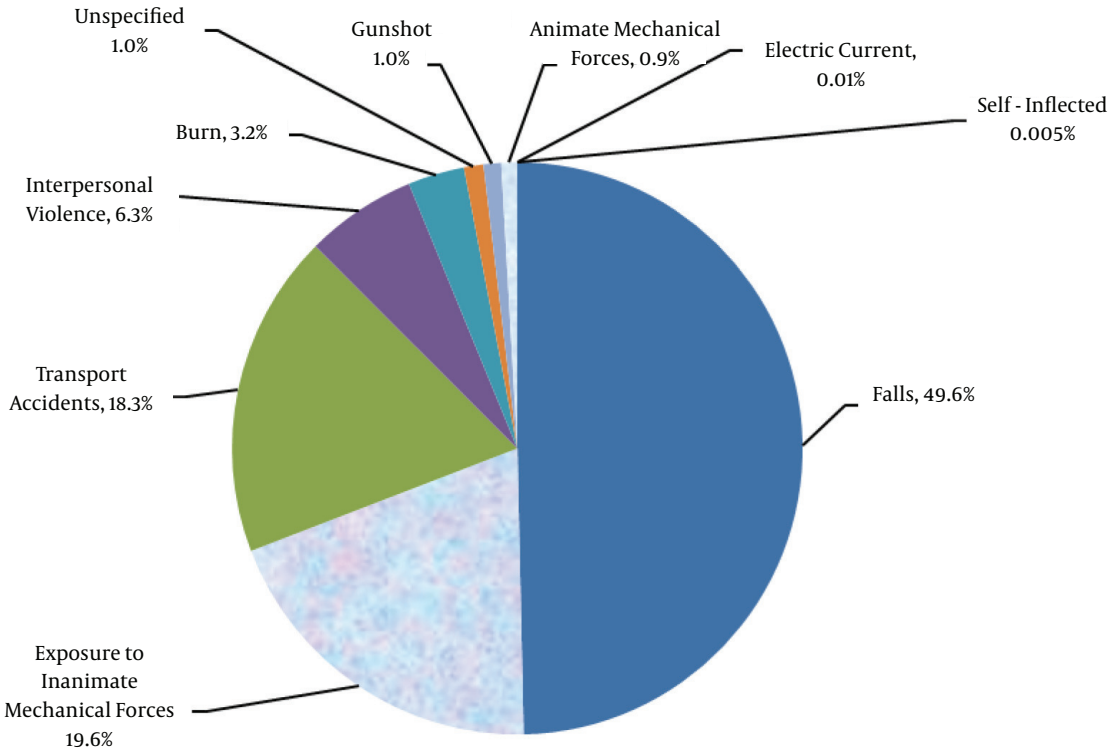

Figure 3. Distribution of Injured Cases by Cause of Injury at Trauma Unit in Assiut University Hospital, Upper Egypt, 2002 - 2009

more likely to be involved in violent activities and road traffic accidents in addition to exposure to work related stress. This is in agreement with the Egyptian injury surveillance 2009 report (14) and with other studies performed in Pakistan, Iran and Uganda (15-17).

This study revealed that the number of injuries were the highest among the age group of 20 - 29 years (22.2%) followed by 15 - 19 age group (12.3%) and 30 - 39 years (12.2%). This provides the evidence that the age group 20 - 29 years is an important group at risk for injuries, because they have more freedom and more outdoor activities, also 15 - 19 years is the age of independency and low supervision from their parents. This finding is similar to that in Egyptian injury surveillance 2009 report, which revealed that the highest distribution occurred in ages 20 to 30 and there is a decline with increase of age (14). Other studies in India and Tanzania (18, 19) are consistent with this finding. These studies revealed that injury is most common in the age group of 15 - 44 years. Other studies performed in Pakistan and Iran (15, 16) revealed that injury cases are high in the younger ages, which are the most productive age groups of society suggesting huge economic loss to the country.

In the present study falls was the first cause of injuries. This agrees with the Egyptian injury surveillance report 2009, in which falls ranked the first leading cause of injuries in 2009 (14). The coverage of this injury surveillance was for one third of the institutions (mainly government institutions), so the comparison would be of value. Findings from a study in Tanzania agreed with this finding as falls considered the first leading cause of injury in rural and urban population (19).

Ranking of falls as the first cause of injuries necessitates application of prevention measures according to the cause, age and sex of the fall victim, which agrees with Mahdian in Iran (20). In addition, installing safety measures for prevention of injuries at home against falls, especially for children and elderly population should be considered to build a more secure environment (21).

Other studies were not consistent with this result, as in a study in Tanzania road traffic injuries (RTIs) was the commonest cause of injury (60.7%) followed by assault and fall injuries (22). Predominance of RTA as a cause of injury followed by fall or assault depending upon socioeconomic condition was shown in other studies as in Manipal and Syria (23, 24).

In our study, transport accidents ranked as the third

Table 2. Leading Causes of Injury at Trauma Unit in Assiut University Hospital, Upper Egypt, 2002 - 2009[a,b]

Rank	Year							
	2002	2003	2004	2005	2006	2007	2008	2009
1	Falls (45.6)	Falls (47.1)	Falls (50.0)	Falls (52.7)	Falls (51.1)	Falls (49.0)	Falls (50.0)	Falls (49.3)
2	Inanimate mechanical forces (22.8)	Inanimate mechanical forces (22.9)	Inanimate mechanical forces (20.7)	Inanimate mechanical forces (19.9)	Inanimate mechanical forces (19.3)	Transport accidents (19.8)	Transport accidents (19.8)	Transport accidents (21.5)
3	Transport accidents (17.1)	Transport accidents (16.6)	Transport accidents (16.1)	Transport accidents (15.83)	Transport accidents (17.8)	Inanimate mechanical forces (18.6)	Inanimate mechanical forces (17.8)	Inanimate mechanical forces (17.1)
4	Interpersonal violence (6.4)	Interpersonal violence (5.5)	Interpersonal violence (6.3)	Interpersonal violence (6.02)	Interpersonal violence (6.6)	Interpersonal violence (6.6)	Interpersonal violence (6.54)	Interpersonal violence (6.4)
5	Burn (4.3)	Burn (4.6)	Burn (3.8)	Burn (2.6)	Burn (2.4)	Burn (2.9)	Burn (3.0)	Burn (3.0)
6	Gun-shot (1.5)	Gun-shot (1.28)	Unspecified (1.2)	Unspecified (1.2)	Animate mechanical forces (1.11)	Unspecified (1.2)	Gun-shot (1.1)	Gun-shot (1.1)
7	Unspecified (1.3)	Unspecified (1.2)	Gun-shot (1.04)	Animate mechanical forces (0.9)	Unspecified (0.9)	Animate mechanical forces (1.0)	Animate mechanical forces (0.94)	Animate mechanical forces (0.82)
8	Animate mechanical forces (0.84)	Animate mechanical forces (0.8)	Animate mechanical forces (0.8)	Gun-shot (0.7)	Gun-shot (0.74)	Gunshot (0.87)	Unspecified (0.92)	Unspecified (0.78)
9	Electric current (0.03)	Self-inflected (0.02)	Electric current (0.03)	Electric current (0.01)	Electric current (0.01)	Self-inflected (0.003)	Self-inflected (0.003)	-
10	Self-inflected (0.01)	Electric current (0.01)	Self-inflected (0.01)	-	-	-	-	-

Abbreviation: -, there is no reported cases.
[a] Ranking was performed by the column percent of leading causes of injury.
[b] Remaining of the 100% in each year is due to unknown causes.

leading cause of injuries in 2002 - 2006 and returned to the second cause in 2007 - 2009, while Egyptian injury surveillance report 2009 showed that road traffic injuries ranked as the fifth leading cause of injuries in 2005, which raised to the fourth cause in 2008 and to the third cause in 2009 (14).

Ranking of RTAs as the second cause of injuries may be because Assiut governorate has the highest morbidity and mortality rates in average of 6.5 people injured or died for each road traffic accident (14). In addition, the highest rates of road traffic deaths were reported in African and eastern Mediterranean regions (25).

This finding is not consistent with a study in Tanzania that revealed RTAs as the first cause of injury, followed by falls (19).

In a study about admitted cases in this trauma unit in the same study period, transport accidents was the first cause of admission and comprised 31.1% of all hospitalized cases and the first cause of mortality (56.4%) (25).

In this study, exposure to animate mechanical forces was the seventh cause of injuries. While the Egyptian injury surveillance 2009 report (14) and another study in Mwanza, Tanzania revealed that animal bite was the fifth cause of injuries (19). Interpersonal violence and burn were the fourth and fifth leading causes of injuries respectively in 2002 - 2009.

Gunshot injuries were the sixth leading cause of injuries in 2002 - 2003, which returned to the seventh in 2004 and eighth in 2005 - 2007 and increased again to the sixth leading cause of injuries in 2008 - 2009. Gunshot injuries and interpersonal violence included in assaults and fights in this report, which was in the fourth rank in this study. These findings raise the importance of intervention at family and interpersonal level to decrease violence.

Road traffic accidents and gunshot injuries came in earlier ranking in 2009 (second and sixth ranks) after third and eighth ranking in 2006, which may indicate higher morbidity and mortality due to increase in the severity of injuries. These two causes of injuries are priority of attention in prevention in Upper Egypt to decrease the burden of injury morbidity and mortality. Transport accidents ranked the first leading cause of deaths from 2002 to 2009 according to a study performed in the same trauma unit among hospitalized cases and gunshot injuries ranking

varied between the third and fifth cause of deaths during the study period (26).

Trauma in Upper Egypt is a significant health problem, which requires prioritized attention. Making policies to increase the awareness of community and planning of preventive and curative trauma program in addition to establishment of a trauma system are important to decrease the burden of injuries.

Acknowledgments

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Footnote

Authors' Contribution: Study concept and design, Mohammad H. Qayed and Dalia G. Mahran; acquisition of data, Osama Farouk, Dalia G. Mahran, and Amal Berraud; analysis and interpretation of data, Dalia G. Mahran and Amal Berraud; drafting of the manuscript, Dalia G. Mahran; critical revision of the manuscript for important intellectual content, Osama Farouk; statistical analysis, Amal Berraud and Dalia G. Mahran; administrative, technical, and material support, Osama Farouk; study supervision, Mohammad H. Qayed, Osama Farouk, and Dalia G. Mahran.

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