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ORIGINAL ARTICLE

In Relation to Morbidity, Mortality, and Hospital Stay, Determine the Predictive Value of Injury Severity Scores in Road Traffic Accidents

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ABSTRACT

Objective: The purpose of this study is to calculate the predictive value of injury severity score in relation to morbidity; mortality and hospital stay of patients following road traffic accidents.

Study Design: Retrospective cohort study

Place and Duration: Study was conducted at the department of General Surgery, Saidu Teaching hospital Swat, Jinnah Hospital Lahore and Bakhtawar Amin Memorial Trust Hospital Multan for duration six months from June 2020 to December 2020.

Methods: Total eighty patients of both genders were presented in this study. Patients with ages 18-70 years had injury because of road traffic accidents were included. Informed written consent was taken from all the patients for detailed demographics included age, sex, body mass index and type of injury. Patients were admitted in emergency ward for initial treatment. Outcomes were calculated in terms of predictive value of injury severity score in relation to morbidity, mortality and hospital stay of patients. Abbreviated injury scale (AIS) score was used to analyze severity score. SPSS 20.0 version was used to analyze complete data.

Results: Majority of the patients 55 (68.8%) were males and 25 (31.2%) were females. Mean age of the patients was 30.17±3.55 years with mean BMI 24.13±6.71 kg/m^2. 45 (56.3%) patients were literate and 60 (75%) cases were from urban areas. Motorcycle was the most common cause of trauma found in 48 (60%) patients followed by car accidents in 18 (22.5%) and 14 (17.5%) trauma were because of cycle or other traffic. Legs and arms fractures were the most common injuries found in 32 (40%) and 25 (31.3%) followed by head fractures in 23 (28.8%) cases. Mean injury severity score was 54.07±3.64. Mean hospital stay was 3.12±4.37 days. Rate of mortality was high found in 19 (23.8%) cases.

Conclusion: We concluded in this study that the injury severity score among traumatic patients were significantly high with rate of mortality and limb fractures were the most common injury found. Injury severity score is becoming more widely accepted as a predictor of mortality.

Keywords: Road Traffic Accident, Injury Severity Score, Mortality, Limb Fracture

INTRODUCTION

A serious health problem, trauma imposes a significant financial and social cost on society. [1,2] Whenever a sequence of unanticipated incidents happens, the victim is subjected to violence or is hurt as a result of the accident, trauma ensues. On a global scale, it ranks first in terms of morbidity and death. [2,3] Every year, more than 5 million people die as a result of accidents, according to the World Health Organization. [4] A quarter of 5 million deaths were due by injuries sustained in automobile accidents. Males are more than twice as likely as females to die as a result of injuries worldwide. In a similar vein, low- and middle-income nations account for more than 90 percent of all injury-related fatalities and deaths.

Roughly speaking, road traffic accidents are the tenth leading cause of death in the world for people of all ages. They are expected to overtake smoking as the sixth greatest cause of death by 2030, and they presently account for 1.2 million fatalities per year in this country. [6] Death can result from injuries sustained in an accident. These include head injuries, musculoskeletal or limb injuries, fractures, open wounds, spinal cord injuries, and other types of injury. [2,5]

The risk of road traffic injury was highest among people with poor socioeconomic status, males, and young age groups [7]. Multiple factors influence the rate at which a road traffic accident victim recovers. Various studies have found factors such as socio-demographic factors, accident features, the type of pre-hospital care provided, the mechanism through which the patient arrives at the hospital, the characteristics of the injury, and the type of hospitalization care. Women's reproductive health, age, the Glass Coma Scale (GCS), the injury severity score (ISS), and systolic blood pressures at admission were all found to be increasingly linked with recovery in patients who had been in a car accident [8-10].

In spite of the fact that there are a variety of various approaches to assess the severity of a crash, there is no instrument that is universally accepted. [11] The severity of RTIs is classified differently by the police and hospitals. A well-established medical scoring system for measuring injury severity, the injury severity score (ISS) has been shown to be beneficial in epidemiological and metabolic studies [12]. The inadequate implementation of traffic safety measures in low-income nations has resulted in a shift in the pattern of injuries, as well as an increase in the number of pedestrians and motorised two-wheelers. Previously performed research also revealed that educational status, sustaining numerous injuries, and being transported by ambulance from the scene of the accident were explanatory variables that were proven to have a statistically significant association with the severity of the injury.

For road traffic accidents, the regular use of a similar quantification instrument is an absolute prerequisite. This condition is met by the Injury Severity Score. A patient's Injury Severity Score, which is based on an anatomical injury severity categorization called the Abbreviated Injury Scale, quantifies the combined consequences of poly-trauma in the same patient (AIS).

Ultimately, we want to use the injury severity score as a predictive indicator in connection to mortality, morbidity, and length of hospital stay among patients who have been involved in a traffic collision.

MATERIAL AND METHODS

This retrospective cohort study was conducted at the department of General Surgery, Saidu Teaching hospital Swat, Jinnah Hospital Lahore and Bakhtawar Amin Memorial Trust Hospital Multan for duration six months from June 2020 to December 2020. The study comprised of 80 traumatic patients of both genders. Informed written consent was taken from all the patients for detailed

demographics included age, sex, body mass index and type of injury. Patients were admitted in emergency ward for initial treatment. Patients less than 18 years of age and those did not give any written consent were excluded from this study.

Patients with ages 18-70 years had injury because of road traffic accidents were included. Injury severity was determined as the sum of the squares of the highest abbreviated injury scale code for each of the three most severely injured injury severity score body areas. As you can see, there are six distinct parts of your body: the head or neck; the face; the torso; the abdomen; pelvis; and the external.

It should be noted that if there is no apparent architectural injury, symptoms will not be scored; for example, if a patient has neck pain but no anatomical injury in the neck, he or she will not be scored, and therefore the truncated score. It should be noted that if there is no observable anatomical injury, symptoms are not scored; for example, if a patient has neck pain but no anatomical injury in the neck, he or she will not be scored, and thus the abbreviation. Furthermore, if a patient has a fracture of the lower end of the radius, his shortened injury scale will be 2 if no details are provided, but 3 if the fracture is known to be displaced or open. The lesser score is utilized if no score is specified. The severity of an injury is measured on a scale of one to seventy-five points. The injury severity score is automatically assigned 75 if the injury is determined to be currently untreatable.

Outcomes were calculated in terms of predictive value of injury severity score in relation to morbidity, mortality and hospital stay of patients. Abbreviated injury scale (AIS) score was used to analyze severity score. SPSS 20.0 version was used to analyze complete data.

RESULTS

Majority of the patients 55 (68.8%) were males and 25 (31.2%) were females. Mean age of the patients was 30.17±3.55 years with mean BMI 24.13±6.71 kg/m^2. 45 (56.3%) patients were literate and 60 (75%) cases were from urban areas. Motorcycle was the most common cause of trauma found in 48 (60%) patients followed by car accidents in 18 (22.5%) and 14 (17.5%) trauma were because of cycle or other traffic.(table 1)

Table 1: Baseline characteristics of enrolled cases

Variables	Frequency	Percentage
Gender		
Male	55	68.8
Female	25	31.2
Mean Age (years)	30.17±3.55	
Mean BMI (kg/m^2)	24.13±6.71	
Education Status		
Educated	45	56.7
Non-educated	35	43.7
Residency		
Urban	60	75
Rural	20	25
Cause of Trauma		
Bike	48	60
Car	18	22.5
Other traffic	14	17.5

Legs and arms fractures were the most common injuries found in 32 (40%) and 25 (31.3%) followed by head fractures in 23 (28.8%) cases.(table 2)

Table 2: Association of fractures among parts of the body

Variables	Frequency	Percentage
Body Regions		
Legs	32	40
Arms	25	31.3
Head	23	28.8

Mean injury severity score was 54.07±3.64. As per severity score, 36 (45%) cases had score between 51-75, 38 (47.5%) cases had score 26-50 and 6 (7.5%) patients had score <25. (table 3)

Table 3: Severity score by using abbreviated injury scale (AIS)

Variables	Frequency	Percentage
Mean injury severity score	54.07±3.64	
AIS score (1-75)		
1-25	6	7.5
26-50	38	47.5
51-75	36	45

Mean hospital stay was 3.12±4.37 days. Rate of mortality was high found in 19 (23.8%) cases. Most of the cases had severity score 51-75 in died patients.(table 4)

Table 4: Hospital stay and frequency of died patients among all

Variables	Frequency	Percentage
Mean hospital stay (days)	3.12±4.37	
Mortality		
Yes	19	23.8
No	61	76.2

DISCUSSION

The values of the injury severity scores in this series of road traffic incidents represent a very close association between clinical severity and mortality, as well as between time to death and length of hospital stay in the hospital. [13] However, it would be appropriate to point out that the term "severity" should be defined in greater depth at this point in time. All patients with an anatomical description of injury severity score of less than 16 are considered badly damaged in our settings. [14] In particular, the mortality statistics appear to be of particular relevance due to the fact that they are nearly identical to those previously published by Haider et al. and are thus more realistically useful and applicable across a wide range of emergency settings around the world. [13,14]

In this retrospective cohort study eight patients of both genders had traumatic injury because of road traffic accidents was included. Age of the patients was 18-70 years. Majority of the patients 55 (68.8%) were males and 25 (31.2%) were females. Mean age of the patients was 30.17±3.55 years with mean BMI 24.13±6.71 kg/m^2. 45 (56.3%) patients were literate and 60 (75%) cases were from urban areas. Motorcycle was the most common cause of trauma found in 48 (60%) patients followed by car accidents in 18 (22.5%) and 14 (17.5%) trauma were because of cycle or other traffic. Findings of our study were comparable to the studies conducted in the past. There was a high statistical correlation between treatment timeframes and disability and the injury severity score values, although it is evident that this applies to groups rather than individuals. This means that the length of a patient's treatment or the severity of their disability cannot be predicted with certainty based on this injury severity score. Legs and arms fractures were the most common injuries found in 32 (40%) and 25 (31.3%) followed by head fractures in 23 (28.8%) cases.[17]

Mean injury severity score was 54.07±3.64. As per severity score, 36 (45%) cases had score between 51-75, 38 (47.5%) cases had score 26-50 and 6 (7.5%) patients had score <25.[18] Injury severity score index, despite its apparent efficiency, should yet be improved upon. [19] Some patients may only be wounded in one "region," yet this harm could be so severe as to decapitate or burst the heart and major veins. Three moderate (A.I.S.) injuries in three separate regions would exceed the maximum injury severity score of 25 for these types of injuries, resulting in an injury severity scores ranking of. [20] Mean hospital stay was 3.12±4.37 days. Rate of mortality was high found in 19 (23.8%) cases. Most of the cases had severity score 51-75 in died patients.These outcomes were significantly comparable to the previous studies.[15,21,22] It's worth noting that walkers, twowheelers (cyclists and motorized scooter riders), and their pillion riders account for around 45 percent of all unintentional deaths globally, and that they are the

people who are the'most at risk' and the most vulnerable commuters in the world. [23]

After stratification to match three different score ranges of injury severity score, the outcome revealed a statistically significant association with mortality, confirming the use of injury severity score as a predictor of mortality.

CONCLUSION

We concluded in this study that the injury severity score among traumatic patients were significantly high with rate of mortality and limb fractures were the most common injury found. Injury severity score is becoming more widely accepted as a predictor of mortality.

REFERENCE

1 Ruan H., Ge W., Chen J., Zhu Y., Huang W. Prehospital Index provides prognosis for hospitalized patients with acute trauma. Dovepress. 2018;12:561–565. doi: 10.2147/PPA.S154670.

2 Farooqui J.M., Chavan K.D., Bangal R.S., Syed M.M.A., Thacker P.J., Alam S., et al. Pattern of injury in fatal road traffic accidents in a rural area of western Maharashtra, India. Australas Med J. 2013;(9):476–482. doi: 10.4066/AMJ.2013.1839. 6POLANTAS.

3 Razente D.M., Alvarez B.D., Lacerda D.A., Biscardi J.M., Olandoski M., Bahten L.C. Mortality prediction in trauma patients using three different physiological trauma scoring systems. PAJT. 2017;6(3):160–168. doi: 10.5005/jp-journals-10030-1187.

4 World Health Organization . WHO Library Cataloguing; 2014. Injuries and violence: the facts 2014.

5 Shobhana S.S., Raviraj K.G., Abhishek Y., Lohith Kumar R. An analysis of pattern of fatal head injuries in road traffic accidents. Med Leg Update. 2019;19(1) doi: 10.5958/0974-1283.2019.00026.4.

6 WHO . 2018. Global status report on road safety 2018

7 WHO. Road traffic injuries, Fact sheet. Geneva: World Health Organization; 2018.

8 Ghaffari-fam S, Sarbazi E, Daemi A, Sarbazi MR, Nikbakht HA, Salarilak S. The Epidemilogical characteristics of motorcyclists associated injuries in Road traffics accidents; a hospital-based study. Bull Emerg Trauma. 2016;4(4):223.

9 Seid M, Azazh A, Enquselassie F, Yisma E. Injury characteristics and outcome of road traffic accident among victims at adult emergency Department of Tikur Anbessa specialized hospital, Addis Ababa, Ethiopia: a prospective hospital based study. BMC Emerg Med. 2015;15(1):10

10 Negesa L, Mohammed J. Assessment of magnitude and treatment outcome of Road traffic accident from January 2013-January 2015 in Dilchora Referal hospital, Diredawa eastern Ethiopia. World J Surg Res. 2017;6(1):1–9

11 OECD/ITF . 2011. Reporting on Serious Road Traffic Casualties : Combining and Using Different Data Sources to Improve Understanding of Non-fatal Road Traffic Crashes

12 Brenneman F.D., Boulanger B.R., McLellan B.A., Redelmeier D.A. Measuring injury severity: time for a change? J. Trauma Inj. Infect. Crit. Care. 1998;44:580–582

13 Salim A, Sangthong B, Martin M, Brown C, Plurad D, Demetriades D. Whole body imaging in blunt multisystem trauma patients without obvious signs of injury: results of a prospective study. Arch Surg 2006;141(5):468–73. Discussion 473–5

14 Haider AH, Villegas CV, Saleem T, Efron DT, Stevens KA , Oyetunji TA, et al. Should the IDC-9 Trauma Mortality Prediction Model become the new paradigm for benchmarking trauma outcomes? J Trauma Acute Care Surg 2012;72(6):1695–701

15 Abdul Samad, Inayat Ali Khan, Afreen Afazal, Lal Shehbaz, Shua Nasir, Syed Jehanzeb Asim. Predictive value of injury severity score in relation to morbidity and mortality following road traffic accident. Pak J Surg 2021; 37(2):65-69

16 Chatimah C, Pratiwi ID, Al Husna CH. Correlation between trauma and injury severity score and prognosis in patients with trauma. J Taibah Univ Med Sci. 2021;16(6):807-811. Published 2021 Jul 10.

17 Tesfay, K., Assefa, M., Zenebe, D. et al. Road traffic injured patients with severe GCS and organ injury had a poor prognosis: a retrospective cohort study. BMC Public Health **19,** 749

18 Garkaz O, Mehryar HR, Khalkhali HR, Lak SS. A comparative study on the ability of trauma severity-assessing methods in determining the prognosis of patients having accident and referred to Imam Khomeini Hospital of Urmia in 2016. Arch Trauma Res 2020;9:62-8

19 Pape H-C, Lefering R. Grading of injury severity – What should be the prerequisites to separate multiply injured patients from those in critical condition and polytrauma? Injury 2013;44(2):157–8.

20 Yousefzadeh-Chabok S, Hosseinpour M, et al. Comparison of revised trauma score, injury severity score and trauma and injury severity score for mortality prediction in elderly trauma patients. Ulus Travma Acil Cerrahi Derg. 2016 Nov;22(6):536-540

21 Gholamaliee B, Khazaei S, Jamorpour S, Mohammadian Hafshejani A, Salehinia H. Epidemiological assessing of motorcyclists' country-level traffic accidents, 2013. Pajouhan Sci J 2015;14:12-21

22 Ghadirzadeh M, Shojaei A, Khademi A, Khodadoost M, Kandi M, Alaeddini F, et al. Status and trend of deaths due to traffic accidents from 2001 to 2010 in Iran. Iranian Journal of Epidemiology. 2015;11:13-22

23 Peden MM, Scurfi eld R, Sleet D, Mohan D, Hyder AA, Jarawan E, et al. World report on road traffi c injury prevention. Geneva : WHO; 2004