

Epidemiology of Fractures Sustained during Bike Accidents

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ABSTRACT

Aim: To assess the epidemiological aspects of fractures sustained during bike accidents.

Study design: Retrospective study

Place and duration of study: Department of Orthopaedic, M Islam Medical & Dental College Gujranwala from 1st June 2020 to 31st December 2021.

Methodology: Five hundred patients of bike accidents were assessed through severity scoring system. Various bike types, fractures sustained, rate of mortality, helmet usage was assessed.

Results: There were 54.6% males and 45.4% females. The mean age of the patients was 33.5±5.75 years. Ninety percent of patients wear no helmet. The presentation of the injuries showed that majority of the cases as 28.2% had facial injuries. Spinal and thoracic injury was common in multi trauma injuries.

Conclusion: Bike accidents cause severe life threatening injuries which can be reduced through wearing helmets.

Keywords: Bike accidents, fractures, multi trauma

INTRODUCTION

Regular physical activity helps in managing various metabolic syndromes including diabetes mellitus, hypertension and it also protects human body from several complications such as heart diseases, mental illness, cancer and arthritis^{1,2}. Cycling is considered as one of the cheap mean of transportation with many environmental and health advantages. On one hand it is eco-friendly and not cause any environmental hazard and air pollution and on the other hand, it also benefits in managing healthy weight, diabetes and combating few mental disorders as well. Similar to regular bicycles, new types of cycles have also gained popularity such as e-bikes and off-road bicycles³. Conversely, with increasing use of cycle, various concerns regarding road safety have grown^{4,5}.

Biking and cycling is rooted in Dutch environment and approximately 1 million bicycles every year sold in Netherlands.³ Dutch study in 2012 also demonstrated that, almost 59% of traffic accident patients and 31% of lethal traffic accidents' victims coming in emergency room were cyclists.⁶ Rate of cycling is very higher in many European countries as they use cycle as a basic mean of transportation but incidence of bicycle crash is also much prevalent in these countries due to frequent and daily use^{7,8}.

Numerous studies have been conducted to assess the frequency of injuries related to bicycles crashes. Exact figure is still not clear and more advanced studies are required to determine the precise number and incidence rate for effective strategic plan to minimize injuries^{9,10}.

Hence, present study is design to gain insight into the frequency and epidemiology of bicycle injuries and accidents as well as for the identification of factors and trauma patterns to predict its outcomes.

MATERIALS AND METHODS

This retrospective study was conducted in the Department of Orthopaedic, M Islam Medical & Dental College Gujranwala from 1st June 2020 to 31st December 2021 after approval from Ethical Review Board and 500 patients with bike accidents were enrolled. The data collection procedure included documenting all the clinical characteristics of the admitted patients such as their demographic information, sex, mechanism of trauma including one sided or two-sided injury as well as the features of injury as fractures, hematomas, internal bleed. An injury severity-score was adapted

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for this purpose. Herein injuries were scored as minor to multi-trauma with a cut off point for multi trauma identified as score greater than 15 in case of abbreviated-injury severity at 98 classification system and greater than 12 score in case of abbreviated-injury severity at 08 classification system. Patient was either protected through helmet or not was also documented on a proforma. Rate of mortality was recorded. The above protocol was generated post ethical committee approval. Additionally, prior the study each patient's attendants were contacted telephonically for an informed consent where it was briefed that the data collected through patients file record will only be used for research purpose and would not invade their privacy. The outcome measures were measured through rate of mortality as well as secondary outcomes included variance in accidental severity through race bikes, off road bikes or e bikes. The statistical analysis was conducted through Chi square test and numerical data was also described in terms of means and standard deviations. The data was entered and analyzed through SPSS-26. The 't' test was applied. P value less than 0.05 was taken as significant.

RESULTS

There were various bike accidents reported with a frequency of 415 (83%) with motor bikes followed by 9.2% those cases reported through regular bike accidents. Off road bikes were common as 4% for involvement in accident (Table 1).

The study showed an increase percentage of males than females with 90% those cases which did not wear a helmet. There were 273 males while 227 females in this study. The mean age of the cases was 33.5±5.75 years. A significant difference in age, multiple injuries including two sided fractures was noticed between helmets and no helmet wearing patients (Table 2).

The presentation of the injuries showed that majority of the cases as 28.2% had facial injuries while skull fractures and rib fractures were also significantly common. Hematoma formation was also presented in patients with subdural or subarachnoid hematoma seen in 17% cases as each respectively (Table 3).

A comparison of multi trauma with minor trauma showed that a high prevalence of spinal and thoracic injury was common in multi trauma injuries. While injuries related to lower extremities were more common in minor trauma cases (Fig. 1).

Table 1: Type of bike involved in accident (n=500)

Accident involved	No.	%
Motor bikes	415	83.0
Racing bikes	46	9.2
Off road bikes	20	4.0
E bikes	19	3.8

Table 2: Comparison of age, gender and injuries among helmet and no helmet wearing patients

Variable	Helmets (n=50)	No helmets (n=450)	P value
Males	14(28%)	259 (57.5%)	<0.05
Females	--	227 (50.4%)	-
Age (years)	45±4.4	22±7.1	<0.05
Multiple injuries	10 (20%)	184 (40.8%)	0.049
Mortality	2 (4%)	25 (5.5%)	0.56
Single Fracture	33 (66%)	190 (42.25)	0.039
One sided accidents	35 (70%)	203 (45.1%)	0.047
Two sided accidents	15 (30%)	247 (54.8%)	0.043

Table 3: Clinical injuries presentation among accidental cases (n=500)

Clinical injuries	No.	%
Facial fractures	141	28.2
Skull fractures	100	20.0
Rib fractures	86	17.2
Cerebral haemorrhages	83	16.6
Subdural hematoma	85	17.0
Subarachnoid hemorrhage	85	17.0
Epidural hematoma	27	5.4
Intracerebral hematoma	28	5.6

DISCUSSION

Road side accidents cause number of injuries and mortality rate is also very higher all over the globe. Due to increased use of public transportation, incidence rate of accidents has much grown over the past decades.^{11,12} Transportation particularly cycling also pose major burden on life safety. Bicycle use has resulted in hospitalization with a high mortality and multi-trauma incidence rate. Reckless and speedy driving, overburdened hauling of transport and public vehicles, driver fatigue, appalling condition of already chocked roads with unauthorized person and immense burden of population are the main contributing factors of road accidents.¹³⁻¹⁵

Cycling is beneficial both for mind and body and it also safe for environment especially in this era. Heavy traffic could be the cause of high accident rate and bicycle injuries. Most of the developed countries have well developed infrastructure and multidisciplinary approaches for road designs and traffic planning. Precautionary measures and strict implementation of bicycle helmet and following traffic rules would prove helpful in minimizing the incidence rate. Use of bicycle should not be avoided but timely measures is the hour of need^{16,17}.

British Broadcasting Corporation (BBC) has recently announced few radical solutions for the protection of cyclists. According to this broadcasting agency of United Kingdom, even number plates and bicycle licenses, ban vehicles from city centers, allow cyclist to jump red lights, cycle on pavements, ban

headphones, body armour, elevated cycling routes and road signs and scrap traffic lights together are few of the benefits and solutions for cyclists and reduce accidents rate^{18,19}.

CONCLUSION

Bike accidents cause severe life threatening injuries which can be reduced through wearing helmets. Helmets protect multi-trauma injuries and saves lives.

Conflict of interest: Nil

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Fig. 1: Comparison of multi and minor traumas

