Motorcycle Accidents in Punjab: A Critical Analysis

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ABSTRACT

Objective: To determine existing occurrences of motorcycle accidents, to identify the causes of accidents and to suggest measures to prevent these accidents from minimizing the undue loss of life and property.
Study Design: Cross-sectional study.
Place and Duration of Study: Emergency Departments of CMH Rawalpindi, CMH Lahore and CMH Kharian, from Aug 2018 to Jul 2019.
Methodology: A total of 384 individuals, who underwent motorcycle accidents and reported to the Emergency Department, were included in the study. A pretested questionnaire was used for all the relevant information on demographic, social, motorcycle, and accident-related parameters.
Results: The mean age of accident victims was 34.4 ± 10.92 years. Motorcyclists having 6-10 years of driving experience, riding daily between 11-20 km, were most commonly involved in accidents. 67.9% drivers had a motorcycle driving license, while most of them (65.8 %) were not wearing a helmet at the time of the accident. Wet road was the most common cause of accidents (35.6%). Collisions mainly occurred with another car (31.7%). The head (26.8%) was the most common injury site, followed by the back/abdomen (24.2%).
Conclusion: Road traffic accidents place a significant economic burden, especially in a developing country like ours. Observance of safety precautions, strict adherence to traffic rules and regulations, and the Pakistan Highway Code knowledge are mandatory to avoid any possible accident. A national effort is required for the prevention of accidents to conserve human life and the financial resources of the country.

Keywords: Accident, Drivers, Helmet, Motorcycle, Punjab, Traffic.

How to Cite This Article: *Rana A, Nasrullah F, Hameedi S, Janjua NI. Motorcycle Accidents in Punjab: A Critical Analysis. Pak Armed Forces Med J 2022; 72(2): 632-636. DOI: https://doi.org/10.51253/pafmj.v72i2.5797*

INTRODUCTION

Road traffic accidents claimed 1.5 million lives globally in 2015.[1] According to the World Health Organization, road traffic injuries kill one person every 25 seconds, with 23% occurring among motorcyclists.[2] Traffic accidents continue to be a significant public health dilemma in South Asian countries, even though; there is evidence of decline across all countries except Pakistan.[3] In a 2009 report, World Health Organization estimated that in Pakistan, road traffic injuries result in 25.3 deaths per 100,000, which is relatively high by international standards.[4]

The data sources on road traffic accidents in Pakistan are hospitals and police stations. Still, substantial data remains obscured.[5] In economic terms, the cost of road crash injuries is projected at roughly 1% of the gross national product (GNP) in low-income countries, 1.5% in middle-income countries and 2% in high-income countries.[5] The economic cost of road crashes and injuries is estimated to be over Rs100 billion for Pakistan.[6]

Transport and roads are essential elements for a nation's prosperity and financial stability. However, increasing population leads to an increased risk of accidents with the saturation of health resources. Causes of accidents include an increasing number of motor vehicles, poor enforcement of traffic safety regulations, poor quality of roads and vehicles and inadequate public health infrastructure.[7] Motorcycle trauma is the most challenging and drastic among all vehicles for the sufferers and families.[8] Motorcycles serve a faster means of transport in a cost-effective, fuel-efficient manner, making them the most common means of conveyance in developing countries.[9] The unsatisfactory condition of public transport, economic constraints like inflated petrol prices and low purchasing capacity make it a priority of the low socioeconomic group as it lies within their financial range.[10]

Motorcycles are readily available in monthly instalments. Most individuals are not well trained to drive a motorcycle; some do not possess a valid driv-

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Received: 06 Dec 2020; revision received: 09 Jul 2021; accepted: 27 Jul 2021

ing license, while others have significantly less knowledge of safety procedures or traffic rules. Despite repeated awareness campaigns, motorcycle accidents are on the rise. This study will help identify the causes of motorcycle accidents and recommend measures to enhance road safety for motorcycle drivers.

METHODOLOGY

This cross-sectional study was conducted in three A-Class Combined Military Hospitals of Punjab, i.e. Combined Military Hospital Rawalpindi, Combined Military Hospital Kharian and Combined Military Hospital Lahore, from Aug 2018 to Jul 2019. The study was approved by the institution ethical committee [No.151/01/2021]. The sample size was calculated with the help of open Epi software at a confidence level of 95% and an anticipated frequency of 50%11. Consecutive sampling was carried out for data collection.

Inclusion Criteria: All the individuals, irrespective of age, involved in motorcycle accidents and reporting to the Emergency Department were included in the study.

Exclusion Criteria: Injuries due to any cause other than motorcycle accidents were excluded from the study.

Three hundred eighty-four people meeting the inclusion criteria were selected for the study. The information on demographic, social, motorcycle and accidentrelated parameters such as motorcycle make type, the attitude of rider, personal characteristics, experience level and other related information was gathered through a pretested questionnaire. Data was collected by sending the questionnaire to the emergency departments of Punjab hospitals.

Statistical Package for Social Sciences (SPSS) version 21.0 was used for the data analysis. Results of num erical variables were analyzed as mean and standard deviation, and categorical variables were given as frequencies and percentages. Results were presented in tabulated form.

RESULTS

Out of the 384 accident victims included in the study, the majority 189 (49.2%) were in the 30-39 years age group, with the mean age of was 34.4 ± 10.92 years. Motorcyclists having 6-10 years of experience were most commonly involved in the accidents seen in 170 (44.2%) victims, as were those riding daily between 11–20 km, i.e. 210 (54.6%). The primary purpose of keeping a motorcycle was to commute to work, seen in 194 (50.5%). 261 (67.9 %) of drivers had a valid driving license, while 253 (65.8 %) were not wearing a helmet at the time of the accident. According to 154 (40.1%) motorcyclists, the main reason for not wearing a helmet was its heavyweight. 193 (50.2%) drivers involved in accidents broke traffic signals. 175 (45.57%) drivers were talking to the other person at the time of the accident. 245 (63.8%) involved in accidents were in a depressed mood at the time of the accident. 221 (57.5%) of the motorcycle drivers obtained the motorcycle in instalments.

Removal of side mirrors was the most common modification made by 121 (31.5%) to the motorcycle. 228 (59.3%) of the accidents in our study occurred on the working day, 184 (47.9%) during day time and 169 (44.0%) on main roads. The wet road was the most common cause of accidents seen in 137 (35.6%). Collision occurred with another car in 122 (31.7%) cases when the speed was high, i.e. more than 50 km/hour, as seen in 206 (53.6%) accidents. 239 (62.2%) suffered from a bony injury during the accident. The head was the most common site of injury seen in 103 (26.8%) victims, followed by the back/abdomen seen in 93 (24.2%) (Table).

Table: Demographic information of victims, factors contri-buting to accident and pattern of injury.

Parameters	n (%)
Age	
20-29 years	114 (29.68%)
30-39 years	189 (49.21%)
40-50 years	63 (16.40%)
Above 50 years	18 (4.68%)
Experience of Motorcycle Driving	
Less than 01 year	22 (5.20%)
Between 2-5 years	147 (38.54%)
Between 6-10 years	168 (44.27%)
More than 10 years	47 (11.98 %)
Average Daily Driving in Kilometers	
Less than 10 km	147 (38.28%)
Between 11-20 km	210 (54.68%)
More than 20 kms	27 (7.03%)
In Possession of Valid Driving License	
Yes	261 (67.96%)
No	123 (32.03%)
Purpose of Keeping Motorcycle	
Commuting to work	194 (50.52%)
To visit friends/relatives	150 (38.54%)
Leisure Trips	40 (10.93%)
Habit of Wearing Helmet While Driving Motorcycle	
Always	142 (36.97%)
Sometimes	202 (52.60%)
Never	40 (10.41%)
Reason for not Wearing Helmet	
It is heavy weight	154 (40.1%)
It is very hot in summers	127 (33.07%)
Vision is not clear	77 (20.05%)

Due to awkward helmet design	26 (6.77%)
Day of the Accident	
Weekday	228 (59.37%)
Weekend	156 (40.62%)
Time of Accident	
Day time	184 (47.91%)
Evening time	139 (36.2%)
Night time	61 (15.89%)
Type of Road	
Main Road	169 (44.0%)
Small Road	142 (36.97%)
Round about	73 (19.0%)
Pattern of Road	
One way	138 (35.94%)
Two way	208 (54.16%)
Round about	38 (9.89%)
Cause of Accident	
Mechanical Fault	122 (31.77%)
Ride error	7 (1.82%)
Wet road	137 (35.67%)
High speed	97 (25.26%)
Opponent mistake	21 (5.46%)
Victim of Accident	
Driver	311 (80.99%)
Back sitter	73 (19.0%)
Source of Collision	
Car	122 (31.77%)
Bus	13 (3.38%)
Coach	35 (9.11%)
Truck	15 (3.90%)
Rickshaw	80 (20.83%)
Motorcycle	94 (24.48%)
Pedestrian	25 (6.51%)
Mode of Payment of Motorcycle	
Cash payment	163 (42.45%)
Monthly Installments	221 (57.55%)
Power of Motorcycle	
70 CC	201 (52.34%)
100 CC	107 (27.86%)
125 CC	69 (17.97%)
200 CC or more	7 (1.84%)
Modifications Done to Motorcycle	
Removed side mirrors	121 (31.51%)
Removed rear carrier	65 (16.92%)
Installed wide foot rest for back sitter	13 (3.38%)
Installed side safety guards	25 (6.51%)
Lights and Indicators of Motorcycle Functional	
Yes	339 (88.28%)
No	45 (11.71%)
Awareness of Traffic Rules and Regulations	
Yes	293 (76.3%)
No	94 (24.48%)
Speed At Time of Accident	
> 30 km/hr	67 (17.44%)
31-50 km/hr	111 (28.9%)
<50 km/hr	206 (53.64%)
Disobey Traffic Signal	
Yes	193 (50.25%)
No	191 (49.74%)
Wearing Hemet at Time of Accident	
Yes	131 (34.11%)
No	253 (65.88%)
Talking to Other Person at Time of Accident	
Yes	175 (45.57%)
No	209 (54.42%)
Looking at Sign Board at Time of Accident	
Yes	151 (39.32%)
No	233 (60.67%)
Using Mobile Phone at Time of Accident	
Yes	87 (22.65%)
No	297 (77.34%)
In a Depressed Mood at Time of Accident	
Yes	245 (63.8%)
No	139 (36.19%)
Smoking at Time of Accident	
Yes	107 (27.86%)
No	277 (72.13%)
Bone Fracture Suffered During the Accident	
Yes	239 (62.23%)
No	145 (37.76%)
Severity of Injury	
Mild	186 (48.43%)
Moderate	131 (34.11%)
Severe	67 (17.44%)
Site of Injury	
Upper extremity	35 (9.11%)
Lower extremity	68 (17.71%)
Head	103 (26.82%)
Back/Abdomen	93 (24.21%)
Chest/Rib cage	85 (22.13%)

DISCUSSION

Road traffic accidents represent one of the most important preventable causes of morbidity and mortality worldwide. Even in developed countries like the United States, mortality for motorcyclists from traffic accidents has increased drastically from 15% in 2010 to 20% in 2013.[11]

Our study deals with motorcycle accidents reported in the emergency departments of three class a hospitals. Young riders were associated with risk-taking behaviour, which increase their risk of being involved in motorcycle injuries. Zia-ud-din *et al*,[12] in their study on the burden of accidents involving motorcyclists in district Kohat, showed that motorcycle accidents most frequently involved younger age groups. The two most frequent age groups were 14-24 years (29.1%) and 25-34 years (41.3%). This finding was consistent with our study, which depicted that majority of the drivers were in the younger age groups, with 49.2 % between 30–39 years of age, followed by 29.6 % in the 20–29 age group.

A study was carried out by Kudebong *et al*,[13] regarding motorcycle accidents in Northern Ghana, which showed that only 29% of the motorcycle riders possessed valid licenses. This contradicts the findings

of our study, which showed that 67.9% of drivers owned a motorcycle driving license, while only 32.0 % did not have a valid driving license. This may be due to increased traffic awareness in Pakistan or reduced implementation of traffic regulation in Northern Ghana.

Similarly, in our study, 52.6 % of drivers sometimes wore a helmet while driving, while 36.9% always wore a helmet. A study by Randhawa *et al,*[14] in Kohat showed that only 16% of the motorcyclists wore helmets at the time of the crash. More percentage of drivers were wearing helmets than in other studies, likely due to the strict implementation of helmet safety laws in cantonments.

The main reason for not wearing a helmet in our study was its heavyweight (40.1%), followed by the reason that it was very hot in summer. A study was conducted by Fong *et al,*[15] regarding the rates of motorcycle helmet use and reasons for non-use among adults and children in Luang Prabang, Lao. According to the results, most adult drivers indicated that they did not like how helmets felt or made them look. The solution to these problems is to revolutionise the motorcycle helmet industry to design new lightweight helmets that are not heavy or hot and are trendy to look at.

The majority of the accidents in our study occurred on a working day (59.3 %) during the daytime (47.9 %). These results are similar to a study was carried out by Hasan *et al,*[16] in Karachi regarding injury patterns from a level one trauma centre in motorcycle crash patients. According to their results, 54.6% of accidents took place on a weekday (Monday to Friday), with maximum motorcycle accidents (36.6 %) taking place during the daytime between 12: 01 to 18: 00.

In our study, the most common causative agent of an accident was a wet road (35.6%), followed by mechanical failure (31.7%). A study by Sapkota *et al,*[17] conducted on motorcycle accidents in Nepal showed that road condition was the leading cause of accident seen in 41% of the cases.

Our study revealed that the head (26.8%) was the most common site of injury, followed by the back/ abdomen (24.2%) and chest/ribs (22.1%). A study on the traffic fatalities among motorcycle users in East Azerbaijan, Iran, by Sadeghi-Bazargani *et al*,[18] also showed that head injury (40.1 %) was the most frequently occurring injury.

The results of different parameters in our study were comparable to the results of other studies conducted worldwide and reaffirm these studies.

The psychological and emotional aspects of the motorcycle drivers involved in accidents are important aspects that need to be studied and addressed. Stress, mood and behaviour disorder can alter the mental state of a person and can culminate in reduced ability to react, resulting in an increased tendency for accidents. Zehra *et al*,[19] studied the prevalence of psychosocial and behavioural aspects in victims of motorcycle accidents in Civil Hospital Karachi. The study concluded that psychosocial factors have a crucial role in motorcycle accidents, and riders experiencing family-related or social-related stress are more likely to have a motorcycle accident than riders who do not have those stressors.

Therefore, the impact of these psychological and emotional factors and their contribution to the occurrence of accidents are newer avenues that need to be explored. However, these aspects are beyond the scope of this study and further studies are needed to confirm these theories.

RECOMMENDATIONS

In the light of our study, the following measures are suggested for the prevention of accidents to minimize the undue loss of life and property:

a. Helmet laws should be strictly implemented. The head was the most common site of injury in our study. The driver and passenger must be wearing a helmet to prevent head injury. Failure to wear a helmet should lead to confiscation of the motorcycle for 03 days and a substantial monetary fine.

b. A considerable number of motorcycle drivers did not have a driving license. This practice should be curbed by surprise checking of driving license. Those found driving without a license should be subjected to disciplinary action and a monetary fine.

c. Driving tests should be uniform, transparent and compulsory for obtaining a driving license. By upgrading the standard of driving tests, the standard of the driver will automatically be improved.

d. The cause of the accident in almost one-third of the cases was a mechanical fault. A few of the motorcycles did not have functional lights or indicators. Maintenance of all the motorcycles should be carried out periodically. Only motorcycles with a valid motorcycle fitness certificate should be deemed roadworthy.

e. More than half of the drivers were driving at a speed of more than 50 km/hour at the time of the

accident. Such practice of over-speeding should be discouraged through speed breakers. Speed cameras should be implemented with punishments such as monetary fines and cancellation of driving licenses on frequent violations.

f. A large number of those involved in accidents had made modifications to their motorcycles. Almost onethird had removed side mirrors. Similarly, others had removed the rear carrier or installed a wide rest foot for the rear sitter. Any modification that jeo pardises the rider's safety or limits the ability to drive should be strictly prohibited and should lead to confiscation of the motorcycle until such modification is reversed.

g. Almost a quarter of the drivers were unaware of traffic regulations. It should be ensured that the drivers are familiar with the traffic rules and regulations before they are allowed to drive so that they do not prove to be a danger to themselves or others.

h. Those found responsible for the accident due to violation of traffic regulations should be made, for example, by strict disciplinary action, monetary fines, and revoking a driving license. The competent authority should investigate the fatal accident thoroughly, and those found at fault should be punished severely.

i. 50% of the people were using a motorcycle to commute to their workplace and had accidents. Appropriate public transport should be provided for commuting to the workplace to avoid unnecessary travelling on motorcycles.

CONCLUSION

Road traffic accidents place a significant economic burden, especially in a developing country like ours. Observance of safety precautions, strict adherence to traffic rules and regulations, and the Pakistan Highway Code knowledge are mandatory to avoid any possible accident. A national effort is required for the prevention of accidents to conserve human life and the financial resources of the country.

Conflict Of Interest: None.

Authors' Contribution

AR: Proposed topic, basic study design, data collection, FN: Co-author, methodology and manuscript writing, SH: Co-author, statistical analysis & interpretation of results, NIJ: Co-author, quality insurer.

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