ORIGINAL ARTICLE

Frequency of Risk Factors Associated with Road Traffic Accidents of Motorbike in a Big City of a Developing Country

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ABSTRACT

Objective: To determine the frequency of risk factors associated with road traffic accidents of motorbike in Karachi, Pakistan.
Methods: A descriptive cross-sectional study was carried out in the two tertiary care hospitals (Civil Hospital and Jinnah Postgraduate Medical Center) of Karachi, Pakistan. All male motorbike accident victims presented to the emergency department of the selected hospital, who gave consent, were included in the study. Patients under age 15 years and do not understand Urdu language were excluded. Information was collected through a pretested questionnaire.
Results: A total of 127 accident cases from respected hospitals were included in the study. Most (76%) of the accident cases were younger than 33 years. Approximately, 49% of the participants were riding the bikes without driving license. Nearly, 43% never used helmet during riding. Approximately, 21% were reported that they were chewing tobacco at the time of accident. Majority (71%) of the accidents occurred on the working days. Almost 61% of the accidents occurredin the evening time. In 43% of the cases, speed of the motorbikes was more than 50 km/hour. Nearly, 31% of the victims were riding along with their friends/family members. Majority (72%) of the accidents occurred on the main roads. Approximately 45 % of the accident cases had fracture. Approximately, 34% of the injuries were severe and lower extremity was involved in 36% of cases. About, 38 % of the victims reported that they were in depressed moods while riding bike.
Conclusion: Mental depression, young age and lack of driving expertise were the major risk factors for motor bike accidents.

Key words: Motorbike accidents, road traffic accident, accidents in Pakistan.

INTRODUCTION

Road traffic accidents (RTAs) have been the major contributor to the global burden of disease and it is predicted that RTAs will be the third leading cause of death by 2020.[1] Death from RTA account for around 23% of all deaths from injuries and 2.1% of all deaths globally. Annual numbers of deaths from RTAs range from 750,000 to 1183,492 (approximately 3000 deaths/day on roads throughout the world) and 10/1000 become disable for life.[2] Injuries result in major financial and productivity losses to nations along with imposing an astonishing impact on individuals and their families.[3,4]

However impact of road traffic injuries is far greater in developing countries as compared to developed countries.[5]

In Pakistan, injuries are fifth leading cause of loss of healthy life, and second leading cause of disability.[6] Death rate from RTA is 4 per 100,000 population and 15 per 10,000 vehicles in Pakistan.[7] Non-fatal injuries of 19 per 10,000 population has been reported from Karachi.[8] Total number of registered vehicles increased 17 times from 1956 to 1996 and during this period there were a 5 fold increase in number of vehicles on roads.[3,9] There was a 14 fold increases in accidents and similarly deaths following RTAs increased 16 times during this time in Pakistan.[3,9]

In RTAs, the cyclist, motorbike riders and scooter riders are mainly the victims and suffered from major injuries and consequently deaths.[10,11] Motorbike ride needs quick decisions as one has to respond immediately to stop or turn around in case of coarse road.[10,12] Increase in motorcycle and scooter use in recent years has increased deaths and injuries in motor bike users.[11,13] The Motorbike riders are more prone towards injuries of head, chest and extremities.[10, 14,15] The nature of wound, fractures, dislocation of the limbs, thoracic injury and head injury is usually severe in case of motor bike accident as compared to other accident cases.[14] Studies reported that majority of injuries related to motorbike riding occur in young people, who generally tend to adopt risky attitudes and behaviors.[10,14,15] The risk of accident depends on many factors such as rider's age, gender, experience, motorcycle mileage, attitude and behavior of the rider, license, helmet use, alcohol use, type and conditions of road.[10,12,15] The main reasons for increasing RTAs in this region is continuously increase in number of motor vehicle, poor enforcement of traffic safety regulation, poor quality of roads and vehicles and inadequate public health infrastructure.[10,12,16] There is a lack of reliable data on injuries in developing countries, because it is primarily recorded by hospital and police authorities to be used for

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legal purpose and comparison of police record and hospital data on injuries shown that police data is under reported.[3,11,13,17,18]

Road traffic injuries related to motorbike accidents are major but neglected global public health problem in our part of the world, which needs immediate efforts to deal with for prevention of RTAs on long term basis.[16,17] In order to understand the reasons for the increasing number of motorbike accidents we need to explore the road conditions, rider's skills, experience and attitude, which need to be targeted in order to reduce the burden of motorbike accidents. Identification of associated factors of motorbike accidents which are modifiable, culturally appropriate and cost effective can help in reducing the burden on these accidents on health care.[10,19] Findings of our study will be helpful in making the basis for initiation of primary prevention programs to control the epidemic of RTAs in our set up.The objective of this study was to explore and quantify the risk factors related to motorbike accidents in Karachi, Pakistan.

METHODOLOGY

This is a cross sectional study, conducted in two tertiary care hospitals of public sector (Civil Hospital and Jinnah Postgraduate Medical Center) in Karachi, which deal with a major bulk of accident cases in city.[20] All motorbike accident victims presented to the emergency department of the selected hospitals fulfilling eligibility criteria(male, willingness to participate) were included. Motorbike injury cases under age 15 years and those who don't understand Urdu language were excluded.A total of 127 motorbike accident patients were included in the study during August 2008 to October 2008.

The information on demographic, social, motorbike and accident related variables such as individual attitude of rider, personal characteristics and experience level was gathered through a questionnaire. Pre-testing of the studied on 15 subjects to assess its appropriateness. Informed oral consent was taken from each participant after explaining the study purpose. Data collection was carried out through trained data collectors. Principal investigator was actively involved in monitoring data collection process to assure the data quality. During training, data collectors were explained about study objectives, methods and sampling technique, proper way of conducting an interview, maintaining the confidentiality of the study subjects and correct way of filling questionnaire. They were also trained about the field editing of the filled questionnaire.

Data were entered through software the Epi-Info version 3.1 and initial data entry file was then transferred into SPSS file for data analysis. Only descriptive statistics were calulated for all the variables in the study, which includes calculation of proportions for categorical variables like age categories, bike riding history, helmet use, day and time of accident and road condition, site of accident and severity of injury.

RESULTS

Data were collected on total of 127 motorbike accident cases. Table 1 summarizes the characteristics of the motorbike injury cases and the traffic conditions associated with motorbike accidents.

Approximately 16% of the motor bike injury patients were younger than 19 years, 60 % were between 19 to 33 years and 24% were more than 33 years old. About 8% had less than 1 year experience of bike riding, 38% had 2-5 years' experience, 25% had 6-10 years' experience and 29% had more than 10 years' experience of bike riding. Approximately, 49% of the injury cases were riding the bikes without having license.Around 43 % of the injured cases reported that they never used a helmet during bike riding.

Table 1: Characteristics of the motorbike riders suffered from motorbike accident and general road traffic conditions related to motorbike accident

Variables	n	%
Age (Years)		
Less than 19	20	15.7
Between 19 to 33	36	59.9
More than 33	31	24.4
Bike riding experience		
Less than 1 year	10	7.9
Between 2-5 years	48	37.8
Between 6-10 years	32	25.2
More than 10 years	37	29.1
Average bike riding (km/day)		
Less than 10	26	21.1
Between 11-20	20	16.3
More than 20	77	62.6
Motorbike License		
Yes	67	51.2
No	59	48.8
Habit of wearing helmet		
Always	25	19.7
Sometimes	47	37.0
Never	55	43.3
Day of the accident		
Working days	89	71
Weekends	36	29
Time of accident		
Day time	49	39
Evening time	78	61
Type of the road (at accident time)		
Main road	92	72.4
Small lane	21	16.5
Round about	14	11.0
Pattern of the road (at accident time)		
One way	72	75.1
Two way	42	33.3
Round about	12	9.5
Source of collision		
Slipped	25	21.4
Car	44	37.6
Bus	15	12.8
Coach	11	9.4
Truck	5	4.3
Rickshaw	4	3.4
Bike	13	11.1
Cause of the accident		
Mechanical fault	14	11.4
Ride error	44	35.8
Wet road	15	12.2
High speed	19	15.4
Opponent mistake	26	21.1
Rider error	5	4.1
On the wrong way		
Bike rider	27	26.5
Opponent	75	73.5

Majority (71%) of the accidents occurred on working days. Similarly, 61% of the accidents occurred in evening time. Most(72%) of the accidents occurred on main roads, while 17% occurred on small lanes and 11% near a roundabout. Reported reasons by motorbike riders for motorbike accidents were; rider's personal mistake (36%), high speed (15%), mechanical faults (11%) and opponent's mistake (21%).Opponent is defined as the person (other than the injured participant) on the other vehicle with whom collision has occurred at the time of accident. Approximately, 74% reported that their opponent was on the wrong side at the time of the motorbike accident. Source of collision was a car in 38% of the accident cases. Road user behaviors associated to motor bike accidents are given in table 2. Speed at the time of the accident was more than 50 km/hour in 43% of the accident cases,between 31-50 km/hour in 36% and less than 31 km/hour in only in 21% of the accident cases. Most (69%) of the motorbike riders were alone at the time of the accident. Only 4% reported that they broke the signal at time of accident. Almost 72% reported that they were not wearing helmet at the time of accident. Approximately 20% reported that they were talking at the time of accident with person with whom they were riding, 21% were chewing tobacco during bike riding and 38% reported they were in depressed mood at the time of accident.

Table 3 describes patterns of injury, type and severity in motorbike riders. Nearly, 45% of the victims got bone fracture. Approximately, 29% of the injuries were mild, 38% were moderate, and 34% were severe.Injuries are divided into mild, moderated and severe form on the basis of Injury Severity Score (ISS) of Abbreviated Injury Scale (AIS) as used by the participant hospitals.Upper extremity was involved in 30% cases, lower extremity was involved in 35% of the injury cases, head injured in 20% of the cases, chest and ribs in 10% and back in 5% of the case.

DISCUSSION

Motorcycle accidents have somewhat different characteristics when compared with other vehicles group. Motor cyclists themselves seem to have far more problems with other types of accidents, such as those on bends/turns and over taking accidents etc.Our findings suggest that most of the accident cases occur in bike riders who are under age of 30 years.There is a possibility that this trend occurred because young age group is over represented in our sample cases but our findings are consistent with other studies that young motor bike riders most likely to experience an accident because of deliberate risk taking by the driver such as non use of helmet and high speed.[11] One study from Singapore by Tham et al was conducted to see the pattern of injuries in helmeted motorbike riders also reported that mean age of motorbike accident case was 32.5 years which was significantly lower than other vehicle accident patients.[14]

Table 2: Attitude and behaviors of motorbike riders suffered from motorbike accidents

Variables	n	%
Speed at the time of the accident		
< 30 km/h	26	20.5
31-50 km/h	46	36.2
>50 km/h	55	43.3
Number of persons on bike		
One	88	69.3
Two	32	25.2
Three	7	5.5
Break the signal		
No	121	95.3
Yes	6	4.7
Wearing helmet		
No	88	72.1
Yes	34	27.9
Talking with other person		
No	102	80.3
Yes	25	19.7
Looking at the sign board		
No	112	88.2
Yes	15	11.8
Attending a call		
No	126	99.2
Yes	1	0.8
Listening music		
No	120	94.5
Yes	7	5.5
Depressed mood		
No	78	61.9
Yes	48	38.1
Smoking		
No	119	93.7
Yes	8	6.3
Chewing tobacco		
No	99	78.6
Yes	27	21.4

Table 3: Patterns and severity of injuries resulted from accident among motorbike riders

Variables	n	%
Bone injury		
No	69	54.8
Yes	57	45.2
Severity of injury		
Mild	36	28.8
Moderate	47	37.6
Severe	42	33.6
Site of injury		
Upper extremity	53	29.9
Lower extremity	63	35.6
Head	35	19.8
Back	9	5.1
Chest / Ribs	17	9.6
Bone involved in injury		
Wrist	4	5.3
Ulna	3	3.9
Tibia	10	13.2
Skull	4	5.3
Femur	21	27.6
Radius	6	7.9
Ankle	2	2.6
Hip	3	3.9
Ribs	6	7.9
Knee	4	5.3
Fibula	7	9.2
Shoulder	5	6.6
Metatarsal	1	1.3

A hospital based study from Nepal highlighted that the majority motorbike accident victims were aged between the years 16-30.[21] Similarly data collected at New south Wales Road by traffic authority between 1996-2000 showed that more than 80% of the victims were in the age group between 14-15years.[22] A cross sectional study of fatal accidentsin Colorado revealed that learner driver-aged 16 reported to drive four times more carelessly and three times more traffic laws violation were reported as compared to older age range between 25-49 years drivers group.[23] Another study from California reported that according to a police crash database between the years 1993-1996 teenager bike riders, driving in night had been noted to have a high risk of accidents.[24] Clarke et al also reported that most of the motorbike accident occurred in the evening time, our results are also showing the same trends because in evening time roads are too busy with all type of vehicles, increases the risk of accidents.[11] Our findings are also supported by another study that reported that fewer accidents occur on weekends as compare to work days.[11]

Studies report that along with culture and socioeconomic status, there are differences in constellation of risk factors contributing to road traffic crashes in urban and rural areas as well.[25, 26] Our data also suggested that there are certain road conditions which making motorbike riders prone towards accident i.e. slippery (wet) roads, roundabout and small lanes. In our study, approximately 73% of cases reported that it was mistake of opponent which led to accident. Our finding regarding opponent mistake is also supported by Clarke's study in which 65% of the cases reported opponent's mistake as a reason for accident and mostly car drivers were the opponent in accidents.[11] A study from Tehran, which was conducted to see the pattern of motorbike injuries reported that in most of the crashes it was opponent's mistake which was responsible for accidents.[18]

There are certain other factors besides experience of driving which are responsible for higher risk of accident like high speed and lack of knowledge of traffic laws. The specific behavior and carelessness was assessed through responses about listening music, talking with another person, looking at sign boards, helmet use and number of persons on the bike. Experience of motor bike rider is difficult to quantify and it is reported that most of the injuries are concentrated in inattentive bike riders.[10]

In Pakistan there is a major issue of insufficient knowledge of traffic rules and the importance of use of helmets during motorbike riding.[27] This fact is evident in our study as 72% of the cases were not wearing a helmet at the time of accident where as in a study by Zargar et al conducted in Tehran, 91.4% of the cases reported that they were not wearing a helmet[18]. Studies have reported that severe injuries are more in cases who don't use a helmet.[15,16] High speed was also identified as one factor associated with motorbike injury which is consistent with other studies.[10,11] A cohort study in Sweden conducted to see the factors associated with motorcycle accidents reported that alcohol consumption, driving in rural area and speeding over 50 km/hour were increasing the risk motorbike accidents in the young bike riders.[28] Jooma et al, in his survey on head injury reported that more severe injuries occur in patients through RTA as compared to other injuries.[20]

Wound, fractures and dislocation of the limbs and severe thoracic injury were also more prevalent in motor bike accident cases as compared to other accident cases as reported in many studies and our data also showed that injuries to the extremity and head injury is more common in bike riders as compare to other form of accidents.[18,29] Among motorbike rider with head injury, more than one third had severe head injury in Tham's study.[14] Adherence to motor cycle helmet law has significantly reduced severe injuries and fatality in many countries of the world.[16,30,31]

There are certain limitations to our study. This is a hospital based study and we are taking only accident cases and do not included information of healthy participants so we can not estimate incidences of motorbike accidents in the community. A community based study would add more in knowledge about incidence and type of injuries in motor bike accidents. Our study does not include data about patients who died before reaching to hospital because of severe motor bike injury. Power of our study might be low due to small sample size, so it may not reflect the actual magnitude of the motorbike accidents.

Motor bike accident can make a victim permanently disabled. Together with pain and suffering, RTA indulges family into a very huge economic burden. The trauma and economic loss to families and employers expands beyond the motorbike accident victim into the community.[4] Implementation of helmet law will increase helmet use and decrease fatalities and injuries among motorcyclists.

CONCLUSION

Young motorbike riders and those with habits of using tobacco during bike riding (responsible for diverting attention during riding) and those who ride motorbike without license are at greatest risk of motorbike accidents. Initiatives for motorbike rider's safety should address the behavior of the both motorbike rider and the other road users as well. The education should be given about the driving habits, speeding, safe distance, driving conditions, and license. Both skill and attitude of the rider needs to be focused.

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