

Motorization Rate Resulting in a Road Traffic Accident an Epidemiological Audit of Injuries and Factors in the Medium-Scaled Cities of Punjab, Pakistan

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ABSTRACT

Background: Motor vehicles are increasing exponentially day by day over the world with a global increasing prevalence of road traffic accidents. This situation of mass motorization has affected developing countries like Pakistan as well. Due to a lack of proper legislation and implementation of the law, the RTA situation is worse and requires proper research of epidemiological factors and medico-legal evaluation of injuries.

Purpose: To see the pattern of RTA injuries and various epidemiological factors influencing them in the medium-scaled city like Sargodha, Gujranwala, Sialkot, and Gujarat Punjab, Pakistan.

Study design: It is a retrospective study to evaluate and assess the pattern, severity, and epidemiological factors concerning RTA injuries and their medico-legal relationship during four years period from 2016 to 2019 in the medium-scaled cities of Punjab, Pakistan. Nearly 300 cases were selected to get information on predesigned Performa from Hospital records of DHQ Teaching Hospitals of Sargodha, Gujranwala, Sialkot, and Gujarat.

Method and materials: After collecting data on designed Performa, the information was collected about epidemiological factors, type of injuries, the pattern of injury, outcome of injury, and medico-legal outcome for furthering justice. A descriptive statistical method was applied for the analysis and evaluation of collected data. Furthermore, standard deviation, F-statistics, and Chitest p-value were also applied to see the association of epidemiological factors with RTA injuries.

Results: In a total of 300 cases of road traffic accidents, the average age was found 28.5 years of age with gender male in most of the cases (86%). The 15-35 years age group was identified in more than 70 % of cases with the majority of accidents being motorcyclists with pillion riders and pedestrians. The majority of victims suffered RTA injuries while crossing the roads and constituted 30.66 % of all the cases followed by the victims passing by the side of roads with 24 %. The head and neck injuries were the most affected in most of these cases followed by extremities injuries.

Conclusion: Motorcyclists with pillion riders were mostly involved in road traffic accidents. Males in the age group 20-30 years were the most affected victims being the socially active age group involved in motoring. The grievous and life-threatening injuries are increasing resulting in a very high rate of mortality and morbidity in society. The study suggests strict legislation and proper implementation of health and safety measures to avoid high RTA rates.

Keywords: Motorization, RTA, automobile accidents, grievous injuries, health & safety measures.

INTRODUCTION

Road traffic accidents are a major concern in developing countries like Pakistan and they impose a big burden on the development of human well-being in the deteriorating economic condition of the country (1,2). The issue of road safety and bad conditions of roads are posing great danger to human lives day by day if it is not addressed timely. Medium-scaled cities are the great sufferer as the motorization rate is increasing drastically while roads are not repaired and developed to sustain the high loads of traffic (3, 4). Furthermore, poor legislation to control the increased motorization with low literacy of health & safety measures, the situation has added fuel to fire for further devastating circumstances.

Road traffic injuries are suffered globally in each part of the world with varying degrees of safety index (5,6). These injuries reflect the condition of roads and ignorance to adopt health and safety measures. The mode and manner of these injuries are ranged from simple hurt to grievous and life-threatening injuries. Recovery time and back to normal life depend upon nature, the severity of the injuries, and part of the body affected (6,7). Although, permanent disability and prolonged psychological trauma are the worst consequence of road traffic accidents it may be a lifelong process that needs to be addressed in further research as well (7).

The mortality rate in road traffic accidents is very high in Pakistan due to low socio-economical status and bad conditions on roads (8). According to the latest figures of WHO, it is a 28,170 fatalities rate and it is 1.93 % of all deaths in Pakistan. The mortality index of Pakistan is ranked number 95 in the world with 15.18 deaths per 100,000 populations (9). Many epidemiological factors are responsible for this high rate of mortality and morbidity in road traffic accidents (10). Age groups and gender have a very

strong association as predicted by many researchers (11). Young age drivers are the worst sufferers of road traffic accidents (12,15). Increase motorization rate of two-wheelers and tri-wheelers are the main source of road traffic accidents in medium-scaled cities (13).

Sargodha, Gujranwala, Sialkot, and Gujrat were the cities selected for data collection in this study as these cities are medium-scaled cities concerning their increasing metropolitan population and motorization rate (14). In these cities, there is a lack of proper urban transport or a government-provided metro bus system and the conditions of the roads have badly deteriorated. The increasing demand for transport facilities has created room for tri-wheeler rickshaws and ching chies with pillion riders on bi-wheeler motorcycles. This increased motorization has increased the road traffic accidents with multiple injury patterns with very mortality and morbidity.

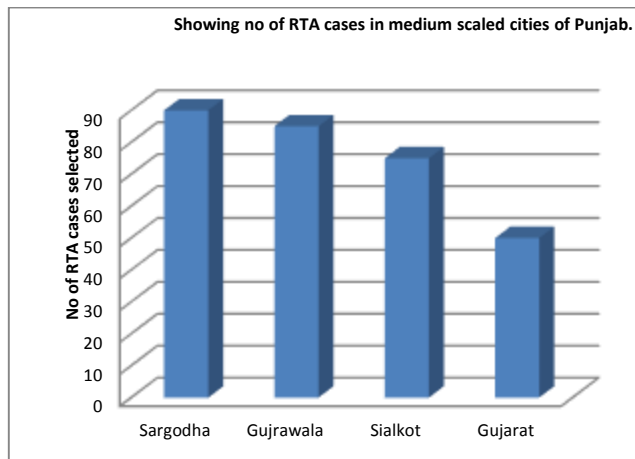
METHOD AND MATERIALS

It is a retrospective study to evaluate and assess the pattern, severity, and epidemiological factors concerning RTA injuries and their medico-legal relationship during four years period from 2016 to 2019 in the medium-scaled cities of Punjab province. Nearly 300 cases were selected to get information on predesigned Performa from Hospital records of DHQ Teaching Hospitals in different medium-scaled cities of Punjab. Sargodha, Gujranwala, Sialkot, and Gujarat were the cities selected for data collection in this study as these cities are medium-scaled cities concerning their increasing metropolitan population and motorization rate. After collecting data on designed Performa, the information was collected about epidemiological factors, type of injuries, the pattern of injury, outcome of injury, and medico-legal outcome for furthering justice. A descriptive statistical method was applied for

the analysis and evaluation of collected data. Furthermore, standard deviation, F-statistics, and Chi-test p-value were also applied to see the association of epidemiological factors with RTA injuries.

RESULTS

Road Traffic accidents data collected from four medium-scaled cities of Punjab have shown the following distribution of cases in four districts of Punjab as given in Picture 1. Most cases were found in highly populated cities due to the massively increasing metropolitan population in these cities



Picture 1: Showing number RTA cases from medium scaled cities of Punjab.

Table 1: Epidemiological factors causing Road Traffic Accidents (RTA) & their statistical significance

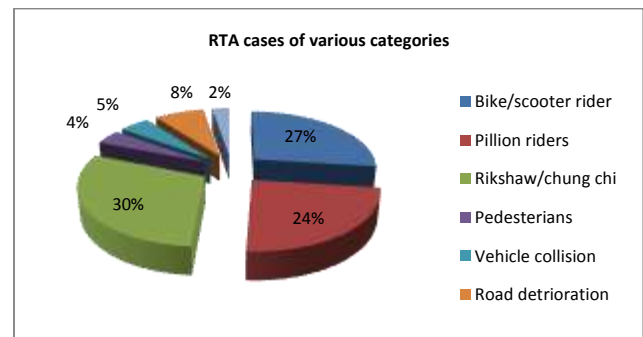
Age groups(Years)	No of Cases	Percentage	P- Value
> 15	13	4.30%	0.019
15 to 25	144	48%	
25 to 35	80	26.66%	
35 to 45	45	15%	
45 to 60	18	6%	
Gender			
Male	250	83.33%	0.13
Female	50	16.66%	
Time of the day			
12 am to 5.59 am	14	4.66%	
6.00 am to 11.59 am	140	46.66%	0.017
12 pm to 6.00 pm	97	32.33%	
6.00 pm to 11.59pm	49	16.33%	
Part of body inured			
Facial & Head injuries	90	30%	0.0024
Chest & abdominal Injuries	45	15%	
limb Injuries	78	26%	
Internal Injuries	32	10.66%	
Fracture & dislocation	55	18.33%	
Use of safety measures			
use of Hamlet	34	11.33%	0.014
Use of seat ballots	40	13.33%	
Use of hamlet to pillion riders	12	4%	

The most affected age group was found 15-25 years of the age group who suffered from RTA injuries in most of the cases and comprised 48 % of cases followed by the 25-35 years age group with 26 % of cases in this study. If we see together 73 % of cases belonged to 15 to 35 years of age in this study as this period of active social life to get the education and get employed or to do any social, political and economical activities in the society. This fact is further supported by the statistical analysis in this study and shows a very strong association with this age group as predicted by a p-value of 0.019 (see table 1).

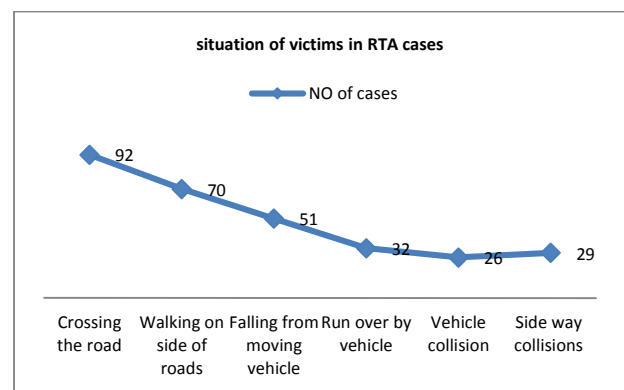
Road Traffic Accidents were found very high prevalence in the early part of the day as investigated in this study. Most RTA

injuries occurred between 6 am to 11.59 am of the morning (46% of all cases) when everyone is in a hustle to reach schools, colleges, universities, or their workplaces to start their daily activities. The second the most affected period of the day was found later part of the day from 12 pm to 6 pm when everyone is coming back to their destination or homes after pursuing day-long activities in their educational places, workplaces, or after traveling back to their home cities(32 % of all cases in this study). This factor was also very statistically related to RTA injuries if we see a p-value of 0.017 as conducted by Chi-test analysis. This is very much following the null hypothesis (see table 1).

The injuries suffered to different parts of the body were also analyzed in this study. It was found that the head and face injuries were the most affected part of the body followed by limb injuries with 30 % and 26 % of all injuries in all cases respectively. Together they constitute 55% of all injuries in all the cases in all the four medium-scaled cities of Punjab. These injuries most affected the motorcycle riders and pillion riders who did not adopt any safety measures like the use of helmets etc. More severe head and spinal injuries were found in vehicle drivers who did not use seat belts and struck windscreens and were thrown out of their vehicles during collision accidents and their heads strike against the road surfaces. These types of injuries were lethal and resulted in many deaths.



Picture 2: Showing percentage of RTA cases of various categories in Punjab.



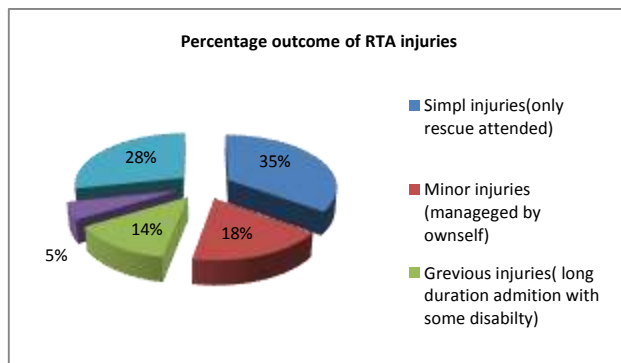
Picture 3: Shows the situation of victims while suffering with RTA injuries.

In the medium-scaled cities, a large number of Road Traffic Accidents were found due to increased numbers of tri-wheelers like Rickshaws and ching chies rooming on the big and small roads without following traffic rules. This factor has dangerously affected urban life and has resulted in a big rush & overcrowded roads. In this study, most accidents were found by tri-wheelers rickshaws, and ching chies which constituted 30 % of all RTA injuries followed by the motorcyclists and pillion riders with 26 % of all the cases investigated in this study (See picture 2). Bike and scooter riders were the main culprits or victims who shared a big percentage of RTA injuries with 27 % of all cases and if combined with pillion

riders they were responsible for 51 % of all the injuries in all four cities of Punjab as investigated in this study(See picture 2).

The situation of victims of road traffic accidents was also investigated in this research study. The majority of victims suffered RTA injuries while crossing the roads and constituted 30.66 % of all the cases followed by the victims passing by the side of roads with 24 % (see picture3). This showed the high congestion of traffic and crowded roads with pedestrians in city life. This factor is further enhanced by the low education and lack of awareness about traffic rules among the general population of citizens as well

The rescue services in medium-scaled cities of Punjab are benefited from the presence of 1122 which is the first contact of a citizen in case of the emergency response of the government in case of any road traffic accidents. They are very efficient in providing emergency service at the site of accidents although possessing very minimal resources and annual funds. It was found that 35 % of simple injuries in this study were rescued by this 1122 ambulance service by providing at-the-spot emergency services to the victims of RTA who suffered simple injuries and not required a hospital or causality department (COD) admission. They served to shift the grievous injuries, and victims, to COD of the nearby hospitals of the district as well which constituted 14 % of all RTA injuries in all the cases of these medium scaled cities of Punjab. 28 % of RTA injury cases were managed by themselves by the victims as these were very minor injuries like a bruise, grazes, and abrasions. The grievous injuries were those which required long-term admission to hospitals and resulted in some permanent disability later in life in some cases. 5 % of RTA injuries proved fatal which resulted in the death of victims which were mostly the head injuries or internal organ injuries on spot or later after serious complications.



Picture 4: Showing percentage of RTA injuries & their outcome.

DISCUSSION

Medium-scaled cities have many traffic control problems as these cities are expanding at a great pace with the same roads and infrastructure of urban traffic control. This increased motorization has posed a great danger of RTA injuries in especially the young population of age group between 15 to 25 as demonstrated in this study and many other studies (16). Motorcycles are used by youngsters as a means of transport and are a cheaper ride with fuel economy without using proper health and safety measures (17, 18). The males are predominantly involved in most RTA injuries in this study as they are considered the main earners of the family and spent active social life by facing all the dangers of mass motorization in urban life.

The condition of the roads in the medium-scaled cities like Sargodha, Gujranwala, Sialkot, and Gujarat has not improved as much as needed for the increasing urban population in recent years. These cities have low compliance with traffic measures as electric signals are installed but not working round the clock due to mismanagement at the administrative level and lack of fund supply to the municipal corporations of city governments. All these factors

have increased traffic congestion which resulted in many road traffic accidents (19, 20).

Diurnal variation is a very important factor concerning several accidents occurring in the early part of the day between 6 am to 12 pm and later afternoon between 12 pm to 6 pm. This fact is related to the early morning busy period of the day when everyone is in hurry to reach their workplaces. The second most significant time for RTA incidents is afternoon and evening time when most of the people suffered from accidents due to fatigue and exhaustion from a whole day of work or traveling. Furthermore, in old age drivers, the evening time is a period of low mood and depression with multiple psychological problems which leads to attention deficit and results in many road traffic accidents in the evening (21). Some drivers drive under the influence of drugs, alcohol, and many other substances of abuse which results in attention-deficit while driving and so they become causes of loss of life not only for themselves but also for pedestrians in case of Road Traffic Accidents (22).

Neglecting health and safety measures is another very prevalent cause of road traffic accidents. In the medium-scaled cities of Punjab people belongs to low social-economical status and are not well educated (23). They do not use proper health and safety measures while driving their motorcycles, rickshaws, and ching chies without helmets. Hence they have suffered more grievous and life-threatening injuries in case of road traffic accidents. Pillion riders are also sustaining more serious injuries in road traffic accidents on these overcrowded and bad-conditioned roads of these cities. This factor is very well demonstrated in this research where nearly 90 % of the motorcyclists were not using helmets while they suffered dangerous injuries during road traffic accidents.

CONCLUSION

Motorcyclists with pillion riders were mostly involved in road traffic accidents. Tri-wheeler rickshaws/ching chies are increasing in the medium-scaled cities of Punjab with great pace and posing high congestion of traffic on deteriorating roads. The city administration and Governments must take a step to build new roads and flyovers to address the issue of high congestion of traffic to decrease the incidence of RTA injuries in these medium-scaled cities of Punjab. Males in the age group 20-30 years were the most affected victims being the socially active age group involved in motoring. Health and safety measures are neglected by general citizens in these medium-scaled cities of Punjab and city administrations are failed to implement strict law and order with effective traffic control to save the general population from RTA injuries. The grievous and life-threatening injuries are increasing resulting in a very high rate of mortality and morbidity in society. The study suggests strict legislation and proper implementation of health and safety measures to avoid high RTA rates.

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