ORIGINAL ARTICLE

QING-QI RICKSHAW: A BOON OR BANE FOR PUBLIC TRANSPORTATION? A STUDY OF ROAD TRAFFIC INJURY PATTERNS INVOLVING QING-QI RICKSHAWS IN KARACHI PAKISTAN

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Background: The three-wheeler Qing-qi and Compressed Natural Gas (CNG) auto-rickshaws were introduced in Karachi to meet the transportation demand of the growing population. These vehicles have directly or indirectly been implicated in a number of road traffic violations as well as road accidents. This study aims to describe the crash characteristics and injury patterns for Qing-qi rickshaw occupants and other road users hit by Qing-qi rickshaw in Karachi, Pakistan. **Methods:** An Observational/ Descriptive study was conducted at Accident& Emergency and Orthopaedic Surgery Department, Jinnah Post Graduate Medical Centre, Karachi Pakistan from July 2014 to June 2015.All patients who came with Qing-qi rickshaw accident in Accident& Emergency (A&E) of JPMC were included. Crash characteristics, details of injuries, injury severity parameters and outcome were documented in detailed interviews. **Results:** Four hundred and eighty-six rickshaw related injuries were noted in road traffic accidents by Qing-gi rickshaw. Age range was 2–85 (43.5±58.68). 350 injured victims were males and 136 were females. By occupation most victims were laborers and daily wage workers (45%) and students (21%). Overloading of vehicle with more than two passengers was found in (28.5%). The most common cause of injury was collision with a moving vehicle (56%), followed by fall from rickshaw. The most common contributing factor was the overloading of rickshaw and roll over on turning (61%). Injury severity on arrival were mild (49%), moderate were (32%), and severe were (19%). Injuries related to head and neck (26%), face (14%), thorax and abdomen (5%), lower extremity and pelvic girdle (31%) and upper extremity (23%) were observed. **Conclusion:** Qing-qi rickshaw injuries are common and these vehicles are vulnerable to road traffic accidents. Occupants and road users are both at risk of injuries.

Keywords: Qing-qi rickshaw; Road traffic accidents; Trauma; Burden; Three-wheeler vehicle; Injury prevention; Engineering; Public transport

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INTRODUCTION

A three-wheeler Rickshaw is a popular mode of transportation in Pakistani towns and is mainly used for traveling short distances within cities. In many cities in Pakistan, there are also motor cycle rickshaws, usually called 'chandgari' (moon car) or Qing-qi (after the Chinese company who first introduced this rickshaw to the market).[1]

Karachi is the most populated city of Pakistan and is also one of the most populated cities in the world. It is also counted amongst the largest cities in terms of area. Public transportation in the metropolis faces a number of challenges and its accessibility is limited. Private taxis and yellow cab fares are beyond the reach of the common people (and are dwindling in number as well) while buses and coaches are in bad shape, though there is little choice to daily traveller but to use them. The arrival of Qing-qi rickshaws (pronounced 'chingchi' locally) and CNG rickshaws (running on compressed natural gas and that can seat at least six people) have however changed the scenario.[2] There is lacking of comprehensive public transport system for the expanding metropolis; the public buses that operate are too short in number to handle the load of passengers. To fill the vacuum, Qing-qi rickshaws were introduced in the year 2007. By 2012, they proliferated to approximately 65,000.[3] They are not as expensive as the other public transport vehicles as the fares can be negotiated to more affordable rates. Qing-qis are not new to the metropolis; similar vehicles have been around for years in Karachi and with their sudden influx, the Qing-qis and larger CNG rickshaws have entered as strong competitors to the other public transport vehicles. They are known to be involved in clogging up the roads as well as breaking nearly all traffic rules.

Rickshaw is not only the most common mode of transportation in Pakistan but in fact it can be seen all over South Asia as well as the Far East and African countries. In Pakistan, new CNG base rickshaws are virtually taking over all urban and rural streets. Because of lack of interest by government in building proper

transportation system results in the rise of Qingqi rickshaw in Pakistan.

In the city of Karachi, there are reports of a controversy regarding the Qing-qi rickshaw introduction. The city administration fails to accept Qing-qi as a public transport option and claims to have not allowed them routes or cleared the vehicle as a viable mode of public mobility. Although Qing-qi's presence on Karachi's roads was a blessing for many, reports indicate that the vehicle is also one of the major contributors of traffic jams as they have no designated stops along the roads unlike transit buses. These drivers have a tendency to halt the vehicle in the middle of the road for loading and off-loading passengers, causing traffic congestion and a risk of traffic collision. Since the vehicle operates without regulation, the drivers often flout laws with impunity since there are no checks and balances. Published data from the neighbouring country, India, report that motorized rickshaw drivers are documented to be amongst the major traffic laws violators and are practicing hazardous driving.[4] Children as young as 12 are seen driving the Qing-qi rickshaw.[3] Since the Qing-qi does not exist as a vehicle with the excise and taxation department, no licensing is required, either for the vehicle or the driver, which puts the passengers and other road users at risk. Pedestrians, rickshaw users, rickshaw pullers, two wheeled vehicle users and cyclists are the most vulnerable for road traffic accidents in road user groups' which result in highest injuries and fatalities.[5–8] In the developing countries these groups are contributing an increasing proportion of road traffic injuries.[5,6]

Since there are no reliable records available regarding number of qingqi rickshaw and injuries caused by these vehicles, the exact number could be even greater. The characteristics of crashes and nature of injuries involving Qing-qi rickshaw is not well understood. This analysis could help in understanding the causation of trauma and crash of Qing-qi rickshaw, which will assist in identification of high-risk practices and targeted preventive measures implications. In this paper, we report data from a prospective study in the A&E Department of Jinnah Post Graduate Medical Centre, Karachi.

MATERIAL AND METHODS

An Observational/ Descriptive study was conducted at Accident& Emergency and Orthopaedic Departments, Jinnah Post Graduate Medical Centre; Karachi Pakistan from July 2014 to June 2015.All patients who came with Qing-gi rickshaw related accidents to the A & E of JPMC were included. Crash characteristics, injury details, parameters of injury severity and their outcome were documented in detailed interviews. Injured detailed data on the demographics, crash characteristics, on arrival at hospital Glasgow coma score (GCS), sustained injuries details and final disposition were documented. The main outcomes reported are the crash characteristics, patterns of injury and outcomes amongst the Qing-qi rickshaw occupants (drivers and passengers of Qing-qi rickshaw) and hit-by-Qing-qi rickshaw subjects (the other type of road users injured due to a crash involving a Qing-qi rickshaw). Data was analysed on the SPSS-21 for statistical significance

RESULTS

Four hundred & eighty-six rickshaw related injuries were noted in road traffic accidents by Qing-qi rickshaw. Age range was 2–85 years, mean age was 43.5±58.68. Of the victims, 350 were male and 136 were female (Figure-1). By occupation, most victims were laborers and daily wage workers (45%) and students (21%). Overloading of the vehicle with more than two passengers was found in (28.5%). Most common cause of injury was collision with a moving vehicle (56%) followed by fall from the rickshaw. The most common contributing factor was the overloading of rickshaw and roll over on turning (61%). Injury severity on arrival was mild (49%), moderate were (32%), and severe were (19%). Injuries related to head and neck (26%), face (14%), thorax and abdomen (5%), lower extremity and pelvic girdle (31%), upper extremity (23%) (Table-1).

The risk of having multiple injuries was significantly higher in Qing-qi rickshaw occupants involved in front collisions. Being a front-seat Qing-qi rickshaw passenger in a vehicle collision increased the risk of having a serious outcome and a Glasgow coma score ≤12, although this was not statistically significant when compared to the back-seat passengers. Lower limb fractures were the most frequent specific injuries in both groups with mostly femoral and tibial fractures in Qing-qi rickshaw occupants and in hit-by-Qing-qi rickshaw subjects (51 tibial, 43 femoral). Multiple injuries were documented in 63% Qing-qi rickshaw occupants and 59% of hit-by-Qingqi rickshaw subjects.

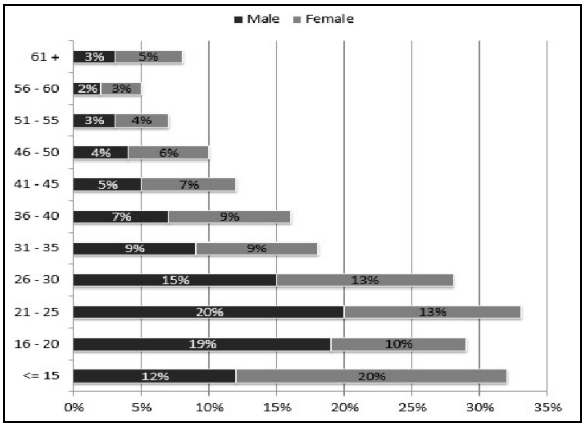

Figure-1: Casualties percentages with respect to age group & gender

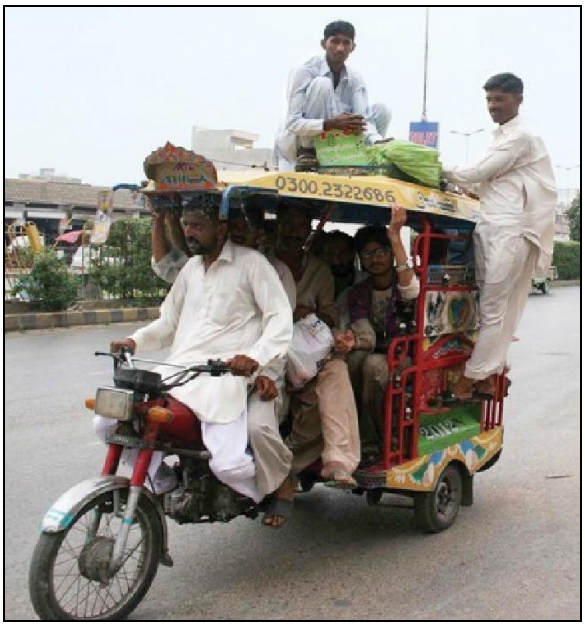

Figure-2: Overloaded Qingqi rickshaw

Table-1: Injury pattern

Injury pattern	Percent
Head and Neck	**26**
Superficial/Open wound	13
Fracture	6
Crush/ Intracranial injury	6
Other	1
Thorax and Abdomen	**5**
Superficial/Open wound	2
Fracture	2
Organ injury	1
Upper extremity	**23**
Superficial/Open wound	11
Fracture	10
Crush	1
Lower Extremity and pelvis	**31**
Superficial/Open wound	12
Fracture	15
Crush	3
Other	1

DISCUSSION

The peak age period of injured patient was between 21–30 years in this study. This is the active age group that was involved in the use of Qing-qi rickshaw for going to colleges and offices. The road traffic accidents involving rickshaw are more likely to involve young adults and children <10 years. Since Pakistan has a majority of young population, so this may be the reason that majority of our patients were young.

These rickshaws are generally overcrowded and overloaded with these students of schools and colleges and office workers. Subsequently they are more prone to accidents. Probably as point to point travelling is provided by this only transport system and men are more mobile, gender was heavily skewed towards males as compared to women. There is little research, in spite of being so common on the characteristics and injury patterns in road traffic accidents involving qingqi rickshaw in Karachi Pakistan. Single vehicle crashes were dominated by overturning of rickshaw. Overloading of qingqi rickshaw found to be the most common reasons for overturning. Poor road condition found to be another significant cause (holes in roads, excessive speed breaker height and Road bumps). poor road condition and poor vehicle design are responsible for the majority of road accidents has already proven.[9]

The risk of accidents caused by mechanical failure increases in developing countries, where economic realities force the population to make use of less reliable and older vehicles.[10] A strong influence of vehicle design on the stability of Qingqi rickshawhas been documented, for example, when driving over bumps or similar road irregularities, wheel lift-offs when driving a Qingqi rickshaw straight over road bumps in an experimental setting.[11] With one-third of all injuries amongst the Qingqi rickshaw occupants resulting from overturning of the Qingqi rickshaw, it is imperative that the stability of Qingqi rickshaw is looked into further detail to prevent these injuries.

Our findings support the need for stricter enforcement of traffic laws amongst qingqi rickshaw drivers, especially because they have been documented to be amongst the frequent traffic violators. A study from Sri Lanka has also reported substantial proportions of motorized (Qingqi) rickshaw drivers without valid driver's license.[12] Compared to the single vehicle injury, crashes which were involving multiple vehicles were found to be associated with more severe injury. In the multiple vehicle crashes the frequency of ICU admission and mortality rates were also high.

It is obvious from this study that the majority of accidents took place in the morning and evening, as this is the time of children and adults to go to school and offices. It is also the time of rush hour because maximum numbers of vehicles plying on the roads at these times.

In our study, the main cause of severe and moderate disability were head and face injuries. Other common injuries included the musculoskeletal injuries, chest and abdominal injuries. Most of the limb injuries were located in the lower thigh region, which may have resulted from initial impact of the Qingqi rickshaw front[13].Unfortunately none of the qingqi rickshaw driver was wearing any helmet for protection and helmet may reduce the incidence of brain injury. Helmet reduces the risk of loss of consciousness and head injury; there is plethora of evidences in the literature about prevention of such injuries by using helmet.[14,15] Educational programs and policy changes that increase the awareness and use of helmets may prevent deaths.[15]

A reference for further research can served by this study, to help in identify research priorities, and assist in traffic planning and vehicle safety legislation for Qingqi rickshaw. In addition, these data suggest the

need to explore means to improve compliance for road safety amongst the Qingqi rickshaw passengers to reduce their risk of RTIs.

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Limitation: Limited literature is available on this topic because these types of injuries are reported mostly in Indo-Pak region.

CONCLUSION

This study concluded that Qing-qi rickshaw injuries are common and these vehicles are vulnerable to road traffic accidents. Occupants and road users are both at risk of injuries. Urgent preventive measures targeted towards this group are needed to reduce injuries involving rickshaws which results in increasing morbidity and mortality. The need for improved understanding of the risk characteristics of Qing-qi rickshaw is emphasized. Improvement in legislation, implementation of traffic laws and engineering is necessary. The option of a safe, accessible and dignified mass transit system for the city of Karachi should be explored at the earliest.

AUTHORS' CONTRIBUTION

MM, MSM, JE: Questionnaire preparation, Data collection, Data analysis, Script writing.
AB, SJ, AM, AQ: Questionnaire preparation, Data collection.

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