

Assessment of the factors for motorcycle accidents and their impact in Kinondoni municipality, Dar es Salaam-Tanzania

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Abstract: *Motorcycle transport business is an employment opportunity to many youths. However, the business has become a blessing in disguise following frequent accidents which cause great loss. This paper assessed the causes of motorcycle accidents and their associated impact in Kinondoni municipality, Dar es Salaam Tanzania. The assessment discloses that motorcycle accidents are largely caused by human socio-economic factors such as age, education, training, terms of employment and income. Majority of motorcyclists are young men who do not possess any formal training. Furthermore, many of them work for others and are required to submit a particular amount of money to their employers in a specified period of time. Impacts of motorcycle accidents include injuries, permanent disability, increased expenditure, dependency and death.*

“1. Introduction”

The use of motorcycles as means of transport has become very common in many developing countries as reported by Kumar and Barret [6] in the case of Douala, Lagos, and Kampala; where motorcycle transport has grown very rapidly in recent years. It is noted that this is a consequence of the poor state of the roads and the inability of bus companies to meet growing demand. It is also advanced that motorcycle transport is cheap in terms of fuel cost and maintenance. Ledger [8] also alluded to the fact that motorcycles have become extremely cheap to buy as well as to maintain. This state of affairs has led to a drastic increase in the number and use of motorcycles. The motorcycle transport does not only provide transport services to people and their goods, but it is also an income generation activity [4].

“2. Statement of the problem”

In recent years, motorcycles have been widely used as one of the means of public transport for shorter distances in urban areas in Tanzania. The introduction of motorcycles as an alternative means of transport in urban areas was prompted by high

transport cost and inadequate transport service provision. Although this is a positive development to provide affordable transport, the risk of the mode is high. In addition, because of the rapid increase in the use of three-wheelers (in Tanzania commonly known as ‘bajajs’) and motorcycles, there are larger numbers of users with inadequate training on the road [11].

Nevertheless, motorcycle transport business has contributed to creation of employment to the youths, but in the process of meeting these challenges motorcycles have frequently been involved in accidents, causing serious injuries to people, damaging the property and sometimes cause death. Motorcycle accidents have become a disaster which affects socio-economic wellbeing of the community. Everyone killed, injured or disabled has a network of others, including family and friends who are deeply affected. Most of the motorcyclists are youths [13]; hence motorcycle accidents take away the productive force. They adversely affect the economy since they increase medical expenditure, reduce productivity and increase dependence burden.

“3. Objectives”

1. To assess the principle factors for the occurrence of motorcycle accidents
2. To identify the socio-economic impact of motorcycle accidents to individuals and to the community in Kinondoni municipality

“4. Review of literature”

4.1 Motorcycle accidents globally

Zhang [21] argues that motorized two-wheeled vehicles (motorcycles) are one of the least safe forms of travel, which have resulted in concurrent increases in related injuries resulting from accidents. Motorcyclists have poor safety record when compared to other road user groups. Motorcycle crashes account for around 1.2 million deaths and 50 million injuries every year [20]. A study conducted in the USA in 2004 show that while about 15 cars

out of 100,000 ended up in fatal crashes, the rate for motorcycles was 69.3 per 100,000.

In the UK, their killed and serious injury (KSI) rate (per million vehicle kilometres), is approximately twice that of pedal cyclists and over 16 times that of car drivers and passengers. Motorcyclists make up less than 1% of vehicle traffic but their riders suffer 14% of total deaths and serious injuries on Britain's roads (DETR, 2000). Motorcyclists are the only traffic group in the UK for which the injury and death figures are rising [8].

At a global level, Asian countries have the largest proportion of motorcycles as well as motorcycle accidents. Odera [14] points out that motorcycle accident statistics from different countries illustrates that mortality figures are highest in South East Asia. Thailand constitutes 70%, Cambodia 63%, Indonesia 61% and Malaysia 58%. In France motorcycle accident mortality is 25%, USA 11%, México 6% and Kenya 1%.

There has been an increasing trend in many African countries following the use of motorcycles for public transportation business. WHO [19] points out that though morbidity and mortality rates from motorcycle accidents are low in developed countries, the risk of dying from a motorcycle crash is twenty times higher than a motor vehicle crash. In Nigeria for example, motorcycle accidents cause at least 70 percent of the city's road traffic accidents. The Kano General Hospital in Nigeria has a ward called the 'achaba ward' where only accident victims from motorcycles are hospitalised. It is reported that the Kano General Hospital receives no fewer than 20 cases of 'achaba' accidents a day [3]. Between 2000 and 2005 motorcycles accounted for 21,876 (31%) of all accidents [15]. In Kenya trends in motorcycle deaths increased from 44 (1.7%) to 164 (6.1%) of total road death between 2005 and 2009. In Kampala, motorcycles are responsible for 50% of road traffic crashes [14]

4.2 Motorcycle accidents in Tanzania

In Tanzania motorcycle transport business has gained momentum in the past few years. Machira [9] reports that the booming transport sector involving Bajajs (tricycles) and motorbikes has created jobs for thousands of youths in Tanzania over the past three years. The Ministry of Infrastructure Development [17] reports that between 2005 and 2006 motorcycles (less than 3 wheel) increased by 54.4% (from 31,006 to 47,888) and they comprise of 15% of all motor transport. Motor tricycles increased by 73% (from 369 to 639) and they comprise of 0.2% of all motor transport.

Dar es Salaam has been recording the highest number of motorcycles than other regions in Tanzania. According to police statistics, by the end of 2009, the total number of Bajajs on Dar es Salaam

roads jumped to 1,000 from only 300 recorded in 2007 [10]. Though there are no reliable statistics on the total number of motorbikes currently used for public transport in the country, estimates put the number in the thousands as entrepreneurs rush to invest in these vehicles. However, motorcycle transport business has become a blessing in disguise. Motorcycles have been frequently involved in accident disasters causing serious injuries and deaths.

In 2009 motorcycle accidents ranked second in road accidents countrywide. It constituted about 16 percent of all road accidents (Traffic Police Report, 2010). Panapress [16], reports that between January and September 2009, 2,199 injuries and 407 deaths were recorded; and during same period in 2010, more than 500 human lives were lost and 3,407 people were injured in the country. In Dar es Salaam alone there were 64 deaths from January to June 2010. In Temeke 17 deaths and 103 injured were reported in 163 accidents; in Ilala 23 deaths, 308 injured in 246 accidents and in Kinondoni there were 24 deaths, 205 casualties in 233 accidents [12]. Kimathi [5], reports that the motorcycle accident problem is seriously felt in Dar es Salaam such that special wards for motorbike accident victims have been established to handle the crisis.

“5. Methodology”

The study employed a survey design. Both qualitative and quantitative methods were used in data collection and analysis. The study was conducted in Kinondoni municipality, Dar es Salaam city Tanzania. Kinondoni is located at latitude 6° 42' 43" S and longitude 39° 07' 54" E.

Data from victims of motorcycle accidents was obtained from Muhimbili National Hospital (MNH). MNH is the referral hospital where most of the accident victims are taken to, following the presence of a specialized orthopedic unit (Muhimbili Orthopedic Institute, MOI). Simple random sampling was employed in selecting the sample population of motorcycle riders at the stations and motorcycle accident victims at the hospital. A survey was also conducted at Oysterbay traffic police to obtain available statistics on motorcycle accidents and other relevant information on the subject matter.

Secondary data (literature review) was obtained from different sources including special sources, journals, newspapers, websites and other published and unpublished materials. First-hand information was obtained from the field using questionnaire, in-depth interview, observation and focus group discussion.

“6. Findings”

The study revealed that factors for motorcycle accidents can be categorized into three groups namely human, technical and environmental. However, human factors grasp a substantial part in causing motorcycle accidents.

6.1 Factors of motorcycle accidents

Human Factors

Age, gender, low level of education, lack of training to motorcyclists, lack of riding experience and terms of employment and income are among the precipitating factors. Also, issues such as excessive use of alcohol, careless driving, riding with high speed and intentional offences (which are influenced by human behaviour) propel accident occurrences.

The study disclosed that majority of motorcycle accident victims are younger (male) motorcyclists. Results show that within 12 months before the research, 87.5% of motorcyclists aged below 20 got into accidents while none of the riders aged 50-59 did during that period as indicated on the table below:

Table 1: Age of respondent against accident occurrence

Age groups (years)	Got into accidents (percentage)	
	Yes	No
Below 20	87.5	12.5
20-29	47	53
30-39	33	67
40-49	17	83
50-59	0	100

Source: Field research, 2012

At the hospital, it was found out that 55.5% of the wounded motorcyclists admitted belonged to the age group 20-29 years which was the lowest age group during the study. It was noted also that the lower the level of education, the higher the rate of accidents. As a sub category, primary school education group had the highest proportion of accident occurrences (51%) than secondary and tertiary education which comprise of 36% and 50% respectively.

The study also revealed that more than two thirds of the motorcyclists are not professional. Only 29% of them were trained by authorised trainers (driving schools) and possessed driving certificates. A large proportion (39%) constituted self-taught

motorcyclists while 32% were simply coached by colleagues or relatives.

In this study it was found out that in total, more than two thirds of the motorcyclists in Kinondoni municipality (72.4%) did not own motorcycles, they worked for others. Ownership might have impact in motorcycle transport business especially when the motorcyclist is required to submit a specified amount of income to the owner. Results of the study show that the proportion of non owners who had been involved in accidents was 30.1% (16 out of 53) while the proportion of owners under this category was only 25% (8 out of 32). A hundred percent (2 of 2) of the riders who were required to submit Tshs. 15,000 per day to the owners (which was the highest amount of revenue found during the study) had been involved in accidents and they claimed that high speed was the cause of the accidents. This was an indication that the motorcyclists made extra efforts to obtain the required amount.

Environmental Factors

Environmental conditions were observed to cause motorcycle accidents as well. Data obtained during the study indicated that 13.5% of motorcyclists who had been involved in motorcycle accidents reported environmental factors to be the causes. The reported environmental factors that caused accidents were the infrastructure which included poor road design, slippery road and lack of road signs (8.1%), vegetation (3.4) and animals (2%). Steep slopes, potholes and road bumps were reported also to be affecting the speed and stability of the motorcycle, causing the motorcyclist to lose control and run into an accident. Slippery vegetation such as short grass and animals such as cows and dogs crossing the road also do cause motorcycle accidents.

The terrain and surface form of an area are among the on-site conditions that cause motorcycle accident disasters especially when the motorcycle is at high speed. A larger proportion of the respondents from this study (78.1%) exposed that there was high rate of motorcycle accidents on paved roads than on unpaved roads. About 47.1% noted that motorcycle accidents occur along paved highways with heavy traffic congestion while 31% revealed that accidents occur on paved highway at the junctions. Paved roads enable motorcyclists to ride with high speed devoid of fear of potholes, gravels or ditches. As a result, motorcycles end up colliding with other vehicles since such roads are used by all kind of motorised transport hence congested.

6.3 Technological factors

A traffic police officer revealed that, occasionally motorcycles have mechanical faults

which cause up to 20% of motorcycle accident disasters. Lighting systems, braking system, reflectors and wheels are among the defects that cause motorcycle accident disasters. When lighting system is out of order, it causes short vision to the motorcyclist especially during the night. Poor reflectance also prohibits other road users to see the motorcycle at a distance, making it difficult to act upon accident avoidance. Overloading, especially with multiple riders also accelerate mechanical defect on the motorcycle.

6.2 Impact of Motorcycle Accidents

Motorcycle accidents have been affecting the people (individuals, families and communities) and the economy. Reported impact of motorcycle accidents included death, injury, or disability; hence there is loss of labour force, increase of dependency ratio and, decline of productivity and efficiency. Report from Kinondoni police traffic division indicated that in 2011, there were 1115 motorcycle accidents in Kinondoni municipality (Kinondoni Police Region), whereby 64 of them were fatal. A total of 48 people died (46 men, 2 women) and 511 were injured (477 men, 34 women). Ninety seven cases were taken to court and a total of Tshs 12,360,000 was paid as fine (From accident record file, Kinondoni region, traffic police division, prepared in January, 2012).

On the other hand, huge amounts of money were redirected to medical expenses for treatment of the victims. In case of death, more resources were redirected to funeral services. This was observed during interview with a medical doctor at MOI who said:

“Motorcycle accidents have increased the institute’s expenditure in terms of treatment costs and overtime charges that workers have to be paid. Minimum rate for one patient at the ICU is Tshs. 100,000 per day! You can imagine the cost of treating at least three motorcycle accident victims at the ICU for one month. Worse enough, majority of the victims are the younger people, the productive force. To the economy, this is double effect; increased medical expenditure and loss of manpower! I don’t think the decision to allow motorcycles for public transport came at the right time.”

Usually before the victim’s full recovery, production time is lost. An injured person cannot carry out his/her normal duties. Most of the victims at the hospital complained of wasting time and financial resources, making their living conditions harsh. Motorcycle accidents affect the economy through damage of motorcycles. Once the motorcycle is

damaged the motorcyclist temporarily or permanently loses his job. Their income generation ceases.

Respondents revealed that accidents affect other people too; especially family members who spend their time and finances to take care of the accident victims. The only woman among the accident victims complained that she is unable to take good care of her two children as she was hospitalized for about a month.

Motorcycle accidents also affect victims psychologically. The doctor at MOI revealed that motorcycle accidents impose inferiority among those who become disabled. The victims start to avoid social gatherings such as ceremonies, funerals or meetings, feeling that they are abnormal, they look strange.

“7. Discussion”

7.1 Human factors

This study presents almost similar results to other studies conducted in other places. Human factors seem to constitute large proportions in causing motorcycle accidents. Hurt et al [2] reported from Los Angeles that the largest proportion (70%) of motorcycle accidents constituted riders with age of 18-34, 57% of riders who involved in accidents were self taught and 27.3% were taught by families and friends and 57.4% of accident occurrences comprised of motorcyclists with riding experience of 0-7 months. Kasantikul [4] pointed out that in Thailand, motorcyclists within the age group of 21-30 represented the largest proportion of accident victims which was 35.4%. Seventy six percent of motorcyclists involved in accidents were self taught while 22% were taught by families and friends. In the case of experience, motorcyclists with 1-6 months riding experience comprised of the largest proportion (35.8%) of those who had accidents. Kudebong [7] noted that motorcycle victims in Ghana were mostly in their productive age group, but did not mention specific age groups.

Odera [14] observed that motorcycles are emerging as important means of public transport in many African cities, but he noted that their operations are characterised by, among other things passenger overloading. From Tanzania, unidentified reporter of the Citizen newspaper [17] reported that one of the causes of bodaboda accidents is overloading. It is very common to see a bodaboda carrying up to four people as operators strive to maximise earnings at the expense of safety. These incidences show that there is inadequate public transport and also limited

financial resources such that some people decide to share the cost through multiple riders' act.

“8. Summary and conclusion”

Given the rapid population growth, rapid urban sprawl, insufficient road networks and inadequate public transport, motorcycles appear to provide the solution to urban commuters. Many people live far from the main roads; therefore they are not served by public transport. Motorcycle means of transport has become their only hope to and from their residences, workplaces or elsewhere. Motorcycle transport saves time. It is flexible, thus not restricted by traffic jam. The means of transport is cheap to hire compared to others especially taxis. People with different income can afford motorcycle transport. Motorcycles also provide employment to a number of young people in Kinondoni municipality, and increase government revenue through tax collection. However, motorcycle accident phenomena present a disastrous situation on this means of transport. Causes of motorcycle accident disasters are rooted from the social, economic and political facets, therefore mitigation measures must address the root causes from all such facets.

“9. Recommendations”

Should motorcycles continue being used for public transport, the following measures and strategies to reduce accidents must be fully implemented by all stakeholders.

- Motorcyclists must be professionally trained, obtain valid licenses and observe the road safety regulations. Vehicle drivers also must acknowledge the presence of motorcycles on the road and give them their right of way. The traffic police force should conduct frequent inspection to ensure that motorcyclists qualify to ride. Furthermore, there must be enforcement of law to all delinquents of the traffic rules and regulations.
- Public awareness raising campaigns should be launched to educate all road users concerning road traffic rules and attendant safety. Importantly, motorcyclists' awareness on the consequences of irrational behavior and the impact of motorcycle accident disasters should be enhanced. Both the motorcyclists and passengers should adhere to safety rules including use of helmets and evading of multiple riders to reduce vulnerability.
- Owners should give employment contracts to their workers, set a reasonable amount for the returns and pay them satisfactory

wages so as to reduce the tension for income maximization.

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