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Abstract

Motorcycles are increasingly popular as a mode of transport, particularly in rural areas of Kenya, due to affordability and accessibility. However, the rise in motorcycle usage has led to numerous fatal accidents, making it a major cause of death and injuries. This study aimed to determine the main risk traits associated with motorcycle accidents among riders in Kiambu County. The conceptual framework examined the relationship between risk traits as independent variables (over speeding, riding under influence, rider fatigue, experience, motorcycle defects, road conditions, regulatory non-compliance) and motorcycle safety as the dependent variable measured by accident occurrence. The study adopted a quasi-experimental research design, with motorcycle taxi riders in Kiambu County as the target population. Using simple random sampling, a sample of 140 riders was achieved. Questionnaires were used for primary data collection and analyzed quantitatively using SPSS. The findings indicate majority of accidents occurred in bends (32%), roundabouts/junctions (28%), entrances (13%), bumps (12%) and crossings (11%). The main causes were rider misjudgement/inattention (42%), steering issues around bends/junctions (21%), potholes/uneven surfaces (15%), wet/slippery surfaces (10%), motorcycle faults (9%) and intimidation by other vehicles (3%). Majority had little knowledge in riding skills enhancement (42.9%), first aid (45%), health/safety (43%) and accident avoidance (45.7%). T-tests showed knowledge gaps in riding skills ($F=8.320$, $p=0.005$), accident avoidance ($F=4.131$, $p=0.018$), bike maintenance ($F=4.223$, $p=0.042$) and road craft ($F=5.416$, $p=0.012$) were significantly related to accident occurrence. The study concludes the main risk traits are linked to accident-prone locations, rider inattention/misjudgement, and lack of crucial safety knowledge. Recommendations include comprehensive training on navigating risk areas, improving judgment/steering, motorcycle maintenance, first aid, and partnering with authorities to enhance road conditions and implement safety measures through the licensing process.

1. Introduction

Motorcycles are increasingly popular as a mode of transport in Kenya, particularly in rural areas due to their affordability, convenience, and ability to access remote routes (NTSA, 2018; Nyameino & Akama, 2018). However, this rise in motorcycle usage has brought about numerous challenges, with fatal motorcycle accidents being a major cause of death and injuries (NTSA, 2018). Motorcyclists are more vulnerable to road hazards, weather conditions, and crashes compared to occupants of four-wheeled vehicles, resulting in a significantly higher risk of fatalities per mile travelled (NHTSA, 2018; Sisimwo & Onchiri, 2018). The motorcycle safety crisis is not unique to Kenya; it is a global problem. In the United States, over 5,000 motorcyclists died in crashes in 2018, with helmets estimated to have saved nearly 2,000 lives (NHTSA, 2018). Similarly, in India, motorcyclists accounted for 23.1% of all road traffic deaths, with a staggering 250 people dying daily from motorcycle accidents (India Ministry of Transport Report, 2019; Das & Gupta, 2016). Other countries like Nigeria, South Africa, and Uganda have also reported alarming rates of motorcycle-related injuries and fatalities (Emiogun et al., 2016; Adeloye et al., 2016; Annual Crime and Traffic Road Safety Report, 2017).

In Kenya, the situation is equally concerning, with motorcycles being the highest rising cause of road fatalities (NTSA, 2018; MOH, 2018). The World Health Organization (2019) found that 36% of emergency department patients in Kenyan hospitals were victims of motorcycle crashes, with 75% not wearing helmets. Furthermore, numerous crashes result in permanent disabilities or critical bone injuries, putting a heavy burden on families, communities, and the healthcare system. The proposed study on motorcycle safety in Kiambu County aims to build upon existing road safety practices and behavioral interventions to promote motorcycle transport safety, with a particular emphasis on rural areas where data availability and quality may be limited (World Health Organization, 2019).

Motorcycle accidents are a significant problem in Kiambu County, contributing to a high number of patients admitted to accident wards and straining hospital resources (Ngunu, 2015). A preliminary study by the World Health Organization (2018) found that 36% of patients presenting to the emergency department in Kiambu Level 4 hospitals due to road traffic crashes were motorcyclists, and 75% of these patients were not wearing helmets at the time of the crash. This highlights the rising trend of motorcycle crashes and fatalities in the area, necessitating the identification of crash causes and the provision of motorcycle awareness information to riders.

While the National Transport and Safety Authority (NTSA) licensing process covers technical aspects of riding, it lacks mandatory behavioral training (NTSA, 2023). This gap in addressing riders' attitudes, risk perceptions, and decision-making processes leaves new riders ill-equipped to navigate the complexities of the road environment safely (Odiwuor et al., 2015; Nyameino et al., 2018). Given the alarming statistics of motorcycle injuries in Kiambu Level 4 hospitals, this study sought to establish the effect of training behavioral interventions on motorcycle transportation safety among rural motorists in Kiambu County, with the aim of assessing the main risk traits associated with motorcycle accidents among riders in the area.

1.1 Research Objective

To determine the main risk traits associated with motorcycle accidents among the motorcycle riders in Kiambu County

1.2 Research Question

What is the main risk traits associated with motorcycle accidents among the motorcycle riders in Kiambu County?

2. Literature review

2.1 Theoretical Review

The Looked but Failed to See Theory

The "looked but failed to see" theory has been used to explain the occurrence of motorcycle accidents in some earlier studies. The looked but failed to see error according to Sabey and Staughton (1975) refers to a set of circumstances where a driver accounts for an accident in terms of failing to detect another road user in time to avoid a collision. Langham, Hole, Edwards and O'Neil (2012) noted that the size of motorcyclists render them more likely to be obscured by other vehicles. Williams and Hoffman (1999) revealed that statistically, motorcyclists appear to be involved in more accidents where the driver failed to detect them in time. For instance, an analysis of motorcycle crashes in Victoria and South Australia have concluded that the failure of a motorcyclist to see the approaching motorcycle may have been responsible for between 12% and 21% of crashes. Carre and Filou (2014) studied motorcycle accidents in France and found that the great majority of two wheeler injury accidents, representing 70% (1,093 out of 1,554 accidents in the sample), involved a vehicle hitting a motorcycle because the driver did not see the rider. Again, Williams and Hoffman estimated that relatively poor motorcycle conspicuity was a contributory factor in 64.5% of accidents in many countries.

2.2 Empirical Review

The use of motorcycles is growing rapidly in different countries in the world. This is due to the global increase in motorization particularly in low and middle income countries, and the disorganized and inefficient transport systems in many developing countries (Kumar & Barret, 2008). The high levels of unemployment have also forced the youths in these countries to turn to motorcycle transport as a source of income (Peden *et al*., 2014). Rapid growth and use of motorcycle has taken place in different countries globally. This has been attributed to increase of global motorization of low and medium income in these countries as well as disorganized transport system especially in least and developing countries (Kumar & Barret, 2018). Raising levels of unemployment faced by these countries have pushed youths who contribute the highest percentage in these countries have been pushed towards this ready form of employment. Youths in these countries focus on the motorcycle taxi business as ready form of employment (Peden et al, 2014).

In the United States motorcycles constitute three percent of all registered vehicles in United States (NHTSA, 2013). The fatality rate of the motorcycles in USA were seven times more in comparison to the passenger cars occupants. In comparison between 2013 and 2012 the fatality rate of the motorcycle riders and passengers was 1052 in comparison to passenger cars which was slightly lower at 1,005 (NHTSA, 2013). It is estimated that by 2007 there were four million motorcycles registered in United States of America (NHTSA, 2017). Majority of those who own motorcycles in USA is for personal or recreational purposes.

In China, motorcycle ownership grew rapidly between 1987 and 2001. During this period, it increased from 23% to 63%, with a corresponding increase in the composition of traffic fatalities sustained by motorists rising from 7.5% to 19 %(Poi *et al*., 2021). However, in other low- income

and middle-income countries, lack of road safety data means that precise levels of motorcycle rider fatalities are still unknown.

According to studies that were carried out in Netherlands by Mooi (2016), there were clear indication that the level of injuries were high on riders who never used helmet in comparison with those riders who used helmets. The research cited that in Netherlands it is mandatory for all riders to be in helmet whenever they are on the road. The study indicated that over speeding was one of the causes of fatal injuries that were experienced in Netherlands. This was evidenced by the extent of the damage that was inflicted on the helmet.

In Nigeria, the contribution of motorcycles has increased the mobility rate of commuters over the years. By coincidence, the level of danger portends by its usage is also quite enormous judging from the wave of losses suffered as a result of accident arising from the conflict between motor vehicles and motor cycles in most urban centers in the country (Emiogun, Faduyile, Soyemi & Oyewole, 2016). The share of motor cycle in the total number of trips made is quite substantial particularly for low income households.

Starkey (2011) suggests that there is a common pattern of motorcycle use which generally starts in congested urban areas, moves outwards to peri-urban areas and then to larger villages, before reaching remote rural areas. A motorcycle's relative ease of operation on poor rural roads and potential to by-pass obstacles such as muddy surfaces, large pools of water and landslides are considerable advantages in these areas.

In Rwanda, the number of motorcycles started to grow as people returned to Kigali after the 1994 genocide. The sector grew, riders were seen as a means of controlling the urban population through surveillance (Goodfellow, 2015). Reports suggest that up to 4.5% of Kigali's population depend on the service that motorcycle taxis offer for their livelihoods. There are over ten thousand registered motorcyclists in the city, the majority of whom are between the ages of 18 and 35 (Rollason, 2017). As in other countries in the region, motorcyclists in Rwanda are generally of low educational attainment and come from poorer backgrounds and therefore the majority of riders take advantage of leasing agreements with local entrepreneurs. This arrangement has seen the motorcycle sector grow rapidly in Rwanda.

Injuries to motorcyclists are an important but neglected public health concern. Motorcycles' riders have the highest public health burden expressed in disability adjusted life years lost (Onyemaechi, Nwankwo & Ezeadawi, 2018). Many developing countries are facing the problem of a rapidly increasing fatality and disabilities due to injuries with the vulnerable groups enduring the most of it. Motorcycle accidents, among other types of road accidents, form a fatal category of motor traffic accidents. The reported prevalence of motorcycle injuries varies around the world, from 22.8% in China to as high as 62% in Vietnam. In Nigeria, prevalence ranging from 12.8-60% have been reported in different studies and 39.4 % in Kenya

In financial terms, the cost of motorcycle accidents is very high. The World Health Organization estimates that most countries in the world lose between 1% to 2% of their Gross Domestic Product (GDP) in direct costs to all forms of road accidents (WHO, 2010). Majority of road crash adult survivors experience considerable psychological distress and disruption to their lives. Some suffer from post-traumatic stress disorder, driving phobias and related anxiety or affective disorders. A link has been documented between surviving a serious road traffic accident and poor mental health outcomes, especially post-traumatic stress disorder and major depressive disorder (Blanchard & Hickling, 2014). Compared to adolescents, the rate of post-traumatic stress disorder among adults

tends to be higher, with as many as 39.2% of adults meeting criteria for current post-traumatic stress disorder. Having a road traffic accident among older adolescents, was associated with alcohol abuse (Williams, Rheingold, Knowlton, Saunders & Kilpatrick, 2015).

The Glasgow Coma Scale (GCS) was published in 1974 and is widely used for the assessment of a patient's level of consciousness. It provides a more accurate estimation of severity for patients with serious head injuries and enables reliable predictions of outcome. The Glasgow Coma Scale is scored between 3 and 15, 3 being the worst and 15 the best. A Glasgow Coma Scale of 13 or higher correlates with a mild brain injury; 9 to 12, a moderate injury and 8 or less a severe brain injury (Sharma, 2005). The Abbreviated Injury Scale (AIS) is a specialized trauma classification of injuries based mainly on anatomical descriptors of the tissue damage caused by the injury.

It was originally developed for use by multidisciplinary vehicular crash investigators in the 1970s as a standardized injury severity assessment tool (Sharma, 2005). The Abbreviated Injury Scale has two components; the first being the injury descriptor which is a unique numerical identifier for each injury description; and the second being the severity score. The severity score ranges from 1(relatively minor) to 6 (currently untreatable), and is assigned to each injury descriptor. The severity scores are consensus assessments assigned by a group of experts and implicitly based on four criteria: threat to life, permanent impairment, treatment period and energy dissipation.

2.3 Conceptual Framework

The conceptual framework for this study examines the relationship between risk traits (independent variables) and motorcycle safety (dependent variable). The independent variables, or risk traits, encompass factors that potentially contribute to motorcycle accidents. These include over speeding, riding under the influence of substances, rider fatigue, the experience level of the rider, motorcycle defects, road conditions, and regulatory non-compliance. Each of these risk traits may increase the likelihood of a motorcycle accident occurring. The dependent variable, motorcycle safety, is measured by the occurrence of motorcycle accidents. The conceptual framework proposes that the presence or absence of various risk traits can directly impact the level of motorcycle safety experienced by riders in Kiambu County. By identifying and understanding the main risk traits associated with motorcycle accidents, targeted interventions and safety measures can be developed to mitigate these risks and improve overall motorcycle safety in the region.

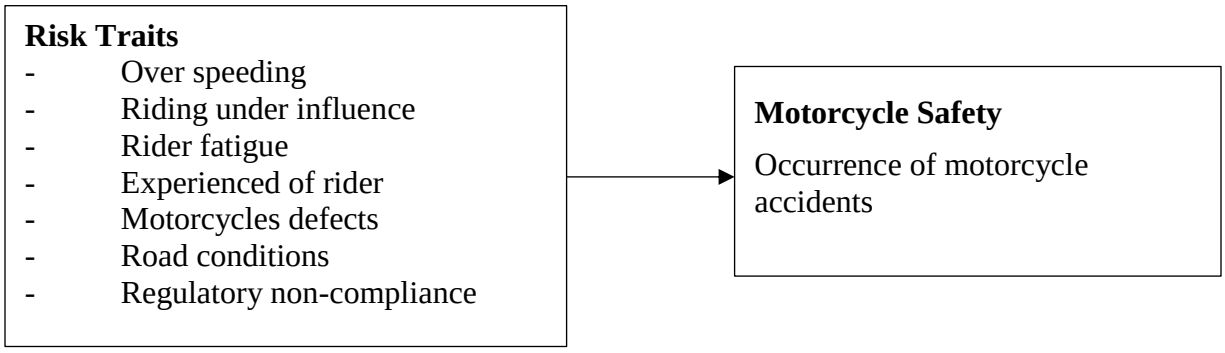

Figure 1: Conceptual Framework

3. Materials and Methods

The study adopted a quasi-experimental research design which establishes a relationship between the cause and effect of a situation. Motorcycle taxi riders in Kiambu County formed the target population for this study. These includes the motorcycle taxi riders in Kikuyu, Githunguri, Gatundu South, Thika and Kiambu Sub Counties for objective representation of the entire Kiambu County The county, comprising 12 sub-counties, served as the study area, with a focus on Kikuyu, Githunguri, Gatundu South, Thika, and Kiambu Sub Counties for diverse representation. A simple random sampling approach was utilized to ensure each individual had an equal chance of selection, promoting fairness and reducing biases in the sampling process. Using the Altman's nomogram a sample size of 140 was achieved. Therefore, motorcycle riders were randomly selected from the riders Sacco.

Questionnaires were used to collect primary data and were administered to the motorcycle riders. Data from this study was analyzed quantitatively. The data was first cleaned then coded by grouping data into responses on independent variables and measures of the dependent variable. Statistical Package for Social Sciences (SPSS) was used to analyze the data. Ethical clearance was sought from Kenyatta University Graduate School and consequently a research authorization was acquired from NACOSTI. Further, Ministry of Transport & Infrastructure officials and health officials in Kiambu County were informed. The research study took into consideration confidentiality, privacy and personal privacy of the respondents along with guaranteeing that the communities in the research place are actually not adversely had an effect on by the study. All data acquired was confidential and made use of for the main function of the research.

4. Results

A total of 140 respondents were sampled for the survey. 140 riders responded in the survey translating to 100% response rate for the rides. The response rate of 100% was deemed adequate for generalization of the study findings to the target population.

4.1 Risk Traits and Motorcycle Accidents among Motorcycle Riders

The section presents the location of accidents occurrence, causes of loss of control related accidents and the knowledge on motorcycle practices. A t-test on the relationship between the knowledge on motorcycle practices and occurrence of accidents is also presented. The results as shown in Table 1 indicate that majority of the accidents occurred in bends (32%), roundabouts/junctions at 28%, entrances at 13%, bumps at 12% and the least was crossings at 11%. Whether on a straight road or in a bend, keeping a vehicle in its lane reduces common crash types such as run-off-road, loss-of-control, side-swipe and head-on crashes.

Table 1: Location of Accidents Occurrence

Loss of Control Accidents	Frequency	Order of prevalence
Rider misjudgment, inattention	59	42%
Steering round bend, roundabout, junction	29	21%
Potholes, uneven road surface	21	15%
Wet/Slippery surface (egg mud, gravel)	14	10%
Motorcycle fault	13	9%
Intimidation' by positioning of other vehicle	4	3%
N=140	140	100

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The results in Table 2 indicate that the causes of loss of control related accidents were rider misjudgment and inattention at 42%, steering round bend, roundabout, junction at 21%, potholes, uneven road surface at 15%, wet/slippery surface (egg mud, gravel) at 10%, motorcycle fault at 9% and the least as intimidation' by positioning of other vehicle at 3%.

Table 2: Causes of Loss of Control Related Accidents

Location of accidents	Frequency	Order of prevalence (%)
Bends	50	36%
Roundabouts/Junctions	39	28%
Entrances	18	13%
Bumps	17	12%
Crossings	15	11%
	140	100

The results in Table 3 indicate that majority at 42.9% had little knowledge in riding skills enhancement while 40.7% had no riding skills enhancement. Further, 45% had little knowledge on first aid training at 45% while 38.6% had no knowledge on first aid training. A further 43% had no knowledge on health and safety in motorcycle riding while 37.9 had little knowledge on health and safety in motorcycle riding. The riders had no adequate knowledge on motorcycle accident avoidance at 45.7% while 41.4% had little knowledge on motorcycle accident avoidance. Under hazard perception, 44.3% had no adequate knowledge while 37.9% had little knowledge. On the maintenance on the motorbikes, 45% had little mechanical knowledge while 44.3% had little knowledge on the road craft to avoid accidents.

Table 3: Knowledge on Motorcycle Practices

Knowledgeable on motorcycle practices	Large Extent	Moderate extent	Little extent	Not at all	Mean	S.D
Riding skills enhancement	10.0%	6.4%	42.9%	40.7%	3.14	0.42
First aid training	12.1%	4.3%	45.0%	38.6%	3.10	0.44
Health and safety	7.1%	11.4%	37.9%	43.6%	3.18	0.39
Accident avoidance	5.0%	7.9%	41.4%	45.7%	3.28	0.30
Hazard perception	7.1%	10.7%	37.9%	44.3%	3.19	0.39
Bike maintenance	11.4%	22.1%	45.0%	21.4%	2.96	0.44
Road craft	9.3%	7.9%	44.3%	38.6%	3.12	0.40

The T-test results for safety knowledge and accident causation are as shown in Table 4. The T-test results indicated that knowledge on motorcycle riding skills was statistically and significance related with occurrence of an accident (F= 8.320, P=0.005). Knowledge on accident avoidance was statistically and significance related with occurrence of an accident (F= 4.131, P=0.018). Knowledge on bike maintenance was statistically and significance related with occurrence of an accident (F=4.223, P=0.042). Lastly, knowledge on road craft was statistically and significance related with occurrence of an accident (F=5.416, P=0.012).

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Table 4: T-test for Safety Knowledge and Accident Causation

Independent Samples Test	Levene's Test for Equality of Variances		t-test for Equality of Means		
	F	Sig.	t	df	Sig. (2-tailed)
Riding skills	8.320	0.005	-2.943	138	0.005
First aid training	5.804	0.170	-1.38	138	0.170
Health and safety	5.351	0.554	-2.522	138	0.013
Accident avoidance	4.131	0.018	-3.124	138	0.026
Hazard perception	7.366	0.546	-2.983	138	0.003
Bike maintenance	4.223	0.042	-1.264	138	0.208
Road craft	5.416	0.012	-3.528	138	0.013

The lack of motorcycle safety knowledge (45.7% lack of or inadequate training) together with need to make enough money for the day might motivate a rider to engage in bad riding practices. This is especially when rules and regulations are not implemented because some concerned institutions are not performing their functions as a team. This may therefore lead to motorcycle related accidents.

Motorcycle accidents can result in a wide range of injuries, which can vary from minor to fatal. The severity of the injuries can depend on many factors, such as the speed of the motorcycle, the type of impact, and the protective gear worn by the rider. Figure 4.1 shows the patterns of motorcycle accident injuries categorized as minor and major. The results indicate that majority of the motorcycle accident injuries were minor at 69% and major at 31%. Despite the minor injuries being relatively less severe and may not require immediate medical attention, they in the long term could lead to further health complications.

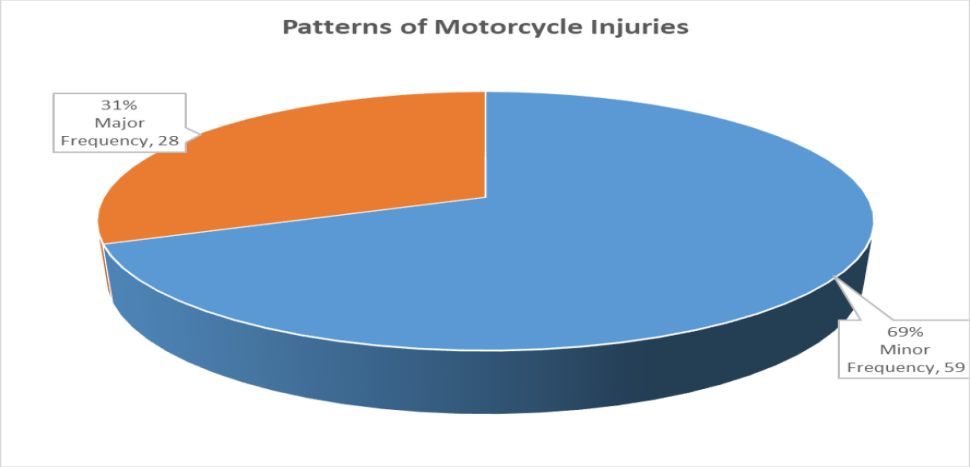

Figure 1: Patterns of Motorcycle Accidents Injuries

The health seeking behavior of motorcycle accident riders can vary depending on a variety of factors, including the severity of their injuries, their access to healthcare, and their personal beliefs and attitudes towards seeking medical attention. Table 5 shows the health seeking pattern from the first to the fifth accident for minor accidents in a health care center. There is reluctance to seek healthcare especially during the first accidents at 20%. The severity of the injuries and the potential

for longterm complications or disability could outweigh any concerns about the cost or inconvenience of treatment.

Table 5: Health Seeking Patten

Accident	Health seeking pattern for minor accidents
1st	20%
2nd	52%
3rd	61%
4th	73%
5th	89%

4.2 Discussion of findings

The objective was to determine the main risk traits associated with motorcycle accidents among the motorcycle riders in Kiambu County. The findings indicate that majority of the accidents occurred in bends (32%), roundabouts/junctions at 28%, entrances at 13%, bumps at 12% and the least was crossings at 11%. The findings indicate that the causes of loss of control related accidents were Rider misjudgment and inattention at 42%, steering round bend, roundabout, junction at 21%, potholes, uneven road surface at 15%, wet/slippery surface (egg mud, gravel) at 10%, motorcycle fault at 9% and the least as intimidation' by positioning of other vehicle at 3%. Majority at 42.9% had little knowledge in riding skills enhancement while 40.7% had little knowledge on first aid training at 45%, 43% had no knowledge on health and safety in motorcycle riding.

The T-tests results indicated that knowledge on motorcycle riding skills was statistically and significance related with occurrence of an accident (F= 8.320, P=0.005). Knowledge on accident avoidance was statistically and significance related with occurrence of an accident (F= 4.131, P=0.018). Knowledge on bike maintenance was statistically and significance related with occurrence of an accident (F=4.223, P=0.042). Knowledge on road craft was statistically and significance related with occurrence of an accident (F=5.416, P=0.012).

Road safety knowledge for riders is important to avoid or reduce accidents. This can be achieved through motorcycle rider training and road safety campaigns. When riders lack formal training it means that motorcycle safety knowledge is limited thus jeopardizing their safety and that of other road users. The riders are not able pay for training and therefore may not be well vast in safety knowledge and riding skills. Furthermore, most riders did not understand how important the three aspects of personal safety, mechanical and behaviour affect motorcycle safety.

From the driving schools' officials, the emerging theme was lack of formal training for riders and therefore lack of information on road safety and how to avoid traffic accidents. Another theme was that riders were not conversant with traffic rules and this compromised safety. It also emerged that many riders were previous bicycle *boda boda* riders without training and did not adhere to traffic rules. Many of the riders did not have safety gear and those who had them did not use them perhaps because of lack of understanding of their importance.

These findings are consistent with other studies in Africa. Obara (2009) found out that motorcycle riders lacked knowledge on road safety; Kumar (2011) observes that, motorcycle safety standards were compromised. Urban roads and highways were increasingly unsafe as riders who were not cautious or knowledgeable about traffic rules and regulations, compete on the streets for

customers. Konings (2016) also points out that many *bendskin* riders did not know the most elementary rules.

Knowledge of motorcycle safety should be able to reduce the high incidences of traffic accidents involving that most respondents had low level of motorcycle as the structural functionalist theory suggests, the institutions charged with the responsibility of collaboration to ensure this function is performed can be disseminated to safety knowledge may improving motorcycle safety.

Mechanical conditions of motorcycles are an important aspect in motorcycle safety. Despite that, riders did not prioritize it accordingly in this study. This suggests that riders did not think much of mechanical conditions of motorcycle they rode. Even when they indicated knowledge they did not put it to practice, they still used faulty motorcycles. The *boda bodas* were mostly serviced by the owners whenever they found it necessary. The respondents claimed that if a rider was ferrying a passenger and the motorcycle developed a mechanical problem mid-way, the rider had to get the customer to his/her destination first before attending to the problem. Failure to do that, they claimed that the customer would refuse to pay for the distance covered. The respondents reported that since they had a financial target to meet, they would ride on to the pillion passenger's destination.

A helmet is a crucial safety gadget and was the most used as compared to others such as boots, gloves and protective jackets. The mechanical conditions of motorcycle did not receive the much attention it required. Also, the fact that one required money to fix whatever mechanical problem there was, made it hard for the riders to deal with the mechanical problem as soon as was necessary. The loss of income as one attends to the mechanical problem was also deemed a challenge.

Under health seeking behavior, the results indicate an upward trend for seeking healthcare in as the number of the accidents increases. There is reluctance to seek healthcare especially during the first accidents at 20%. In some instances, riders who experience minor injuries may be hesitant to seek medical care due to concerns about the cost or inconvenience of receiving treatment. They may also downplay their symptoms or delay seeking care, assuming that their injuries will heal on their own. However, riders who experience more severe injuries, such as broken bones, head trauma, or internal injuries, are more likely to seek medical attention immediately (Ogendi, Odero Mitullah and Khayesi 2013). In these cases, the severity of the injuries and the potential for longterm complications or disability often outweigh any concerns about the cost or inconvenience of treatment.

Access to healthcare can also play a significant role in the health seeking behavior of motorcycle accident riders. Riders who live in areas with limited access to medical facilities or who lack health insurance may be more likely to delay or avoid seeking care, even if their injuries are severe. In addition, personal beliefs and attitudes also impact health seeking behavior. Some riders may view seeking medical attention as a sign of weakness or may have cultural or religious beliefs that discourage them from seeking care (Odiwuor, Nyamusi & Odero, 2015). In contrast, other riders may prioritize their health and view seeking medical attention as a necessary step in their recovery.

It is evident that there is low level of motorcycle safety knowledge, this is in regard to safety measures, overloading, helmet use and *boda boda* speed. There is need therefore to ensure safety knowledge is disseminated to the riders in order to reduce motorcycle related accidents.

5. Conclusions

The study concludes that the main risk traits associated with motorcycle accidents among riders in Kiambu County are primarily linked to specific locations and rider inattention or misjudgment. Accidents predominantly occur in challenging areas such as bends, roundabouts, junctions, entrances, and near bumps. The key causes include rider misjudgment, steering issues around bends and junctions, poor road conditions like potholes and slippery surfaces, and mechanical faults in motorcycles. A significant lack of knowledge in crucial areas such as riding skills enhancement, first aid, health and safety in motorcycle riding, and bike maintenance correlates strongly with the occurrence of accidents. This highlights the need for comprehensive training and awareness programs focusing on these specific risk traits to reduce accident rates effectively.

6. Recommendations

The findings suggest the need for comprehensive training and awareness programs addressing specific risk traits associated with motorcycle accidents. Training should be tailored to improve riders' skills in navigating challenging areas such as bends, roundabouts, and junctions. There should be an emphasis on enhancing judgment and steering skills, as well as educating riders about the importance of regular motorcycle maintenance to prevent mechanical faults. Implementing courses on first aid, health and safety, and bike maintenance as part of the licensing process could be highly beneficial. Partnerships with local government bodies and traffic authorities to improve road conditions, such as repairing potholes and ensuring proper signage, would also contribute significantly to reducing accident rates.

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