Factors Associated with Accidents Involving Commercial Motorcyclists in Migori Town, Kenya

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*Abstract:-*Transport services offered by commercial motorcyclists present a number of advantages to users. The advantages range from affordability to flexibility. However, commercial motorcyclists have continued to operate in fear of their lives. This is due to increasing number of cases of road accidents involving them and other road users. This study uses a descriptive survey research design targeting commercial motorcyclists registered with Migori town Motorists Sacco limited. One hundred and ninety fiveriders were randomly sampled while fivekey informants were purposively identified.Pretested structured questionnaires were administered to sampled riders to collect quantitative data and in- depth interviews to gather qualitative data. The likelihood of a rider with a riding license, not being involved in accident was 7.2 times higher than those who do not possess riding license. The likelihood of respondents in age group 31 to 42 years not being involved in accident was 7.5 times higher than those who are aged over 54 years. Rider in age group 43 to 54 years were 5.6 times likely not to be involved in accident compared to those aged over 54 years. The study recommends that both existing and potential commercial motorcyclists undergo rider formal training in driving schools as a way of reducing commercial motorcyclists' accidents involvement.

Keywords: Accidents, commercial motorcyclists, riding license, mode of training

I. INTRODUCTION

The devastating and growing numbers of motorcycle related accidents on our roads presents safety concern to government agencies, motorcyclists, motorcycle passengers and other road users. Road accidents are known to be responsible for a large proportion of orthopedic patients in some hospitals (Ogunjumo, 1990; Gbadamosi, 2006). In U.S.A motorcyclists were 27 times likely to die and almost 5 times likely to be injured in a road accident compared to other road users (NHTSA, 2013), but their conducts while riding that leads to road accidents remains unknown.

In Kenya, a study conducted by World Health Organizations on accident injuries at Kakamega County Referral Hospital revealed that most patients were as a result of motorcycle related accidents (WHO, 2009). A lot has been written on motorcycle related road accidents in Kenya. Much of the reported motorcycle accidents are caused by careless riding by motorcyclists (Obara, 2009). According to Odera et al., (2003) nearly 3,000 people are killed annually on Kenyan roads. However, despite several studies on motorcycle related accidents, there is paucity information on factors associated with accidents involving commercial motorcyclists while operating motorcycles in busy traffic roads like Migori town.The purpose of this study, therefore, was to explore factors associated with accidents involving commercial motorcyclists in Migori town, Kenya.

II. LITERATURE REVIEW

2.1 Rider Formal Training and Involvement in Accidents

General public believe that a panacea too many road safety problems, specifically in regard to novice rider crash involvement is the training of the riders. However, with the strong believe vested on rider training on the ability to reduce accident, the notion is not well supported by empirical research, with reviews suggesting very little benefit from formal training and educational programs in terms of crash reduction for drivers or motorcyclists (Christtie, 2001; Haworth and Mulvihill, 2005; Mayhew, Simpson and Robinson, 2002; Watson et al., 1996). The overconfidence following training may also potentially impact on subsequent crash involvement (Gregersen, 1996; Hatfield and Job, 2001). Training for long has been entirely focused on motorcycle control skills and traffic awareness, with little attention to attitudinal and behavioral issues. This kind of training may possibly fail to recognize different training needs of motorists thus this negatively influence the effectiveness of training on road accident reduction.

Recklessness riding, indiscipline and lack of respects for other road users by motorists who are youthful, are the major cause of motorcycle accidents in Uganda. They rarely wear helmets hence can easily get head injuries in case of an accident. The government of Uganda introduced motorists' training, and restriction of alcohol abuse to reduce risks of motorist's related accidents. Motorists in Malaysia suffer the neglect of wearing helmet and the proportion is about sixty percent of all road fatalities. A study in Malaysia further denotes that young age of the motorcyclists is one of the major factors behind motorists' accident most possibly due to lack of experience.

In Kenya, there is a weak legal framework put in place for training and certification of both drivers and riders (Kisia, 2010). Kenyan legislation provides that motor vehicle drivers can receive driving training from any registered driving school. This means that any one holding a driving license can train others how to drive. Moreover, there is lack of a standard

curriculum for drivers. There is also no requirement for proof of good health when one gets admission for driving training (Kisia, 2010). Given casual way in which training and certification is done, it is not surprising that drivers are the major cause of road crashes in Kenya (Chitere, 2004).

The major concern to Kenyan about driver's or rider's training institutions is their competence and capacity. Most of the training institutions are ill equipped and not properly staffed to offer effective training. Conditions in most of the training centers are worse. The situations in question ranging from poor remuneration of instructors, low morale for instructors as they train, this makes the qualified instructors to keep moving for search of greener pastures. According to Odera et al., (2003) cyclists also cause crashes mainly due to ignorance of road traffic signs and signals as a results of poor training.

2.2 Rider Alcohol Use / Drug Abuse and Involvement in Accidents

In Australia, there is proof to indicate that motorists' drink-drive remains a problem of safety to motorcyclists due to excessive influence of alcohol makes them have serious crash (National Health and Medical Research Council, 2001). Impairment caused by alcohol consumption is potentially risky for motorists compared to car drivers due to balance and awareness required to ride in the traffic environment. Adverse effects of alcohol at legal BACs have been found for obstacle avoidance for motorists (NHTSA, 2008).

According to Anderson (2007) countries like Netherlands, Finland, Estonia and Belgium try to measure the distribution of alcohol levels among the riders so as to overcome drug and substance abuse among the motorists. The data from this survey was used by the Netherland Government to estimate yearly number of accidents from drunk- riding (Anderson, 2007).

Alcohol use is known to have negative effect on drivers and riders as it impair their performance and it is implicated more frequently in fatal crashes than non-fatal crashes (Siskind et al., 2011). Moreover, motorists are involved in road crashes mostly at lower BAC than car drivers (Sun, Kahn, and Swan, 1998). Studies have it that impairment at motorcycle operation under the influence of low dose (less or equal to 0.08 percent) BAC. Factors responsible for crash occurrence and injury related to motorcycle accidents are among other factors; young age, lack of experience, operating borrowed motorcycle, alcohol consumption, blood spot roads, poor road conditions (Haworth et al., 2008).

2.3 Rider Experience and Involvement in Accidents

In Australia, unlicensed or unregistered riding is particularly common among younger motorcyclists. A recent Victorian study shows that 45 percent of riders below 21 years are hospitalized following crashes recorded on the hospital files. Younger riders tend to lack patience and also lack experience

of ridding the motorcycles with the over speeding which is witnessed amongst them.

In single vehicle accidents , motorcycle rider error was present as the accident precipitating factor in about two – thirds of the cases , with the typical error being a slide out and fail due to over braking or running wide on a curve due to express speed or under – cornering due to lack of experience on riding of motorcycle among the motorists. Also, those riders are generally unfamiliar with motorcycle operation.

In Western Kenya, for instance, Kakamega County, a study conducted by World Health Organization on 'motorcycle accidents injuries seen at Kakamega Hospital in Kenya' revealed that many patients were as a result of motorcycle related accidents (WHO, 2009). The study further indicated that young riders are usually involved in over speeding which boasts the risk of getting into accidents (WHO, 2009). According to Wilson et al., (2010) over 90 percent of motorcyclists involved in an accident do not have formal training instead rely on family , friend or being self-taught. As a result motorcycle riders between the age of 16 and 24 are significantly overrepresented in accident; motorcycle riders between the ages of 30 and 50 are significantly underrepresented.

2.4 Rider Conversance of /Adherence to Traffic Laws and Involvement in Accidents

Developing economies have high levels of road accidents which are accounted for by many factors like road designs and most importantly the driver / rider behavior. In Saudi Arabia over 50 percent of road accidents are caused by speeding of the drivers / riders. Other causes include not obeying road traffic signs and using incorrect methods of overtaking, u – turning and parking; an insignificant number was caused by alcohol and use of mobile phones while riding (Ansari, Akdaar, Mandoorah and Moutaery, 2010).

In Korea 64 percent of road accidents are caused by reckless driving and or riding which includes alcohol, violation of traffic signals, driving too close a vehicle and motorcycle or either, improper driving at intersections , and violation of pedestrian protection (Yang and Kim , 2003). According to Shah, Khoumbati and Soomo (2007), the main cause of road crashes in Parkistan accounted to 31percent on vehicles hitting pedestrians and motorcyclists operating close to the moving motor vehicles while 19 percent are caused by over-speeding.

In South Africa an average of 85 percent of fatal crashes that occur every year are as a result of human error including over speeding and pedestrian jay – walking. Further, most road accidents take place after 1700 hours in Namibia and South Africa (Namibia MVA Fund Report, 2009; Gainewe and Masangu, 2010). This is due to lack of visibility and undesirable behavior of the motorists and drivers in the dark when human policing is absent. According to Mupimpila (2008: 1) a combination of over speeding, overloading, drinking and ridding, listening to music installed in the

motorcycles are the major causes of road accidents in Botswana.

Most motorcyclists suffer the risk of involving in a road accident since they either lack proper knowledge required for traffic rules and regulations or motorists simply ignore them to make them take carry the day; the requirements like use of helmet are not put into practice by motorcycle riders near across the world. Most effective intervention currently available to reduce motorcyclists' injuries in crash is the use of helmet while riding. The introduction of compulsory wearing of motorcycle helmets in Australia in the 1960s resulted in a substantial decline in serious head injuries sustained by motorists (Nairn, 1993). Many contemporary analyses also address the efficacy of helmet usage. The majorities of these describe a more serious situation, focus on United States which repealed or weakened their mandatory helmet wearing laws, leading to 40 to 50 percent decrease in helmet wearing involvement and a subsequent increase in the frequency of serious head injuries (Chenier and Evans, 1987).

Majority of motorcyclists who get involved in on – road crashes are unlicensed or riding on unregistered motorcycle. Data from the US Department of Transportations' Fatal Accident Reporting Systems (FARS) shows that the percentage of fatality injured motorcyclists who were either unlicensed or improperly licensed between 1983 or 1989 ranged from 39 to 42 percent. The problem is severe in Carlifonia where the incidence of improperly licensed motorcyclist fatalities ranged from 39 to 63 percent over the same time (Nairn, 1993). In Australia, unlicensed or unregistered riding is particularly common younger motorcyclists. A recent Victorian study shows that 45 percent of riders below 21 years are hospitalized following crashes coded on the hospital files.

In Kenya, there is a weak legal framework put in place for training and certification of both drivers and riders. Kenyan legislation provides that motor vehicle drivers can receive driving training from any registered driving school. This means that any one holding a driving license can train others how to drive. Moreover, there is lack of a standard curriculum for drivers. There is also no requirement for proof of good health when one gets admission for driving training (Kisia, 2010). Given casual way in which training and certification is done, it is not surprising that drivers are the major cause of road crashes in Kenya (Chitere, 2004).

III. METHODOLOGY

3.1 Research Design

The study employed a descriptive research design. Descriptive survey research designs are used in preliminary and exploratory studies to allow the researcher to gather information, summarize, present and interpret for the purpose of clarification (Orotho, 2002). A study by Onserio (2014) used a similar design to establish factors influencing accidents rates among motorcycle operators in Kisii town. Descriptive survey research design is the most appropriate especially when the purpose of study is to create a detailed description of an issue (Mugenda and Mugenda, 1999). Descriptive survey research design also helped in the study to gather original data for the description and measurement of characteristics of a population which is not easy to be observed directly. Moreover, the design allows inductive and deductive reasoning so as to arrive at generalizations.

Accidents involving commercial motorcyclists in Migori town are practices and conditions that already exist among riders. This study fitted in the provisions of descriptive surveys research design because the researcher collected data and report findings without modifying any study variable. Thus, a survey research design was considered appropriate for this study.

3.2 Sample Size and Sampling Technique

3.2.1 Sample Size

Israel (1992) noted that a sample size can be determined using different approaches such as census for a small population, imitating a sample size of similar studies, using published tables, and applying formulas.

The sample size of this study was computed as shown by the formula:

$$n = N \div [1 + N (e)^2];$$ where n is the sample size required, N is the population size and e is the level of precision (Yamane, 1967).

$$N = 380, \text{ and } e = 5 \text{ percent } (0.05)$$

Therefore, $\quad n = 380 \div [1 + 380(0.05)^2] = 194.87$

Thus, sample size of 195 riders

3.2.2 Sampling Technique

The researcher stratified the entire Migori town commercial motorcyclists who are registered with Migori town commercial motorcyclists Sacco limited. This was done by segregating the commercial motorcyclists registered with the Sacco limited into homogenous groups based on their stages or routes of operation. According to Hunt and Tyrrell (2001), stratification is ideal since it is able to give the most representative sample of a population. Thereafter, all the stratified stages (strata) were subjected to a lottery method so as to pick thirteen (13) stages to be included in the study. The number of stages was consistent with the earlier studies conducted in Kisii and Kakamega by Onserio, 2014 and Luchido, 2013 respectively. This was then followed by a non-proportionate simple random selection of fifteen (15) commercial motorcyclists riders from each stratum identified. Thus, a total of one hundred and ninety five (195) commercial motorcyclists were selected to participate in this study.

In addition, a purposive sampling was used to identify five (5) key informants of the study to take part in this study.

3.3 Data Collection Instruments

3.3.1 Questionnaires

Self-administered questionnaires were used to establish the link between rider attributes and accidents involving commercial motorcyclists. Questionnaires are suitable for data collection since the instrument ensures high response rate at a low cost (Mugenda and Mugenda, 1999). Further, questionnaire was appealing for this study since it is anonymous and can help to generate candid answers.

To test reliability of the questionnaire, Cronbach's coefficient alphas were computed; the obtained alpha values ranged from 0.78 to 0.84. The alpha values are acceptable as they exceeded the 0.7 threshold as recommended by Gliem and Gliem (2003).

3.3.2 Interview Guides

The interview guides comprised of six questions for key informant of the study. An interview makes it possible to get information needed to achieve specific objectives under study (Mugenda and Mugenda, 1999). It was also used, since it gives the researcher opportunity for probing the interviewees, consequently taking care of the weaknesses of questionnaire. The interview guide was used by the researcher to carry out in – depth interviews to the five (5) key informants of the study.

3.4 Data Collection Procedures

3.4.1 Administering Questionnaires

Structured questionnaires were used to collect quantitative data from commercial motorcyclists to identify factors associated with accidents involving commercial motorcyclists in Migori town. However, to riders who were not conversant with the English language used in the questionnaire, the research assistant verbally translated the questions to a language preferred by the respondent.

3.4.2 Interviewing Key Informants

The qualitative data were collected using in – depth interviews from key informants of the study. In – depth interviews are qualitative data collection technique conducted on one to one basis (Knodel and Walle, 1979). In this technique, respondents are allowed to give their subjective interpretations of subjects and the interviews are normally conducted based on a prepared guideline. The conversations verbatim of the in – depth interviews were recorded by the researcher using note taking.

3.5 Data Analysis

3.5.1 Quantitative Analysis

Data was analyzed using statistical package for social sciences (SPSS) version 20.0 and supplemented with Microsoft Office Excel 2010. The SPSS computer program was chosen because of its statistical capabilities and popularity in social sciences research (Bryman and Bell, 2007).

The association between dependent variable and individual independent variable was tested using cross tabulation. Because of random sampling, homogeneity and categorical nature of study variables, the researcher used Pearson chi- square and Fisher's exact test appropriately to test for association between the variables. A probability value of ≤0.05 was considered statistically significant.

A multivariate analysis is also used to examine the net effect of the predictor variables on the dependent variable using logistic regression model. Logistic regression model is useful because of its ability to analyze categorical dependent variable and it is statistically vigorous (Homer and Lemeshow, 2000; Agresti, 2007).

The logistic regression model is summarized as:

Logit P (accident involving commercial motorcyclists) = $\alpha + \beta_1$ rider possession of riding license + β_2 rider mode of training + β_3 age of rider + β_4 riding duration + β_5 rider alcohol use + β_6 rider drug abuse +β_7 rider conversance of traffic laws + β_8 rider adherence to traffic laws.

Where:

α = constant of the equation

β = the coefficient of the predictor variables

3.5.2 Qualitative Analysis

Qualitative data was analyzed using content analysis approach. This approach help make sense to a set of texts which are generated in the interview scripts (Silverman, 2006). Content analysis establishes a set of categories, and then this is followed by counting the number of instances that fall into each category. This was then followed with a data processing activity flows as recommended by Miles and Hubernam (1998): data reduction, data display, and verification and conclusion. The qualitative data was used to reinforce the quantitative data, where some of the reported statements by key informants of the study were quoted verbatim.

IV. STUDY FINDINGS AND DISCUSSIONS

4.1 Rider Formal Training and Involvement in Accident

This variable was measured on the basis of; rider possession of riding license and rider mode of training.The findings as shown in Table 4.2 ,reveals that, among the surveyed respondents, about 5 percent (n = 2) of commercial motorcyclists who have ever been involved in accident reported possession of riding license compared with 95 percent (n = 35) of those surveyed respondents who had never been involved in an accident. Thirty four percent (n = 43) of the surveyed respondents who had been involved in accident indicated that they do possess riding license compared with 66 percent (n = 85) of those surveyed respondents who had never been involved in an accident while operating motorcycle.

These statistics basically indicate that commercial motorcycle riders who did not have riding license were more likely to be involved in accident compared to their counterparts who possessed riding license. The analysis also showed that, the association was statistically significant as chi – square (X^2) = 11.498; df = 1; p < .05.

Table 1: Percentage Distribution of Rider Possession of Riding License by Accident Involvement

	Ever been involved	Never been involved
Rider possession of riding license		
Have	5.4 (n = 2)	94.6 (n = 35)
Don't have	33.6 (n = 43)	66.4 (n = 85)

Note: Chi - square (X^2) = 11.498; df = 1; p = .001; N = 165; No missing case

Source: Field Data, 2017

On rider mode of training, Table 2 indicates that, among the commercial motorcycle riders who acquired riding skills through driving / riding school, 100 percent (n = 17) of them had never been involved in accident while riding motorcycle in Migori town. Thirty percent (n = 45) of the respondents who had ever been involved in accident compared with 70 percent (n = 103) of those who had never been involved in an accident learned how to ride a motorcycle from other places which did not equip them with formal training. The analysis further showed that, the association was statistically significant (p < .05).

Table 2: Percentage Distribution of Rider Mode of Training by Accident Involvement

	Ever been involved	Never been involved
Rider mode of training		
Driving/riding school	0.0 (n = 0)	100.0 (n= 17)
Other places	30.4 (n = 45)	69.6 (n = 103)

Note: Fisher's exact test (p = .007); N = 165; No missing case

Source: Field Data, 2017

The association witnessed between rider formal training and accident involvement among commercial motorcyclists was also confirmed by majority of key informants during in-depth interviews (IDIs) carried out by the researcher to all the five key informant of the study in their respective offices in the town.

One interviewee, during IDIs, however, held a different opinion. The interviewee argued that, formal rider training does not necessarily translate to lower involvement in accidents. The interviewee stated that, in spite of the fact that many commercial motorcycle operators have no formal training; most of them have never been involved in an accident. The interviewee also noted that there are a few riders who have had formal rider training and are licensed to ride and yet have been involved in accidents.

The interviewee stated as follows with reference to rider formal training and involvement in accidents:

"What is important in my view is knowledge of traffic rules and regulations, which someone can learn even without getting formal education… one, can learn how to ride competently by training in an informal environment" (KI – Motorists Sacco Official, Migori town).

Having a driving license is often closely associated with attending driving school as noted by Mayhew and Simpson (2002). In this regard, having a driving license is often assumed to be proof that an individual has undergone formal training to become a driver or rider. Against this assumption, the results of this study reveal a weak correlation between how one learns to ride and their possession of a riding license. What this basically means is that attending driving school is not strongly associated with having a riding license.

The study findings indicate that there is a significant difference in involvement in accidents between those holding a riding license and those who have no license to ride. As noted by Mayhew and Simpson (2002), the principal aim of driver training and education programs and licensing is to produce safer drivers - drivers who will be less involved in accidents. It is generally assumed therefore those drivers who have gone through formal education and training programs should be less involved in accidents compared to their counterparts who have not received such training. The findings of this study are consistent with these assumptions much as they are inconsistent with a number of studies that have failed to show any positive effect of such programs on safety and non-involvement in accidents.

A study by the John Hopkins School of Public Health, for example, indicated that formal training that results in early licensure of individuals is linked to higher accident rates among young drivers (Mayhew and Simpson 2002).

The findings by the John Hopkins School of Public Health is consistent with another study by Roberts and Kwan (2002) whose results indicated that there was no proof that formal training reduces involvement in accidents but rather led to a modest but potentially vital rise in the proportion of traffic accidents, especially among teenagers.

In an attempt to explain why there is no association between how a person learnt how to ride and accident involvement, Haworth and Mulvihil (2005) suggest that the skills learnt during formal rider training (as done in a driving/riding school) are limited to traffic awareness, traffic rules, and practical control of motorcycles, and to a great extent preclude those related to behaviour and attitude. The suggestion by Haworth and Mulvihil (2005) that behaviour and attitude could be applied in explaining the high rate of non-involvement of respondents who did not undergo driving school training in accidents as evident in the findings.

Several other studies also have found strong positive correlations between rider formal training (Christtie, 2001; Haworth & Mulvihill, 2005; Mayhew, Simpson & Robinson, 2002; Watson et al., 1996). As suggested by Hatfield and Job (2001), the low accident cases experienced by those who have

undergone formal training could be attributed to their traffic awareness, knowledge of traffic rules and signs and motorcycle control skills.

4.2 Rider Alcohol Use / Drug Abuse and Involvement in Accidents

This variable was measured on the basis of; rider alcohol use and rider drug abuse.Table 3 indicates that, twenty seven percent (n = 13) of the sampled commercial motorcyclists who had been involved in an accident indicated that they consume alcohol during riding period compared with 73 percent (n = 83) of the riders who had not been involved in an accident. Twenty seven percent (n = 14) of the commercial motorists who had been involved in an accident reported they don't consume alcohol. Similarly, 63 percent (n = 37) of commercial motorcyclists who had never been involved in an accident never agreed that they do consume alcohol. The analysis further indicated that, the relationship between the two variables was not statistically significant as chi – square (X^2) = 0.001; df = 1; p > .05; N = 165.

Table 3: Percentage Distribution of Rider Alcohol Use by Accident Involvement

		Ever been involved	Never been involved
Rider alcohol use			
	Drink	27.2 (n = 31)	72.8 (n= 83)
	Don't drink	27.4 (n = 14)	72.5 (n = 37)

Note: Chi - square (X^2) = 0.001; df = 1; p = .973; N = 165; No missing case

Source: Field Data, 2017

Results in Table 4 shows that, twenty six percent (n = 13) of commercial motorists who had ever been involved in accident compared with 74 percent (n= 37) of those who had never been involved in an accident reported they do abuse drugs while riding. Among those who do not abuse drugs, 28 percent (n = 32) had ever been involved in accident compared with 72 percent (n = 83) of the surveyed respondents who have never been involved in an accident while riding motorcycle. The findings revealed no marked difference between commercial motorcyclists who do abuse drugs and those who do not abuse drugs with regard to involvement in accident while operating motorcycle. The analysis showed that, the relationship was not statistically significant as chi – square (X^2) = 0.059; df = 1; p > .05; N = 165.

Table 4: Percentage Distribution of Rider Drug Abuse by Accident Involvement

	Ever been involved	Never been involved
Rider drug abuse		
Abuse	26.0 (n = 13)	74.0 (n= 37)
Don't abuse	27.8 (n = 32)	72.2 (n = 83)

Note: Chi - square (X^2) = 0.059; df = 1; p = .809; N = 165; No missing case

Source: Field Data, 2017

It is worthwhile reporting that, despite none statistical association witnessed from bivariate analysis between rider alcohol use / drug abuse and accident involving commercial motorcyclists, there was consensus among the five key informants of the study engaged by the researcher during IDIs, that riding under the influence of alcohol / drugs influences accident involving the motorists. One of the interviewees noted that most of the commercial motorcycle riders in Migori town consume alcohol and go ahead to ride while they are still intoxicated. The following statement from an interviewee emphasized the use of alcohol among commercial motorcyclists in Migori town.

"Riding under the influence of alcohol use/drug abuse is particularly a common phenomenon among commercial motorcycle riders in Migori town" **(KI – Traffic Police Officer, Migori town).**

According to another interviewee, the high number of accidents that are reported during and as the weekend approaches is partly attributed to alcohol use /drug abuse by commercial motorcycle riders. These sentiments were further confirmed by another interviewee who stated:

"At the hospital, we realize that many commercial motorcyclists' patients who are involved in an accident especially during weekends or on Monday morning's show signs of having consumed alcohol or drug" **(KI – Medical Officer, Migori County Referral Hospital).**

The results from the bivariate analysis on rider alcohol use/drug abuse and accident involving commercial motorcycle operators are incontinent with those of several studies that have shown a strong link between drink driving and substance abuse and involvement in accidents. A study conducted by the Australian National Health and Medical Research Council (2001), for example, linked drink-driving and consumption of hard drugs to serious crashes involving motorcycle riders. Another study by Siskind et al., (2011) linked alcohol use to negative effects on riders and drivers, including impaired judgment leading to fatal and non-fatal accidents. That the survey has not shown a link between alcohol use/drug abuse and involvement in accidents possibly points to limitations inherent in it. On the other hand, the results could be an indication that those who consume alcohol or drugs and drive consumer relatively small quantities of these products so that their judgments are not grossly impaired as they operate their motorcycles. Alcohol use is known to cause impairment and subjective feelings of drowsiness or tiredness (McKim, 2003).

4.3 Rider Experience and Involvement in Accidents

This variable was measured on the basis of; rider chronological age and rider duration of riding. Results in Table 5 reveals that, among surveyed respondents who have been involved in accident while riding, 29 percent (n = 18) were aged between 31 to 42 years compared with the 71 percent (n = 45) of commercial motorcycle riders who indicated they have never been involved in an accident while operating motorcycle. Twenty three percent of commercial

motorcyclists who had been involved in accident and 74 percent of riders who had never been involved in an accident are in group 43 to 54 years. The riders who are aged over 54 years, 20 percent (n = 7) had been involved in accident compared to 80 percent (n = 28) of who had never been involved in an accident. Fifty seven percent (n = 8) of those who had been involved in accident and 43 percent (n = 6) of those who had never been involved in accident were aged between 18 to 30 years. Conversely, the trend is slightly different for commercial riders aged above 54 years; however the results were not statistically different (p > .05).

Table 5: Percentage Distribution of Age of Rider by Accident Involvement

	Ever been involved	Never been involved
Age of rider (years)		
18 to 30	57.1 (n = 8)	42.9 (n = 6)
31 to 42	28.6 (n = 18)	71.4 (n = 45)
43 to 54	22.6 (n = 12)	77.4 (n = 41)
Over 54	20.0 (n = 7)	80.0 (n = 28)

Note: Fisher's exact test (p = .091); N = 165; No missing case

Source: Field Data, 2017

According to results presented in Table 6, twenty eight percent (n = 10) of the commercial motorcyclists who had ever been involved in accident had worked as riders for a period less than a year compared with 72 percent (n = 26) of the riders who had never been involved in accident. Twenty eight percent (n = 18) of the commercial motorcyclists who had ever been involved in accident had worked for a period of between 1 to 3 years. Similarly, 72 percent (n = 46) of riders who had never been involved in accident had worked as riders for a period minimum one and maximum three years.

Among commercial riders who had been involved in accident, as well as those who had never been involved in accident, roughly twenty four percent (n = 10) reported they had worked as riders for a period between 4 to 6 years compared with 76 percent (n = 32) of the riders who had never been involved in an accident while riding.

Thirty percent (n = 7) of the commercial motorcyclists who had ever been involved in accident indicated that they had worked as commercial riders for more than 6 years compared with roughly 70 percent (n = 16) of those who had never been involved in an accident. Statistics above show no marked difference between commercial motorcyclists who had rode for less period of time and those who had rode for more number of years with regard to involvement in accident while riding; however, the results were not statistically different as chi – square (X^2) = 0.398; df = 3; p > .05; N = 165.

Table 6: Percentage Distribution of Rider Riding Duration by Accident Involvement

Rider Riding Duration (years)	Ever been involved	Never been involved
Less than 1	27.8 (n = 10)	72.2 (n= 26)
1 to 3	28.1 (n = 18)	71.9 (n = 46)
4 to 6	23.8 (n = 10)	76.2 (n = 32)
Over 6	30.4 (n = 7)	69.6 (n = 16)

Note: Chi - square (X^2) = 0.398; df = 3; p = .941; N = 165; No missing case

Source: Field Data, 2017

Against expectations, the results of bivariate analyses performed in this sub section revealed no association between age of rider and involvement. The results also show no significant difference between riders riding duration with regard to their involvement in accidents. This situation can be explained by the fact that younger riders eventually advance in age and experience. Even as this happens, their past experiences with accidents remain an inalienable fact. As they advance in age and experience, their overall involvement in accidents can grow, but cannot decrease.

Perhaps the results would be different if the study limited data gathered on respondents' involvement in an accident to a short period in the past, a few months or years back, as opposed to considering the entire experience of a commercial motorcycle rider.

All the five interviewees indicated that lack of experience was the main cause of accidents involving motorcycle taxi operators in Migori town. That many commercial motorcycle riders venture into the business without experience leading to accidents is evident in the words of one of the interviewee:

"Commercial motorcyclists learn to ride in a matter of hours and then find a motorbike to ride….they make all manner of mistakes... Some even ride at night knowing that they have no confidence to control their bikes in the dark." **(KI – Traffic Police Officer; Migori town)**

It was noted by one respondent that those who are new to riding are prone to making some errors such as over braking, careless crossing of lanes, and making turns or crossing lanes without indicating, he emphasized, however, that some new or inexperienced riders are *"consciously cautious to avoid accidents or situations that may lead them to accidents."* **(KI – Traffic Police Officer, Migori town)**.

According to one interviewee, statistics from the county government of Migori indicated that younger riders get involved more in accidents compared to their older and more experienced counterparts. This view was supported by another interviewee who stated:

"In our wards in the hospital, most commercial motorcycle riders who undergo treatment are young, and most of them are below 35 years of age." **(KI – Medical Officer, Migori County Referral Hospital)**.

The results of the respondents mesh with the results of the interviews as well as several studies that show younger and less experienced motorcycle riders to be more involved in accidents compared to their older and more experienced counterparts (Harrington 1972; Peck, 1993). These results are further confirmed by hospital statistics that show younger and less experienced riders to be the majority casualties in cases

involving motorcycle accidents. The World Health Organization (WHO) links this trend to over speeding, under – cornering, and over braking by younger riders, all of which are potential causes of motorcycle accidents (WHO, 2009).

4.4 Rider Conversance of / Adherence to Traffic Laws and Involvement in Accidents

The variable was measured on the basis of; rider conversance of traffic laws and rider adherence to traffic laws.

Findings in Table 7 reveals that ,among commercial motorcyclists who had ever been involved in accident as they operate motorcycle, as well as those who had not been involved in an accident, 27 percent (n = 13) reported that they are conversant with traffic laws guiding riders while riding. Among those who are conversant with the traffic laws, 73 percent (n = 35) of them had never been involved in an accident. The respondents who are not conversant with traffic laws, 27 percent (n = 32) had been involved in accident compared to 73 percent (n = 85) of the respondents who had never been involved in an accident while riding motorcycle in Migori town, however results were found not be statistically different as chi – square (X^2) = 0.081; df = 1; p > .05; N = 165.

Table 7: Percentage Distribution of Rider Conversance of Traffic Laws by Accident Involvement

Rider conversance of traffic laws	Ever been involved	Never been involved
Conversant	27.1 (n = 13)	72.9 (n= 35)
Not Conversant	27.4 (n = 32)	72.6 (n = 85)

Note: Chi - square $(X^2) = 0.081$; df = 1; p = .775; N = 165; No missing case

Source: Field Data, 2017

When surveyed respondents were asked to indicate whether they do always adhere to traffic laws while riding, 17 percent (n = 7) of those who had been involved in an accident and 83 percent (n = 34) of commercial motorcyclists who were never involved in an accident reported that they always adhere to traffic laws while riding. The analysis further indicates that the commercial motorcyclists who do not adhere to traffic laws are contributing greatly to accidents. Thirty one percent (n = 38) of respondents who have been involved in accident and 69 percent (n = 86) of those who had never been involved in accident indicated that they do not always adhere to traffic laws as they operate their motorcycles in Migori town. The analysis showed no statistical different as chi – square (X^2) = 2.861; df = 1; p > .05; N = 165.

Table 8: Percentage Distribution of Rider Adherence to Traffic Laws by Accident Involvement

Rider adherence to traffic laws	Ever been involved	Never been involved
Adhere	17.1 (n = 7)	82.9 (n= 34)
Don't adhere	30.6 (n = 38)	69.4 (n = 86)

Note: Chi - square $(X^2) = 2.861$; df = 1; p = .091; N = 165; No missing case

Source: Field Data, 2017

All the key informants engaged in IDIs indicated that rider conversance of / adherence to traffic laws was important to the safety of road users and that lack of it was a potential cause of accidents in Migori town. Lack of conversance /non – adherence to traffic laws was noted to be a feature of motorcycle riders subjecting them to make illegal and careless moves on the road such as wrong overtaking and making U-turns. Even so, one of the interviewee emphasized that there is a big difference between being conversant with traffic laws and obeying them, adding that motorists should know the laws and obey to them to reduce road accidents.

The fact that most commercial motorcycle riders have no driving license from the National Transport and Safety Authority is both captured by the results of the survey and the statements of the interviewees. Among riders, non-adherence to traffic laws is commonly displayed by over speeding, overloading, and enter junctions carelessly, listening to loud music while riding, overtaking on the wrong side, using mobile phones while riding, driving under the influence of drugs and alcohol. In general the perceptions of commercial motorcycle riders and the interviewees of an existing relationship between conversance of traffic laws and accident rates are consistent with several studies (Nairn 1993; Chenier and Evans, 1987; Gainewe and Masangu, 2010).

In spite of these perceptions, the survey indicated that there was no relationship between awareness or conversance of traffic rules and involvement in accidents. The study also found no significant difference between those who were conversant with traffic laws and those who were not with regard to their involvement in accidents. As noted by Nairn (1993), several factors including road design and condition, driver attitude, non-adherence to traffic laws, and errors made by other road users could lead knowledgeable drivers to be involved in traffic accidents. These additional factors could have been at play in the experiences of some of the respondents leading to the results obtained.

A binary logistic regression for accident involving motorcyclists was performed. Multivariate analysis involved regression of accident involvement on eight covariates. Table 9 presents estimates of odds ratio from logistic regression analysis of accident involving commercial motorcyclists in Migori town. The finding reveals that most of the factors have insignificant effect on accident involving commercial motorcyclists. Only riding license and age had significant effect on dependent variable.

Rider possession of riding license had a statistically significant effect on accident involving commercial motorcyclists' currently operating motorcycle in Migori town. Riders having riding license are more likely never to be involved in an accident while riding than riders who do not

have riding license. For example, a rider with riding license was 7.2 times more likely not to be involved in accident than those who do not have license. This finding is supported in literature from other studies that have indicated that; the principal aim of driver/rider training and education programs and licensing is to produce safer riders/ drivers; those who will be less involved in accident (Mayhew and Simpson, 2002).

Rider mode of training did not have significant effect on accident involving commercial motorcyclists although the relationship was positive. Literature suggests that skills learnt during formal rider training (through driving school) are limited to traffic awareness and practical control of motorcycles (Haworth and Mulvihil, 2005). Riding under influence of alcohol was also found not significant factor of accident involving commercial motorcyclists. This finding contradicts the finding of other studies in the literature. Alcohol use impairs judgment of riders / drivers leading to fatal or non-fatal accidents (Siskind et al., 2011). Drinking of alcohol leads to impairment and subjective feelings of drowsiness or tiredness which may lead to accidents (McKim, 2003). The odds of accident involving commercial motorcyclists who drink alcohol during working hours was only 1.1 times higher than those riders who do not drink alcohol. Abusing of drug is negatively associated with accident involving commercial motorcyclists although the results were insignificant.   This is an indication that the surveyed respondents, who indicated they do drink alcohol and abuse drugs, use relatively small quantities which do not impair their judgment.

Age was found to be significant factor of accident involving commercial motorcyclists in Migori town. Conversely, the findings were mixed; with age group 18 to 30 years not significant while age group 31 to 42 years and 43 to 54 years had significant effect. Riders in age group 18 to 30 years (relative to those aged over 54 years) were 4 times more likely to be involved in an accident , while those in age group 31 to 42 years were 7.5 times more likely to be involved in accident. The riders in age group 43 to 54 years were found to be 5.6 times more likely to be involved in accident compared to those riders aged over 54 years.

Riding duration did not have significant association with accident involving commercial motorcyclists. Looking at the individual riding duration, the findings show variation in riders' likelihood to be involved in accident, that is, the odds increases as the riding period increases. Literature indicates that younger and less experienced commercial motorcyclists to be more involved in accident compared to their older and more experienced counterparts (Harrington 1972; Peck. 1993).

Both rider conversance of and adherence to traffic laws were found to be having insignificant effect on accident involvement. This finding is not in support of other studies in literature. Over speeding, overloading, drinking during riding hours, listening to music installed in the motorcycles together cause road accidents (Mupimpila, 2008). Factors like bad road design and condition, rider attitude, errors made by other road users lead to accidents (Nairn, 1993). These other factors could have been at paly in the experiences of some respondents who have ever been involved in accident leading to the results obtained.

Table 9: Logistic Regression Results for Accidents Involving Commercial Motorcyclists Currently Operating in Migori Town

	B	S.E	Sig.	Exp(B)
Rider riding license Don't have [@]				
Have	1.976	0.835	0.018	7.214[***]
Rider mode of training Other places [@]				
Driving school	20.118	9244.035	0.998	-
Rider alcohol use Don't drink [@]				
Drink	0.104	0.443	0.815	1.109
Rider drug abuse Don't abuse [@]				
Abuse	-0.027	0.456	0.953	0.974
Age of rider (years) Over 54 [@]			0.056	
18 to 30	1.394	0.738	0.059	4.031
31 to 42	2.019	0.756	0.008	7.529[***]
43 to 54	1.717	0.800	0.032	5.566[***]
Rider riding duration (years) Over 6 [@]			0.779	
Less than 1	0.001	0.661	0.998	1.001
1 to 3	0.112	0.580	0.847	1.119

4 to 6	0.531	0.642	0.408	1.700
Rider traffic conversance Not Conversant @				
Conversant	0.006	0.441	0.989	1.006
Rider traffic adherence Don't adhere @				
Adhere	0.084	0.564	0.881	1.088
Constant	-1.216	0.946	0.199	0.297
-2 Log likelihood		161.021		
Cox & Snell R square		0.178		
Nagelkerke R square		0.258		
Note: @ *Reference Category ;* ***Statistically Significant at p ≤ .05 ;* N = 165				

Source: Field Data, 2017

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

It is important to note that the study variables which had no association with accidents involving commercial motorcycle operators in Migori town should not be taken for granted because some studies indicate that alcohol use /drug abuse impairs judgment of riders hence cause road accidents.

5.2 Recommendations

5.2.1 Recommendations for Policy

This study has successfully revealed that formal rider training impacts on involvement in accidents among commercial motorcycle riders in Migori town. Based on this result, the study recommends that the governmental and non-governmental agencies put in place measures to ensure that existing and potential commercial motorcycle riders undergo rider formal training in riding/driving schools as a way of reducing commercial motorcycle involvement in accidents. Measures should also be taken to ensure that the completion rates of these trainings remain high and lead to riding certification or licensing.

5.2.2 Recommendations for Research

There is need to examine the study variable further; the dependent variable ever been involved in accident may not be inductive of recent experiences.

It is important to further investigate the variables that show no statistical significance in this study with a relatively large sample size in other areas, since available literature from other studies has revealed that they are significant.

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