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RESEARCH ARTICLE

INFLUENCE OF MOTORCYCLE (BODA BODA) RIDER'S PRACTICES ON ROAD SAFETY IN KAMPALA, UGANDA

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ABSTRACT

The objective of this study was to establish the influence of motorcycle riders' (Locally referred to as "Boda Boda") practices on road safety in Kampala, Uganda. Specifically the study determined the level of compliance of these riders to safety practices and also establishes both the individual and institutional factors influencing road safety practices among them. The road safety practices examined were two: Having valid Riding Licenses and Wearing Head Protection gear (Helmets) whenever riding. The study adopted a descriptive and correlational approach collecting both qualitative and quantitative data. The questionnaire was used to collect quantitative data from a random sample 384 riders while a key informant guide was used to collect qualitative data from 4 key informants. The results show that the level of compliance with the road safety practices measures in terms of having a valid riding license and wearing helmets whenever riding among these riders was only 27.2%. It was further established that age, receipt of training and attitude towards road safety measures were the personal factors that independently influenced compliance with road safety practices among these riders in Kampala. The results also established that belonging to a Boda Boda Association was the only institutional factor that independently influenced compliance with road safety practices among these riders. The qualitative results fully supported the quantitative findings. The study concluded that urgent efforts were needed to change the behavior of these riders in as far as compliance with the road safety measures was concerned. From the above conclusion, the researchers recommended among others that policy makers in the transport sector should develop a comprehensive policy that envisages training of those intending to join Boda Boda Riding business as well as being members of recognized and registered Boda Boda Associations if compliance with the road safety practices were to be promoted. They further recommended that the road traffic police in consultation with the different Boda Boda Associations should design and continuously improve engagement with these riders on the need to embrace and continuously apply best road safety practices.

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INTRODUCTION

In East Africa especially the countries of Kenya, Tanzania and Uganda motorcycles are growing as a major public transportation business commonly referred to as "Boda-Boda". This connotation arises from the word "Border" which originated from the Uganda / Kenya border town of Busia where local traders use this cheaper and easier means of transporting goods across the border from one country into another. Since then, Boda Boda riders have remained the common means of transportation in East African communities and other low-income and middle-income countries as they are cheap and accessible to many people. Their high presence East African communities has been due to a number of factors among which is the increasing demand for public transit, availability of motorcycles on credit, and an influx of cheap imports from Indian manufacturers like Bajaj and Boxer.

The Boda-Bodas have also become common because they provide vital job opportunities for the informal sector and entrepreneurial youth. There has been high growth of use these riders as means of both goods and human transportation in most towns and villages in East African countries. Directly related to this growth has been the inevitable rise in accidents directly related to these riders [2, 3, 4].

BACKGROUND

Globally, adherence to the road safety rules among motorcyclist riders continues to be a public health concern and the World Health Organization [3] indicates that 1.25 million people are killed each year on the world roads with motorcyclists accounting for every one in four accidents globally Motor Cyclist accidents resulting in road traffic injuries are one of the leading causes of death globally. In

many countries worldwide, the high numbers of injuries and deaths resulting from motorcycle transport remains of public health attention given that it retards efforts aimed at curtailing the increasing mortality rates. A critical look at the trends across the world by the Center for Disease Control [5] reveals that the 4,502 motorcyclists that were killed in motorcycle crashes were responsible for 14% of all road traffic deaths in USA. The Malaysian Institute of Road Safety Research (2010) [6] reported that motorcycle related accidents in Malaysia account for more than 50% of road accidents. In Thailand, the number of injuries as a result of motorcycle accidents was about 70-80% of all accidents in the period starting 2008 ending 2010, and in Taiwan, about 1,153 people were killed in motorcycle related accidents in 2004 [7]. It is now more than a decade since the United Nations General Assembly [8] adopted a resolution declaring 2011–2020 as a decade characterized by action for road safety, but the problem of road accident especially by motorcycle riders is still persistent. In Africa reports of the World Health Organization [9] show that the region is characterized by road traffic related mortality with one of the highest rates in the world. Many studies have focused mainly on road safety issues related to using road traffic management lenses and also use of helmets as the reduce injury severely that culminates into deaths. It is however highly evidenced that the numbers of injuries and deaths recorded across the national referral hospitals and the emergency rooms in Africa remains high among commercial motorcycles given that it's a popular means of public transport. Despite their importance in the transport sector, these Boda Boda have contributed to an increase in motorcycle-related injuries and mortality rates rendering them a major public health concern [2]. In Uganda, efforts to promote road safety have been curtailed by underfunding, weak implementation and unsustainable traffic law enforcement [1].

Rationale

The case of embracing the motorcycle recommended road safety measures is vital in preventing accidents, reducing injury or even mortality rate in society [10]. According to the Uganda Traffic and Road Safety Act, (1998) [11], a number of offences have been prescribed penalties to enforce road safety regulation. In the case of the Boda Boda riders that this study targets, the road safety cat number 120 (a) deals with overtaking, and code number 12 123(4) deals with right of the way. In addition offense code 15 section 127 (1) deals with carrying more than one person in addition to the driver (rider) on motor cycle as being illegal and punishable. In Uganda however majority of Boda Boda riders often fault embracing such road safety requirements which has not only led to increased preventable accidents but also worsen the associated injuries and consequently resulted in deaths. Evidence shows that as a result of not complying to the recommended safety requirements people were killed in Boda Boda accident between 2015 and 2017 in Uganda of which more than 60% of the recorded deaths occurred in Kampala [12]. In Rwanda another Eastern African Country, there is a better adherence to helmet use by drivers and passengers (49% and 1% respectively) and this Law is enforced at rate of 30% [9]. Whereas some researchers [13] attribute the high road traffic injuries from motorcycles to their use in commercial transportation of commuters, goods, and services, the World Health Organization [9] attributes this high injury rates to poor

law enforcement. The persistence high level of accidents among Boda Boda riders in Kampala, Uganda need to be understood if proper interventions are to be designed and adopted. It has been reported that an estimated 7000 people were killed in Boda Boda related accidents between 2015 and 2017 worsening Uganda's mortality rates. Evidence further shows that out of the 24,352 motorcyclists' accidents in the last three years, the majority 65.7% were in Kampala, the capital of Uganda where compliance to safety practices is expected to be much better [12]. It is against this background that the current study examined the potential individual and institutional factors affecting compliance to road safety practices among Boda Boda riders in Kampala.

Objectives

Several agencies have brought forth a number of interventions to propel adherence to road safety measure among which is giving free reflective jacket, licensing and imposing penalties but results are yet to be feasible. Whereas understanding the factors responsible for limited compliance to road safety measures is important in coming up with desirable interventions and policies that would help reduce accidents, their severity, and fatalities, studies to this effect in Uganda remain scanty. If not addressed disabilities alongside mortality rates let alone their associated consequences like increased economic burden on health sector [14] are bound to increase. The major objective of this study was therefore to examine the influence of individual and Institutional factors on Road safety of motorcycle riders (Boda Boda) in Kampala, Uganda.

The specific objectives were to:

1. Determine the level of compliance of Motorcycle (Boda Boda) riders to road safety practices in Kampala.
2. Identify the individual factors affecting road safety practices among Boda Boda Riders in Kampala.
3. Investigate the institutional factors influencing road safety practices among Boda Boda riders in Kampala.

METHODS

The study used both descriptive and correlational design. Quantitative data was collected to allow numerical measurement of the issue at hand, and qualitative data was also collected to provide explanations to some of the elements of the issue under study.

Locale of the Study: The study was conducted in Kampala Central Division one of the 5 Divisions of Kampala City, Uganda. This area was chosen because it serves as a center and major destination where most of Boda Boda riders from other Divisions are commonly destined for it.

Sampling Size: The total number of Boda Boda riders in Kampala city is unknown. This is basically because some of them are unregistered and others come into the city day time and leave in the evening and others do not have specific stages which are used as home stages. So the population was considered infinite and a sample of 389 was set using the sample determination Formula used by other researchers [15]. This total of 389 respondents constituted 384 riders and 5 Key Informants (Made up of 1 Health Personnel from the Trauma

Department of Mulago National Referral Hospital, 2 Traffic Officers from Uganda Police and 2 Boda-Boda Riders Association officials).

Research Instruments: Data was collected using a Questionnaire, Key Informant Interviews, and an Observation Check List from randomly selected motorcyclists.

Data Analysis: The collected data was analysed using SPSS version 20.0. During the analysis descriptive statistics in form of frequency tables and bar graphs was generated for the demographics and to address objective one. For objective 2 and 3, bivariate analysis involving Pearson Chi-square tests or Fishers' exact test was undertaken to establish whether personal and institutional factors influence compliance to recommended road safety practices among the riders. The qualitative data from the key informants was analysed following a thematic analysis.

RESULTS AND DISCUSSION

The study targeted 384 riders and received 356 responses (92.7%).

Demographic Characteristics of the Riders: Table 1 below shows that the majority of the Riders are youth 18 to 35 years (66%), who have attained Secondary School level (53.7%), are single (not married) (66.3%).

Table 1. The Demographic Characteristics of the Boda Boda Riders

Demographic characteristics	Frequency (N = 356)	Percentage (%)
Age in years	18 to 25	29.5
	26 to 35	36.5
	36 to 45	20.5
	Above 45	13.5
Education level	Primary	33.1
	Secondary	53.7
	Tertiary	13.2
Marital status	Single	66.3
	Cohabiting	21.3
	Married	6.2
	Divorced/separated	6.2

Age

The largest percentages of the riders are youth mainly between 26 to 35 years (36.5%) closely followed by those between 18 and 25 years (29.5%). These results were supported by the responses from one of the key informants who said:

“The Boda Boda riding business is full of youths who have not yet secured other jobs. They get them (Motorcycles) on loan and service the loans. Few people of old age are sometimes involved” (KI 1)

These results are quite comparable to those earlier found in 2009 [16] stating that one key factor related to road safety is the rider's age where the adolescents and young adults more frequently involved in boda boda riding.

Education level: While most of the Boda Boda riders have studied up to the secondary level of education (53.7%), a good proportion of them have also undertaken tertiary education

(13.2%). This could be probably because entry into salaried and other employments requires more skills than those acquired at secondary level. These results were supported by opinions from one of the key informants who said that:

“A few of these Boda Boda are highly educated but they have mostly reached secondary level of education. Yes like in Senior 3 or even higher they drop out and start riding. We have some even who have tertiary education because of lack of alternative jobs” (KI 2)

These findings are quite similar to those earlier reported in 2009 [17], that the riders in Calabar, Nigeria were at least educated and only 10% had not attended school at all. This has also been further confirmed by other researchers that most of the motorcycle riders had some formal education and were not illiterate [18, 19, 20].

Marital status: Most of the riders reported to be single (66.3%). This could easily be attributed to being youth and using this business of riding as an initial venture into working life before settling down into marriage.

Compliance with road safety measures: The first objective of this study was to establish the level of compliance with the road safety measures among the Boda Boda riders. Two aspects of compliance were used: Wearing helmets whenever riding and being in possession of a valid riding license.

The results are presented in the Figure 1 below:

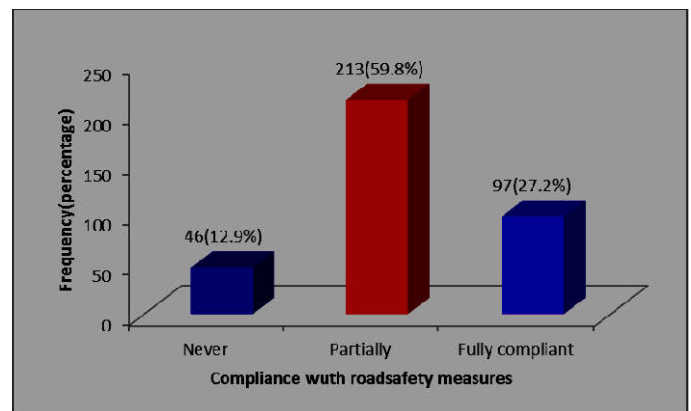


Figure 1. Compliance with road safety measures

The results in Figure 1 above shows that only 27.2% of the riders fully comply with the road safety measures of having a valid riding license and in habit of wearing helmets whenever riding. This result indicates very low level of adherence to their safety and is a strong indication that perhaps efforts to road safety practices need to be stepped up. The Ministry of Works and Transport in its Annual Sector Performance Report of 2016 / 2017 [21] had made this observation and strongly recommended a need for improvement in adherence.

Individual factors of the boda-boda riders in Kampala

The second objective was to describe the personal factors associated with road safety practices among Boda Boda riders in Kampala. In addition to the biodata (Table 1 above), the following factors were studied: drug taking, social pressure, knowledge about safety practices, receipt of training and

attitude towards road safety measures. The results are presented in Table 2 below.

Table 2. Individual characteristics of the boda-boda riders in Kampala

Individual characteristics		Frequency (N = 356)	Percentage (%)
Drugs taken while riding	Drug for medical purposes	160	44.9
	Alcohol	58	16.3
	Others	29	8.1
	None	109	30.6
Social pressure instance while riding	Yes	165	46.3
	No	191	53.7
Whether the boda-boda rider has knowledge	Yes	287	80.6
	No	69	19.4
Whether boda-boda riders are trained	Yes	178	50.0
	No	178	50.0
Recommended by a friend (Attitude)	Positive	273	76.7
	Negative	83	23.3

Drug use: The Results (Table 2) show that most (44.9%) of the riders take drugs for medical purposes and thereafter ride their motorcycles. But also a substantial proportion of them (16.3%) take alcohol.

These results were further supported by the key informants during the interview who said:

“The problem is that some of these Boda Boda riders have quite a number of challenges especially with drinking alcohol. This makes them to ride the motor cycles recklessly without helmets and under the influence of alcohol”

“It is not uncommon to find the Boda Boda rider on duty drunk or when sick and has taken medicine. The Uganda of today is very hard in that someone may have taken drugs but has to pay house rent and / or provide food for the family. He is forced to ride even when on treatment” (KI 3).

These findings are quite different to those in developed countries. For example in studies undertaken in Australia [22], it was reported that the majority of riders (78.8%) had not driven under the influence of alcohol in the previous month, 20% had driven under the influence of alcohol between one and 10 times and 1.2% had driven under the influence of alcohol more than 11 times in the previous month.

Social pressure: Table 2 above also shows that significant proportions (46.5%) of the riders have been involved in instances when they ride at unacceptably high speeds and / or do not use helmets to impress a friend or a relative. This could be due to youthful age of the majority of the riders.

These findings were also supported by opinions from the key informants as follows:

“It is quite funny that some of the Boda Boda riders ignore using the helmets and other safety gadgets because of disapproval by their friends. They fear to be called “kataala” [Colloquial Luganda word for someone not up to date with times and current trends]. But also for those who drink then come for duty, they want to impress women and girl friends” (KI 1)

Knowledge about Road Safety Measures: A very large percentage (80.6%) of these riders is knowledgeable about the road safety measures (Table 2). This could easily be attributed to the studies and tests required before getting a riding permit and registration. While the above findings differ from those of some researchers [23] who studied motorcycle riders in Kisumu, Kenya and reported that they lacked knowledge on road safety, other researchers [20] agree with the findings in Table 2 that that few commercial motorcycle riders in African cities did not know the most elementary road safety rules.

Training: The results (Table 2) show that only 50% of the riders were trained in riding the motorcycles. This may be attributed to the limited formal motorcycle training centers in the city. These results were supported by the key informants who said:

“Most of these Boda Boda riders just get the Boda Boda then are shown a few things by the friends and the following day they are on the road doing Boda Boda business. Most are not trained but learn while at work which is very risky. I personally rarely use a boda but of recent Safe Boda and Taxify are trying to get them trained” (KI 2).

These results are quite similar to those earlier found in 2006 [24] which reported that driver training is monopolized by commercial riding schools which are not subjected to any inspections by the government.

Attitude

The findings (Table 2) show that most (76.7%) of the Boda Boda riders would recommend a friend to make use of the safety gadgets like the helmets. This implies that such Boda Boda riders have a positive attitude towards the use of helmets and having a valid riding license as a road safety measure. These results are not comparable to those earlier established [25] which concluded that riders were aware of the factors that could increase the likelihood of being involved in an accident.

Institutional factors influencing road safety practices among the Boda Boda riders in Kampala:

The third objective of this study was to describe the institutional factors associated with road safety practices among Boda Boda riders in Kampala. The factors investigated included whether there were training facilities for Boda Boda riders, whether these riders belonged to any Associations and the state of the road infrastructure. The results in this regard are in Table 3 below.

Table 3. Description of the institutional factors associated with road safety practices among Boda Boda riders

Institutional factors		Frequency (N = 356)	Percentage (%)
Whether there are training facilities for boda boda riders available	Yes	85	23.9
	No	271	76.1
Whether boda boda riders belong to associations	Yes	119	33.4
	No	237	66.6
Road infrastructure state	Good	73	20.5
	Fair	210	59.0
	Poor	73	20.5

Availability of training facilities: Most (76.1%) riders reported absence of training facilities for motorcycles in the

city. This was supported by one of the key informants who said that:

“It should be a requirement that before getting onto the road each and every Boda Boda rider goes through a training institution set by government. This institution would teach safety measures. This is not the case because of politics and ineffective advisors” (KI 4)

Association Membership: The results (Table 3) show that a small proportion (33.4%) of the Boda Boda riders belong to some association as opposed to the majority (66.6%) who do not belong to any Association. This may be due to absence of well-organized Associations. These findings were supported by opinions from one of the key informants who said:

“The associations could best organize the activities of the Boda Boda riders. But here they are few and do their work unprofessionally with a lot of corruption. Like Boda Boda 2010 (An Association) was not doing good work. Politics of getting money from the Boda Boda riders only nothing with regard to safety measures” (KI 4)

An earlier researcher [26] reported that cyclists are also victims of poor road infrastructure design, which ignores their presence on the road.

Bivariate results for the individual and institutional factors influencing road safety practices among Boda Boda Riders in Kampala: The study also aimed at establishing the influence of individual and institutional factors on road safety practices among Boda Boda riders. The Pearson Chi square analysis, Cross tabulations and Crude Odds Ratios (COR) were applied on the data collected at bivariate analysis level. The detailed results are presented in Table 4 below.

Personal Factors affecting road safety practices among Boda Boda Riders in Kampala

Age: The results (Table 4 above) show that full compliance with road safety measures is lowest (5.1%) among riders aged 18 to 35 and highest (70.2%) amongst those aged 36 years and above. The variation in percentage complying with road safety measures was statistically significant (COR=0.023; 95% CI: 0.05-0.01; p= 0.000).

Table 4. Bivariate results for the factors affecting road safety among Boda Boda Riders in Kampala

FACTORS		COMPLIANCE WITH ROAD SAFETY MEASURES		O.R (95%CI)	P-VALUE
		YES (%)	NO (%)		
PERSONAL FACTORS					
Age	18 to 35	5.1	94.9	0.023(0.05-0.01)	0.000**
	36 above	70.2	29.8		
Education level	Up to secondary	26.9	73.1	0.87(0.44-1.69)	0.675**
	Tertiary	29.8	70.2		
Lifestyle [Alcohol and Drugs]	Yes	25.5	74.5	0.76(0.46-1.24)	0.267**
	No	31.2	68.8		
Succumbing to Social pressure	Yes	27.9	72.1	1.061 (0.67-1.69)	0.804**
	No	26.7	73.3		
Marriage status	Single	25.6	74.4	0.74(0.45-1.24)	0.252**
	Married	31.6	68.4		
Knowledge	Yes	25.4	74.6	0.64(0.37-1.12)	0.117**
	No	34.8	65.2		
Training	Yes	41.0	59.0	4.46(2.64-7.53)	0.000**
	No	13.5	86.5		
Attitude	Positive	30.8	69.2	2.39(1.26-4.56)	0.007**
	Negative	15.7	84.3		
INSTITUTIONAL FACTORS					
Training capacity	Yes	28.2	71.8	1.067(0.62-1.84)	0.815
	No	26.9	73.1		
Membership to boda association	Yes	61.3	38.7	14.08 (8.04-24.67)	0.000**
	No	10.1	89.9		
Road infrastructure	Good	30.0	70.0	2.18 (1.12-4.26)	0.020**
	Poor	16.4	83.6		

**Significant at 5% level, also include the DV- and its interpretation

State of infrastructure: On the state of infrastructure, the results (Table 4) show that the majority Boda Boda riders (59%) describe the road infrastructure on which they ride as being fair, while only 20.5% report it as good and an equal percentage report it as being poor. This could be to the fact that these riders prefer using short cuts to save time (and fuel) and avoid longer tarmac roads. This result was supported by one of the key informants who said:

“The roads are being improved but have been and are still with potholes which take months without repair. The Boda Boda riders have to keep dodging the potholes which is really challenging. Most of the small roads to the mains are yet to be done” (KI 3)

This could be attributed to the fact that those 36 years and above incline to having a big responsibility at home and thus comply to avoid injuries that may occur when accidents take place. These results agree with those of earlier researchers [16, 27, 28] who reported that one key factor related to road safety is the rider's age, where adolescents and young adults more frequently got involved in accidents compared to other age-groups due to failure in observing safety measures while riding. These include tolerance to breaking road rules hence affecting decision-making, using mobile phones while riding reducing their concentration and performance being more common among younger riders.

Education level: The results show that full compliance with road safety measures is lowest (26.9%) among the riders who

had studied up to secondary education level and higher (29.8%) amongst those who have studied up to tertiary level. However this discrepancy in complying with road safety measures was not statistically significant (COR=0.87; 95% CI: 0.44-1.69; $p=0.675$). This could be attributed to the fact that riders who studied up to secondary level possibly think they know or else feel they are doing inappropriate job so ignore compliance. These results are similar to those established by earlier researchers [29, 30] who reported that educational level of commercial motorcyclists has also been associated with their knowledge of safety protective devices and that levels of education are directly correlated to traffic accidents.

Lifestyle: The results (Table 4 above) further show that full compliance with road safety measures is highest (31.2%) among riders who do not ride after taking drugs and alcohol and lowest (25.5%) amongst those who ride after taking drugs and alcohol. This difference in the proportion of the riders complying with road safety measures however, was not statistically significant (COR=0.76; 95% CI: 0.46-1.24; $p=0.267$). This could be due to the fact that taking drugs affects judgment and operation of machines and / or equipment and may increase rate of forgetting. The above results do concur with those reported in 2014 [31] that road safety measures were less observed by those that used cannabis. Other researchers [32, 33] also reported that the groups most likely not to observe road safety measures were those dependent on alcohol and cannabis, and that riders who use alcohol or drug were 3.3 times more likely to sustain a severe injury as a result of not using helmets than those that do not drink.

Social pressure: While the above results (Table 4) also show that full compliance with road safety measures is lowest (27.9%) among riders succumbing to social pressure and highest (26.7%) amongst those that do not succumb to social pressure; this difference is not statistically significant (COR=1.061; 95% CI: 0.67-1.69; $p=0.804$). It could be possible that the individuals whose advice the riders succumb to may not know the consequences or have a negative attitude which negates road safety practices. Other researchers [34, 35] reported that peers can affect motorcycle riders' behaviour both directly and intentionally as well as indirectly and inadvertently; and also that young motorcycle riders who believed that their friends were not supportive of risky riding behaviour were more likely to observe road safety measures.

Marriage status: Study findings also show (Table 4) that full compliance with road safety measures is low (25.6%) among the riders that are single and higher (31.6%) amongst those who are married. But this variance in the proportion of the riders complying with road safety measures was not significant (COR=0.74; 95% CI: 0.45-1.24; $p=0.252$). This is most likely due to the fact that married riders are bound to be more responsible and try to avoid consequences of not using the road safety measures. These findings are in agreement with those of other studies [33] who also reported that the groups most likely not to observe road safety measures were those who were unmarried.

Knowledge about road safety measures: On the issue of knowledge about road safety measures, the results (Table 4) show that full compliance with road safety measures is lowest (25.4%) among riders who know about road safety measures and highest (34.8%) amongst those who have limited

knowledge 34.8%. This difference was established to be statistically significant (COR=0.64; 95% CI: 0.37-1.12; $p=0.117$). These results could be attributed to the fact that knowledge usually translates into practice. However this may not necessarily be true as earlier reported in 2011 [20] that motorcycle safety standards were compromised as a result of limited knowledge and that those not knowledgeable about traffic rules and regulations were likely to fall victims of serious injuries and fatalities.

Training in Boda Boda riding: Results (Table 4) also reveal that full compliance with road safety measures as a practice is highest (41%) among respondents who have ever received training from a centre for training in Motorcycle Riding and lowest (13.5%) amongst those who have never received any such training. This difference in compliance is statistically significant (2.304-11.795; $p=0.000$). While these findings are quite similar to those earlier found [36] which observed that the motorcycle riders involved in accidents were essentially without training, other researchers [37, 38] showed that sometimes riders develop overconfidence following training and this may also potentially impact on subsequent crash involvement.

Attitude towards road safety practices: The research findings as presented in Table 4 above show that full compliance with the road safety measures as a practice is highest (30.8%) among riders who would recommend a friend to use road safety measures and lowest (15.7%) amongst those who would not recommend a friend to use road safety measures. This variation in the compliance with the road safety measures was found to be statistically significant (COR=2.39; 95% CI: 1.26-4.56; $p=0.007$). These findings are quite similar to those earlier found by other studies [39, 40, 41]. These researchers found that those younger respondents who had less regard for the negative consequences for speeding, reported greater intentions to speed and that attitudes were a predisposition to behave positively or negatively towards an individual, group, event or even an object and that students who reported frequent helmet use were characterized by a high perceived threat of motorcycle related injury.

Road infrastructure state: Study results in Table 4 above shows that full compliance with road safety measures is highest (30%) amongst those riders that reported the state of the road infrastructure as good and lowest (16.4%) amongst those that reported the state of the road infrastructure as poor. This disparity in proportion is significant (AOR=14.084; 95%CI: 8.041-24.671; $p=0.000$). This means that the state of the road infrastructure affected compliance with the road safety measures. Other researchers [26] do agree that cyclists were commonly victims of poor road infrastructure design.

Association membership: There is high (61.3%) rider compliance with Road safety measures amongst those who are members in certain boda boda associations and lowest (10.1%) amongst members who do not belong to any association. This variation is statistically significant (AOR=14.084; 95%CI: 8.041-24.671; $p=0.000$). This result shows that belonging to Riders Associations is very important in ensuring compliance with road safety measures. This is in agreement with other earlier researchers [42] who reported that helmet use is high among Association of Southeast Asian Nations countries (ASEAN).

Table 5. The logistic Multivariate results for factors affecting road safety practices among Boda Boda Riders in Kampala

Factors		Compliance with Road safety measures		A.O.R (95%CI)	P-Value
		Yes (%)	No (%)		
Age	18 to 35	5.1	94.9	0.061(0.019-0.194)	0.000**
	36 above	70.2	29.8		
Training	Yes	41.0	59.0	5.214(2.304-11.795)	0.000**
	No	13.5	86.5		
Attitude	Positive	30.8	69.2	18.264(5.314-62.774)	0.000**
	Negative	15.7	84.3		
Boda association membership	Yes	61.3	38.7	51.816(20.423-131.467)	0.000**
	No	10.1	89.9		
Road infrastructure	Good	30.0	70.0	1.183(0.440-3.183)	0.740
	Poor	16.4	83.6		

This could be attributed to the fact that such associations have some rules that the members have to follow that make them more compliant.

Multivariate results for factors affecting road safety practices among Boda Boda Riders in Kampala: All significant variables were compared to level of effect on road safety based on a multivariate analysis using the binary logistic regression at a 95% confidence level. The results of this analysis are presented in Table 5. The study results (Table 5 above) at confirmatory level show that the age in years of the riders, receipt of Boda Boda training and attitude towards road safety measures were the personal factors independently associated with compliance to road safety measures among the riders in Kampala. However, these compliance rates were more among those aged 36 years and above, those trained and those having a positive attitude towards the road safety measures. These results agree with those earlier found by a researcher in 2003 [43] that the behavior among the young people was such that they tend to adopt risky behavior and attitudes as compared to their older counterparts. The results are also quite comparable to those by other researchers [27] who reported that social factors such as a tolerance of breaking road rules also affects decision-making, with these factors more likely to occur among younger riders than their older counterparts. However, the results (Table 5) also show that belonging to a Boda Boda Association is the only institutional factor independently and directly associated with compliance with road safety measures among the riders in Kampala. As indicated above, compliance with the road safety measures were highest among those riders that belonged to a Boda Boda Associated compared to those that did not belong to any association.

Conclusions and Recommendations

Conclusion: From the results and the foregoing analysis, it is concluded that there is a significant association between personal factors and compliance with road safety measures; and that personal factors which include age of the riders, receipt of training and their attitude significantly influences compliance with the road safety measures as a safety practice. It is further concluded that Boda Boda Association membership is a significant predictor of compliance with the road safety measures as a safety practice. It is further concluded arising from the results that there is urgent need to rethink efforts in ensuring that the boda riders change their behavior in as far as the compliance with the road safety measures are concerned.

There is also urgent need for training of young Boda Boda riders coupled with requirement to belong to an association.

Recommendations: Based on the findings in relation to the influence of the individual factors and institutional factors on road safety practices of motorcycle riders, the following recommendations are advanced. The policy makers in the Health and Transport sector should develop a comprehensive policy that covers training and use of motorcycles for all those intending to be engaged in the Boda Boda business and being attached to a registered Boda Boda Association. The road traffic police in consultation with the different stakeholders should design and continuously improve engagement with the Boda Boda riders on the need to embrace best road safety practices. Finally there is need for further studies to include all other road safety practices not undertaken by this study. And further studies should also consider undertaking a national wide study so that the conclusions can be used at national level and not only urban settings.

REFERENCES

1. Kamulegeya, L. H., Kizito, M., Nassali, R., Bagayana, S., & Elobu, A. E. The scourge of head injury among commercial motorcycle riders in Kampala; a preventable clinical and public health menace. *Afr Health Sci.*; 15(3), (2015):1016-22. doi: 10.4314/ahs.v15i3.41.
2. Hung, D., Stevenson, M., & Ivers, R. Prevalence of helmet use among motorcycle drivers in Vietnam. Retrieved December 03, 2016, from <http://www.ncbi.nlm.nih.gov/pubmed/17170192>.
3. WHO. Bloomberg Initiative for Global Road Safety (BIGRS) 2015 – 2020. The World Health Organization, Geneva, (2015).
4. The Ministry of Health, Uganda. The Ministry of Health Annual Strategic Plan Evaluation 2016 / 2017. Uganda Government Printery, Entebbe, Uganda, (2017).
5. Centre for Disease control, CDC. "Helmet Use Among Motorcyclists Who Died in Crashes and Economic Cost Savings Associated With State Motorcycle Helmet Laws, (2012). <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6123a1.htm>.
6. The Malaysian Institute of Road Safety Research. MIROS Annual Report 2010. Ministry of Transport, Malaysia, (2010).
7. Chang, L. Y. Empirical analysis of the effectiveness of mandated motorcycle helmet use in Taiwan. *Journal of the*

- Eastern Asia Society for Transportation Studies, 6, (2005): 3629-3644.
8. WHO. Decade of Action for Road Safety 2011–2020. The World Health Organization. Geneva, Switzerland, (2011).
 9. WHO. The World Health Organization. Road Safety in The WHO African Region. The Facts 2013. World Health Organization: Geneva, (2013a)
 10. WHO. The World Health Organization. Global Status report on road safety: Time for action. 2013, World health Organization: Geneva. (2013 b)
 11. The Uganda Traffic and Road Safety Act,. Statutory Instrument 361 – 10.The Traffic and Road Safety Regulation. Government Printer, Entebbe, Uganda. (1998)
 12. UPF. Uganda Police Force, Annual Crime Report 2018. Kampala, Uganda. (2018).
 13. Solagberu B., Ofoegbu C., Nasir A., Abdur-Rahman L. Motorcycle injuries in a developing country and the vulnerability of riders, passengers, and pedestrian. September 2006. *Injury Prevention* 12(4), (2006): 266-8
 14. Kigera J., Nguku L., and Naddumba E.K. The Impact of Bodaboda Motor Crashes on the Budget for Clinical Services at Mulago Hospital, Kampala. *East and Central African Journal of Surgery*, 15(1), (2010): 57–61.
 15. Amin, M.E. Statistical inference for social science research. Makerere University. Kampala, Uganda, (2004).
 16. Beenstock, M., Gafni, D. Globalization in road safety. Explaining the downward trend in road accident rates in a single country (Israel). *Accident Analysis Prevention*; 32(1), (2009): 71-74.
 17. Mahlstein, M. Shaping and being shaped. The regulation of commercial motorcycle operation and social change in Calabar, Nigeria. MA, (2009).
 18. Ngim, E. U., and Anthony, M. Commercial motorcyclists: Do they care about Road Safety? . In: *Nigerian Medical Practitioner*, Vol. 51 (6), (2007): 111-113.
 19. Mutiso, W., and Behrens, R. Boda boda bicycle taxis and their role in urban transport systems: a case studies of Nakuru and Kisumu, Kenya. 30th Southern African Transport Conference: Africa on the Move, Pretoria, (2011).
 20. Kumar, A. Understanding the role of motorcycles in African cities; a political economy perspective. Sub-Saharan Africa Transport Policy Program. SSATP discussion paper No 13 (urban transport series), (2011).
 21. MoWT. The Ministry of Works and Transport, Uganda: Annual Sector Performance Report 2016 / 2017, Kampala, Uganda, (2017).
 22. Harbeck EL, Glendon AI. How reinforcement sensitivity and perceived risk influence young drivers' reported engagement in risky driving behaviors. *Accid Anal Prev*. 54, (2013): 73–80.
 23. Obara, R. Motorcycle injuries in low and middle income countries experiences within Kisumu municipality. RTIRN Regional Workshop on motorcycle injuries, Nairobi, Kenya June 23, (2009).
 24. Chitere, O. Public Service Vehicle Drivers in Kenya: Their Characteristics and Compliance with Traffic Regulations, and Prospects for the Future. Institute of Policy Analysis and Research, Nairobi, Kenya, (2006)
 25. Mannering, F. L., & Grodsky, L. L. Statistical analysis of motorcyclists' perceived accident risk. *Accident Analysis and Prevention*, 27(1), (2014): 21-23.
 26. Wilson, C. The Actuary. Published by the Staple Inn Actuarial Society, United Kingdom. Retrieved from, (2012) www.sias.org.uk
 27. Delhomme P, Meyer T. Control motivation and young drivers decision making. *Ergonomics*. 41, (2009): 373–93.
 28. McCartt AT, Hellinga LA, Braitman KA. Cell phones and driving: Review of research. *Traffic Inj Prev*. 7, (2009): 89–106. doi: 10.1080/15389580600651103.
 29. Johnson OE, Adebayo AM. Effect of Safety Education on Knowledge of and Compliance with Road Safety Signs Among Commercial Motorcyclists in Uyo, Southern Nigeria. *Ghana Medical Journal*, September 2011 Volume 45, Number 3, (2011).
 30. Sufiyan, M. B., & Ahmad, S. M. Knowledge, attitude and compliance with safety protective devices among commercial motorcyclists in Tudun-Wada Zaria, North-Western Nigeria. *Ann Nigerian Med*, (2012).
 31. Asbridge M, Poulin C, Donato A. Motor vehicle collision risk and driving under the influence of cannabis: Evidence from adolescents in Atlantic Canada. *Accid Anal Prev*. 37, (2014): 1025–34.
 32. Vachal K, Malchose D. Research Faculty What can we learn about North Dakota's youngest drivers from their crashes? *Accid Anal Prev*. 41, (2009): 617–23.
 33. Morrison L, Begg DJ, Langley JD. Personal and situational influences on drink driving and sober driving among a cohort of young adults. *Inj Prev*. 8, (2011): 111–5. doi: 10.1136/ip.8.2.111. [PMC free article] [PubMed] [Cross Ref].
 34. Simons-Morton BG, Ouimet MC, Chen R, Klauer SG, Lee SE, Wang J, et al. Peer influence predicts speeding prevalence among teenage drivers. *J Safety Res*; 43, (2012): 397–403. doi: 10.1016/j.jsr.2012.10.002.
 35. Scott-Parker B, Watson B, King MJ. "If they say go faster or something I'll probably go faster": Peer influence upon the risky driving behaviour of young novices. *Australasian Road Safety Research, Policing and Education Conference*; 28–30 August (2013); Brisbane, Queensland, Australia.
 36. Hurt, H. H., Quillet, J. V., & Thom, D. R. Motorcycle Accident Cause Factors and Identification of Countermeasures, Vol 1: technical Report. Contact No DOT HS-5-01160. Los Angeles: Traffic Safety Centre, University of Southern California. (2012).
 37. Gregersen NP, Berg HY, Engström I, Nolé S, Nyberg A, Rimmö PA (2010). Sixteen years age limit for learner drivers in Sweden: An evaluation of safety effects. *Accid Anal Prev*. 2000;32:25–35.
 38. Hatfield J, Fernandes R, Job RF. Thrill and adventure seeking as a modifier of the relationship of perceived risk with risky driving among young drivers. *Accid Anal Prev*; 62, (2013): 223–29. doi: 10.1016/j.aap.
 39. Lawton, R., Parker, D., Stradling, S. G., & Manstead, A. S. R. Selfreported attitude towards speeding and its possible consequences in five different road contexts. *Journal of Community and Applied Social Psychology*, 7, (2014): 153–165.
 40. Forward, S. The intention to commit driving violations a qualitative study. *Transportation Research Part F: Traffic Psychology and Behaviour*, 9(6), (2009): 412–426.
 41. Germeni, E., Lionis, C., Davou, B., & Petridou, E. (2009). Understanding reasons for non-compliance in motorcycle helmet use among adolescents in Greece. *BMJ Journals Injury Prevention*. Vol 15 Issue 1, (2009).

42. Lindskog, P., and Ghazwan AG. Road safety in Southeast Asia, Factors Affecting Motorcycle Safety. ICTCT extra workshop Campo Grande 2005. Linköping University, Sweden, (2005).
43. Seleye-Fubara, D., & Ekere, AU, Pedestrian deaths resulting from road traffic accidents seen at the University of Port Harcourt Teaching Hospital--six-year review. Nigerian Journal of Medicine : Journal of the National Association of Resident Doctors of Nigeria, 12(2), (2003): 103-105.
