Helmet Wearing Among Commercial Motorcyclist in Brazzaville (Congo): Knowledge, Attitude and Prevalence

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Abstract: Transport on motorcycles has grown and is widespread in Congo (Brazzaville) and several sub-Saharan Africa countries; leading to a growing incidence of traffic road injuries and fatalities. The effectiveness of helmet wearing as preventing is founded out and the laws on its promotion exist, but its prevalence remains low. In order to make commercial motorcyclists and their passengers aware of the importance of wearing a safety helmet and contribute to promoting, the study aims to determine the prevalence, the knowledge, and attitude of helmet use and attitude among motorcycle taxi drivers in Brazzaville. We performed a descriptive cross-sectional mixed-method study, both quantitative and qualitative data were collected and analyzed. A total of 241 commercial motorcyclists were interviewed in their station point, near the market located in areas of the north of Brazzaville downtown. All were male with an average age of 28.6±7.1 years, 65.1% (157/241) had a previous motorcycle accident and none had a driving certificate. Ninety-one point three of the percentage had a "good level of knowledge on the helmet, their attitudes towards safety helmets use were favorable among 95.4% (230/241). Only 40.3% (97/241) of drivers wore the helmet, slightly linked to the history of police sanction (p<0,05). The study carried out a high level of knowledge, a favorable attitude towards the use of safety helmets contrasted with the low prevalence of helmet use, exposing drivers and passengers to the risk of fatal head injuries. The promotion of the wearing of safety helmets should take into account the emergence of this type of public transport, in order to address awareness and coercive actions to them.

Keywords: Commercial Motorcyclists, Road Traffic Injury, Helmet Use, Knowledge-Attitude, Prevalence, Congo-Brazzaville

1. Introduction

Public or individual transport on motorcycles has grown and is widespread in several countries in sub-Saharan Africa. This is the case in Nigeria [1], Benin where they represented up to 83% of motorized vehicles in 1981 [2], Ghana where their number rose by 292% between 2000 and 2008 [3] and Kenya where the number rose from 57,000 in 2005 to 514,000 in 2011 representing 36.1% of vehicles [4]. In Brazzaville, Congo, this type of transport has recently emerged. It is known as "motorcycle taxi" or "Jakarta", named after the Indonesian capital where these motor bikes are manufactured.

The increase in motorcycle transport has led to a growing incidence of road accidents. In Kenya, for example, accidents involving motorcycles doubled between 2004 and 2009 with an annual increase of 29% [5]. Head injuries and fatalities are then on the rise [6-8]. These accidents represent the third leading cause of death from road traffic accidents in Asia, a significant share in developed countries and a growing share in Africa. Head injuries account for 88.8% of all deaths [9].

In Congo, despite the lake of official statistics, the rate of accident involve motor bicycles is increasing. In the same period, the epidemiology of head trauma victims admitted to Brazzaville University Hospital reveals that 39.7% were drivers or passengers of motor bicycles [10].

According to several studies, not wearing a safety helmet is strongly associated with serious cerebral complications in the event of a motorcycle accident, and compliance with the wearing of a helmet correlates with a reduction in these complications [11, 12]. Some studies report up to a 69% reduction in head injuries and a 42% reduction in the number of deaths [13, 14]. Motorcyclist who did not wear a helmet have a 40 times greater risk of head injury in the event of an accident than those who did wear a helmet [7]. In order to make motorcyclists and their passengers aware of the importance of wearing a safety helmet, the study aims to determine the prevalence, the knowledge and attitude toward helmet use among motorcycle taxi drivers in Brazzaville.

1.1. Statement of the Problem

The effectiveness of helmet wearing is founded out. In African sub-Saharan countries who have the highest rate of death due to traffic injuries, the rates of helmet wearing remains low, despite the laws on helmet use. In Congo the rate of death due to traffic injury is 17 per 100.000 persons, the lake of data on helmet wearing is a major issue for planning the preventing interventions promoting helmet wearing. The motorcyclists "moto taximen" constitute the major target because they also involve the passenger's lives.

1.2. Objectives of the Study

1.2.1. General Objective

The study aimed to contribute to promote helmet wearing and reduce the fatalities while traffic injury involved motorcyclist, by implanting the campaign of sensibilization.

1.2.2. Specific Objectives

The study aimed to:
Describe the "motorcyclist" socio-demographics characteristics.
Assess the knowledge level on helmet utility.
Assess the attitude to helmet wearing.
Determine the helmet wearing prevalence.

1.3. Significance of the Study

The traffic injury involved the motorcyclist is the most public health concern due to brain trauma. Helmet use is an effective intervention, but there is paucity of data on helmet wearing among motorcyclist in Brazzaville. The study seeks finding out the prevalence of helmet wearing among motorcyclist and the possible factors which influence helmet use. As type of transport the motorcyclist involve also the passenger's lives. It will one of first study in this field.

Table 1. *Helmet's knowledge level score.*

Proposal	Correct answer	Weitling	
		Yes/Did	No/Didnt'know
Have you ever heard of biker protection devices? If yes, cite them	Had Cited	2	0
How important is the safety helmet?	Head protection or safety	2	0
Do you know a place of helmet sales?, if yes locate it	Had located correctly	2	0
Give an average price of helmet	5-15000FCFA	2	0
Does the law or the police require the wearing of a safety helmet?	Yes	2	0

Interprétation:
Score$\geq$ 6 = acceptable or good knowledge level.
Score < 6 = unacceptable or poor knowledge level.

Table 2. *Attitude score for wearing a safety helmet.*

Proposal	Assessment	Pondération	
		Yes	No/didn't
History of helmet wearing	Yes/no	1	0
Headset purchase history	Yes/no	1	0
Opinon on police sanction	yes /no/ dind't know	1	0
Refusal to wear a helmet	Yes /no	0	2
Decision to wear the helmet	Yes /no/ didn't know	4	0

Interprétation:
Score $\geq$7= favorable attitude.
Score < 7 = unfavorable attitude.

1.4. Conceptual Framework

The independent variable were socio demographics characteristics as: age, sex, nationality, school level, belonging of motorcycle, existing of another job, history of motorcycle driving, history of traffic road injury, history of police sanction.

The dependent or outcome variables were: attitude to helmet wearing, and knowledge level on helmet.

2. Research Methodology

2.1. Study Setting

The study took place in the motorcycle station near market located in areas of north of Brazzaville downtown: Mikalou, lycée Thomas Sankara, Kombo CNRTV and Soprogi.

2.2. Study Population

The motorcyclist who earn money by carrying person who is named "Moto-taximen".

2.2.1. Inclusion Criteria

All motorcyclist present in site and who gave her verbal consent.

2.2.2. Exclusion Criteria

Non consent, or any file not completely filed.

2.3. Research Design

The design of study was a descriptive cross-sectional mixed-method, both quantitative and qualitative data were collected and analyzed. Qualitative date was a bout attitude which has scored from 0 to 9 (table 2). The knowledge level was scored from 0 to 10 (table 1).

2.4. Sample Size Determination and Sampling Procedure

The sample size couldn't determine previously, so the population of motorcyclist "moto-taximen" was not known yet. We opted for exhaustive recruitment of all "motorcyclist" consent being included.

2.5. Data Collecting

With close questionnaire we used "directive interview", a questionnaire was researcher administered. Sometimes he translated in Lingala (Congolese local language) for motorcyclist.

The date was collected between from February 7th to 13th, 2020 (7 days).

2.6. Pre-testing

Pre-testing was done on 30 motorcyclists, six in each site, therefore the questionnaire was adapted.

2.7. Variables Measurement

2.7.1. Dependent Variables

The dependent variables for this study were:

Knowledge level on helmet utility and prevalence of helmet wearing. The level of knowledge was scored from 0 to 10; categorized in "poor level" and "good level" as shown in table 1.

Attitude to helmet wearing. It was scored from 0 to 7. And categorized in "favorable" and "defavorable" as shown in table 2.

2.7.2. Independent Variables

The independents variables were:
Socio-demographics characteristics,
length of time on the motorcycle,
Personal motorcycle accident history,
History of helmet wearing,
Headset purchase history.
Opinion on the strengthening of laws on helmet use. Did they approve the punishing offenders by police?

2.8. Data Analysis

Descriptive statistics were made by calculating frequencies, mean and standard deviation. The comparison of means was done using Student's t-test and the comparison of proportions was done using the KHI2. The significance threshold was set at $p<0.05$. The data were sorted out, cleaned, categorized, coded, entered and analyzed on Epi info 7.2.2.6 software.

3. Results

3.1. Characteristics of Sample

A total of 253 drivers were contacted of which 241 (95%) accepted maintenance and 13 (5%) refused. The average age of the drivers was 28.6±7.1 years, the average length of time on the motorcycle was 62.3 months and the average length of time in motorcycle taxi activity was 6.4 months; 65.1% (157/241) had a previous motorcycle accident. The characteristics of the sample are detailed in Table 3.

Table 3. characteristics of sample.

	n	%
Observation site		
Mikalou	106	44
Lycée thomas-sankara	57	23,7
Nkombo-esplanade CNRTV	54	22,3
Soprogi	24	10
Gender		
Masculin	240	99,6
Féminin	1	0,4
Nationality		
Congoleese	228	94,6
Other	13	5,4
Age range (years)		
17-26	109	45,2
27-36	102	42,3
37-46	25	10,4
47-56	5	2,1
School-level		
None	16	6,64
Cepe[a]	44	18,26
Bepc[b]	103	42,74
Bac	63	26,14
Bac+	15	6,22
Another job		

	n	%
Yes	131	54,4
No	110	45,6
Seniority in motorcycle riding (years)ᵘ		
0-4ans	144	60
5-10	64	26,6
11-15	22	9,2
16-+	10	4,2
Belonging to the motorcycle		
Owner	159	66
Tenant	82	34
Road accident history		
Yes	157	65,1
No	84	34,9

a=elementary certificate, b=first cycle brevet. μ=one motorcyclist didn't give his seniority in riding.

3.2. Level of Knowledge

On the level of helmet knowledge, of the 241 drivers 91.3% had a "good level of knowledge" (≥6 score). For knowledge of types of safety equipment, only the helmet was cited by 44%, helmet and other accessories by 37.4%, only other accessories by 2% and no equipment by 16.6%. Specifically, about the helmet, 91% knew where it was purchased and 86% knew its price. The importance of the helmet was known by 81.3% (196/241). Finally, 93% (224/241) of drivers knew that not wearing a helmet was punishable by law or the police.

3.3. Attitudes to Helmet Wearing

Attitudes towards the use of safety helmets were favorable among 95.4% (230/241) and unfavorable among 4.6% (11/241) of motorcyclist, two of whom had explicitly refused to wear a helmet. A total of 95.5% (231/241) said they had already worn a safety helmet and 81% had already purchased one. Also 83.8% (203/241) approved of the police crackdown on helmet use. The police's previous record of sanctioning by the police was investigated: 53.1% (128/241) had already been fined with or without confiscation of a motorcycle, 16.2% with a simple warning and the remaining 30.7% had never been sanctioned. Of all the respondents 93.8% took the decision to buy and wear a helmet now or always.

3.4. Prevalence of Helmet Wearing

For the prevalence of helmet use: 59.7% (144/241) did not wear a helmet, 40.3% (97/241) wore a helmet or hung it on their motorcycle. The reason for the 144 not wearing a helmet was: discomfort for 1.4% (2/144), lack of money to buy one for 9.7% (14/144) and no reason for 88.9% (128/144) others. Helmet use was compared in the different modalities of school level, seniority in motorcycle riding, attitude towards helmet use, history of police sanction and motorcycle accident (p=0,03. Table 4).

4. Discussion

In Congo public transport by motorcycle is illegal (Road Code of Economic and Monetary Community of Central Africa, art 52. EMCCA, 2001); it is also the case in Ghana where driving a motorcycle is reserved for private use. Wearing a safety helmet significantly reduces cerebral or cervical complications and deaths in motorcycle accidents [13-15]. Thus, several countries have laws making the wearing of a safety helmet mandatory. In Kenya, under the Traffic Act Rules (2012 Amendment) the offender is punished with a fine of 10,000 shillings (94.12 US dollars/ https://fr.coinmill.com/KES_USD.html, updated on June, 22th 2020). In Benin, Decree No. 72-113 of 27 April 1972, prescribing the compulsory wearing of helmets for drivers and passengers of two-wheeled vehicles and similar vehicles equipped with an internal combustion engine, as well as the Prefectural Enforcement Order: Year 2011 N°2/_0321_/DEP-ATL-LIT/SG/SPAT (available at: https://www.24haubenin.info/?L-integralite-de-l-arrete) punish offenders with a fine and/or impoundment.

Our sample consisted only of adult males (Table 3). Its characteristics are very similar to those of the study by Fadekemi O et al [16] where all respondents were adult males (35.1 ± 8.6 years vs. 28.6± years in our study), very few (8.4%) had no education as in our study (6.6%). The male gender was also dominant in the studies conducted in Ghana, where 86.5% to 88.8% were men and 74.1% were adults [17.18], and in Bachani A's study in Kenya, where 97.1% to 97.9% were men [15]. The educational level was higher in our country (75.1% secondary school or higher) while in Kenya they were 42.2% to 52.1% secondary school or higher [15]. The level of knowledge about the safety helmet and its importance was overwhelmingly good (91.3%) compared to that found by Bachani A [10] and the 20% reported by Fadekemi O [16]. In our case this may be due to a high level of literacy in Congo [19]. None of our respondents had a driving licence; in the Fadekemi O study in Nigeria 44.2% had less than one month's training. This explains why a large majority (65.1%) had already had a motorcycle accident; this proportion was 46% in Fadekemi O [16].

Despite the existence of these restrictive laws and police sanctions reported by more than two thirds of our respondents (69.3%), the findings show a low prevalence of helmet use in several African cities. In Ghana between 45.8% and 32.4% [17.18], in Kenya between 35.12% and 37.42% [15], in Nigeria 23.8%; as an illustration, the tightening of

the "Traffic Act Rules" has not significantly improved the prevalence of helmet use or police repression in Kenya [11]. Elsewhere, however, the introduction of helmet promotion laws has had a positive impact [20-22]. In our survey, the prevalence of helmet use (59.7%) was higher than in the above studies. This relatively high prevalence can be explained by the urban site of our observation and slightly by police sanction (p<0,05, table 4). As shown in the Ghana studies, the prevalence of helmet use is higher in urban areas than outside the city [3, 4], probably due to police presence on urban roads. At home no driver had a helmet for the passenger; this implies that no passenger wears a helmet during traffic. This finding is also reported in studies conducted in Ghana, where only 1.9% to 3.7% of passengers wore helmets and often borrowed them from the driver [17,

18]; and in those conducted in Kenya, where 2.77 to 2.43% of passengers wore helmets [15]. The prevalence of helmet use is, however, very high in South-West Asia, particularly in Indonesia, where it is 89% [23]. Factors contributing to helmet non-wearing may be: a low level of knowledge of the risks and the importance of helmets as suggested by the Fadekemi O study [16], but in our context it is perhaps necessary to mention the laxity of the authorities in applying sanctions; two thirds (69.3%) of our respondents were sanctioned without much deterrence. However, the majority of motorcycle taxi drivers were in favor of wearing a helmet (95.4%) and punishing offenders (83.8%). Fadekemi O also reported a favorable attitude towards helmet use among the majority, who in 67% approved of the strengthening of laws on helmet use [16].

Table 4. *Wearing a safety helmet in modalities of school level, motorcycle ownership, seniority in motorcycle riding, police sanction history and accident history.*

	Wearing the helmet	**Not wearing the helmet**	**P [KHI2]**
Road accident history			0.7
Yes	95	62	
Never	49	35	
School-level			0.9
None or low[a]	24	36	
Medium or high[b]	73	108	
Previous police sanction for not wearing a helmet			0.03*
Yes[c]	60	107	
No	37	37	
Belonging to the motorcycle			0.09
Tenant	27	55	
Owner	70	89	
Seniority in motorcycle riding (years)[μ]			0.1
0-4	51	93	
5-10	28	36	
11-15	13	9	
16-20	4	6	
Attitude to helmet use 0.1			
Favorable	95	135	
Unfavorable	2	11	

a=Elementary certificate, b=from first cycle brevet, c=verbal warning to other sanctions. μ=one motorcyclist didn't give his driving seniority.
*statistically significant.

This situation leads us to believe that educational and capacity building actions, and promotion of the law in the form of dialogue with drivers and the population are necessary. In road safety interventions, warning signs should be put up in places where "motorcycle taxis" are parked. However, raising awareness among motorcycle taxi drivers raises the issue of recognition of this activity by municipal and police authorities. This study therefore opens up the prospect of raising the authorities' awareness of the extent of this practice and the need to regulate it.

5. Conclusion

The activity of driving a "motorcycle taxi" is practiced by adult men. The prevalence of helmet use is low among them and almost nil among their passengers, exposing them to the risk of fatal head injuries. Despite a high level of knowledge and a favorable attitude towards the use of safety helmets. The promotion of the wearing of safety helmets should take

into account the emergence of this type of public transport, in order to address awareness and coercive actions to them.

6. Limitations of the Study and Outlook

It was difficult to know the total number of drivers, as this activity is not yet organized, as no previous counts exist to constitute a reliable database. The study was limited to an area of Brazzaville. We plan to conduct a larger study on the observation of all motorcyclists on the road at several locations frequented to have a national prevalence of helmet use.

Conflict of Interest

The authors do not declare any conflict of interest or external funding.

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