

# CAUSES AND CONSEQUENCES OF COMMERCIAL MOTORCYCLE ACCIDENTS IN MAKURDI METROPOLIS

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## ABSTRACT

Accident associated with the use of motorcycle for commercial transportation in Makurdi metropolis was studied. Data obtained from the police, hospitals and questionnaire administered on commercial motorcycle riders involved in accident and personnel of traffic law enforcement agencies, was used in the study. Data analysis revealed that an average of 284 commercial motorcycle accidents per year occurred in Makurdi metropolis, resulting in an annual average of 224 deaths, and 188 injuries. Recklessness of commercial motorcycle riders accounted for 28 percent of accidents and 30 percent of deaths, over speeding accounted for 27 percent of accidents and deaths respectively, non-adherence to traffic rules accounted for 18 percent of accidents and 16 percent of deaths, obstruction on the path of riders accounted for 17 percent of accidents and 16 percent of deaths, with other factors accounting for the remaining percentages of accidents and deaths. Proper education and licensing programmes, enforcement of rules governing the use of motorcycle, such as the compulsory use of helmets and wing mirrors, are suggested measures that can reduce commercial motorcycle accidents and its consequences.

**KEYWORDS:** Commercial, Motorcycle, Accident, Injury, and Death.

## 1.0 INTRODUCTION

The use of motorcycle for commercial activities, where motorcycle riders carry passengers for hire according to Olusanya, William & African Regional Health Education Centre (2007) has gained wide spread acceptance, due in large part to the economic down turn, which has placed the purchase and maintenance of new cars and minibuses used as taxis and buses beyond the grasp of most Nigerian, other factors are motorcycles' ability to travel on roads where no car has gone before, especially the urban slums, it is inexpensive, environmentally friendly, effective means of transport, with minimum delay as it requires just a passenger, that is normally taken to his doorstep. They are more manoeuvrable than automobiles during traffic congestions.

Despite the numerous advantages associated with the use of motorcycle for commercial transportation, the high rate of

motorcycle accident, ranked by Oluwadiya, Kolawole, Adegbehingbe, Olasinde, Olaide, & Uwaezuoke (2009) as the second most common causes of road traffic injuries in Nigeria, has been a big source of worry to both the society and the different Government agencies charged with the responsibility of promoting safety on the roads. Accidents can be classified in terms of severity or number of vehicles involved. In terms of severity, O'Flaherty (2006<sup>b</sup>) classify them as fatal; when there is loss of human life within 30 days of occurrence, or from injuries sustained directly from the accidents, serious; when someone is wounded and hospitalized, minor; when there is no injury to someone but there is damage to vehicles or property. Classification by vehicles as reported by Khisty & Lall (2008) can be multiple vehicles, single vehicle, vehicle pedestrian and vehicle-fixed object.

According to the Nigeria Highway Code (2008) motorcyclists are six times more likely to die in a crash than people in other type of

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encased vehicles. The chances are 8:10 that a motorcycle accident will result in death or very serious injury such as head and spinal column injuries. In agreement with this view the World Health Organization (WHO, 2005) reported that motorcycle users make up a high proportion of overall traffic injuries and death, particularly in low-income and middle-income countries where motorcycle ownership is high.

The consequences of motorcycle accidents on the riders and passengers are normally injury and in severe cases death. Such associated injuries can be head, fracture, limb wound, facial/scalp, dislocations, abdominal, chest and spinal injuries. According to Umar (2002) head injuries contributed to around 75 percent of deaths among motorized two-wheelers users, in European countries, while in some low-income and middle-income countries head injuries are estimated to account for up to 88% of such fatalities. These values are however higher than values reported by Ngim, Udosen & Ikpeme (2006) attributing 66.7 percent of death associated with motorcycle accidents in Calabar to head injuries. Other consequences of motorcycle accidents are economic loss; arising from damages to motorcycle, cost of treatment in hospitals, cost of litigations, and loss of man hour for the employed and burial expenses in the case of death.

Olusanya, William & African Regional Health Education Centre (2007) listed some causes of motorcycle accident as over-speeding, failure to stop at a junction before entering the main road, wearing of non-protective light clothing and slippers, carrying in excess of one passenger, and failure to make appropriate turn signals. Non adherence to road signs, unlicensed and untrained riders, drunk or drugged riding, shared-rides involving two or more passengers, are other general causes of motorcycle accidents as reported by the Nigeria Highway Code (2008), O'Flaherty (2006<sup>a</sup>), and Oluwadiya, Kolawole, Adegbehingbe, Olasinde, Olaide, & Uwaezuoke (2009).

Makurdi is the capital of Benue state, Nigeria, West Africa where motorcycle ownership for use in commercial transportation is on the increase, with attendant consequences of motorcycle accidents, such as injuries, economic loss, arising from damages to motorcycle, treatment in hospitals and deaths, likely to increase. The need for a study aimed at identifying the causes of motorcycle accident in Makurdi, cannot be overemphasized. Owoaje,

Amoran, Osemeikhain & Ohnoferi (2005), Ngim, Udosen & Ikpeme (2006) and Oluwadiya, Kolawole, Adegbehingbe, Olasinde, Olaide, & Uwaezuoke (2009) studied motorcycle accidents in some Nigerian cities, the researchers approached this concept from the consequences of motorcycle accident, without revealing the causes of these accidents. This study is aimed at identifying the causes of commercial motorcycle accident in Makurdi metropolis, and using results from the study to make appropriate recommendation and useful suggestions that will help reduce the menace of commercial motorcycle accident in Makurdi, metropolis, which may also serve as a guide in the reduction of commercial motorcycle accidents in other locations.

### 3.0 MATERIALS AND METHODS

Data was obtained from two comprehensive questionnaires that considered various influential factors in traffic accidents. The first questionnaire was administered on 600 commercial motorcyclists, who had been involved in motorcycle accidents in Makurdi metropolis to help obtain first hand information from riders involved in accident, while the second questionnaire were administered on 130 personnel of traffic law enforcement agents, which comprises of the Policemen, Men of the Nigerian Road Safety Commission, and Vehicle Inspection Officers involved in rescue operations at accident scenes. Makurdi metropolis was subdivided into five zones, for ease of administration of the questionnaires, in each zone, copies of questionnaire were administered at all the commercial motorcycle loading points to riders involved in accidents, while copies of second questionnaire were administered on personnel of the respective traffic law enforcement agents offices in each of the zones, a summary of the response to the questionnaires is as summarized in Tables 1 and 2.

Eleven years motorcycle accident data covering a period of 1998 to 2008, obtained by summing up data collected from all the Nigerian police stations located in each zone, is as summarized in Tables 3, 4, and 5 respectively, and Figure 1. The use of data from police for analysis is based on Slinn, Matthews, & Guest (2005) observation that the police are the primary sources of information on road accidents, with others being motor insurance companies, hospital casualty (accident and emergency units). This observation was in agreement with the

practice in Nigeria. The annual mean value of data in Table 4 and 5 were converted to percentages.

#### 4.0 RESULTS AND DISCUSSIONS

Response to questionnaires shows that 96 percent and 88 percent of questionnaires administered on motorcycle riders involved in accident and personnel of law enforcement agents respectively were returned and used in analysis. The responses were converted to percentages as presented in Tables 1 and 2 respectively.

#### Classification of Motorcycle Accident by Type of vehicle and Severity

The classification of vehicles involved in accident in Makurdi metropolis, reflected in Table 3 shows that motorcycle ranks highest as it constitute 35 percent of vehicles involved in accident, it ranked higher than private cars and buses that constituted 25 percent and 15 percent respectively. A confirmation of high accident involvement rate associated with the use of motorcycle, as reported by (WHO, 2005).

Accident statistics data obtained from the Nigerian police showed that the number of commercial motorcycle accidents is generally on the increase with years, with an annual average

**Table 1:** Summary of Response to Questions Administered on Commercial motorcycle Riders Involved in Accidents.

S/No	Subject Matter	Response to subject Matter indicated on the Questionnaires	
		Number of response	Response in Percent (%)
1	Ownership of Driver's License.		
(a)	Regular License	246	44
(b)	Learner's permit	102	17
(c)	None of the above	234	39
2	Ownership of Highway Code.		
(a)	Yes	252	42
(b)	No	348	58
3	Age of Commercial Motorcycle Riders		
(a)	18-25 Years	144	24
(b)	26-30 Years	186	31
(c)	31-35 Years	108	18
(d)	36- 40 Years	60	10
(e)	41-50 Years	72	12
(f)	Above 50 Years	30	5
4	Age of Motorcycle Passengers		
(a)	18-25 Years	162	27
(b)	26-30 Years	144	24
(c)	31-35 Years	114	19
(d)	36- 40 Years	78	13
(e)	41-50 Years	60	10
(f)	Above 50 Years	42	7
5	Possession of wing mirror and Crash helmet.		
(a)	Yes	12	2
(b)	No	588	98

**Source:** Questionnaire administered on riders.

**Table 2:** Summary of Response to Questions Administered on personnel of Law Enforcement Agents and Motorcycle Riders involved in Accidents on causes of Commercial Motorcycle Accidents

S/No	Causes of Accidents	Response to causes of accidents as indicated on Questionnaires administered on motorcycle riders involved in accident		Response to causes of accidents as indicated on Questionnaires administered on personnel of Law enforcement agents	
		Number of response	Response in percent (%)	Number of response	Response in percent (%)
1	Recklessness of commercial motorcyclist.	150	25	30	26
2	Over speeding	138	23	32	28
3	Non-adherence to road traffic rules	84	14	11	10
4	Defect on pavement	60	10	9	8
5	Obstruction on the road	114	19	19	17
6	Drunk/Drug riding	12	2	9	7
7	Vehicular defects	42	7	5	4
	Total	600	100	115	100

**Source:** Questionnaire administered on riders and law enforcement agents.

**Table 3:** Annual mean Classification of Vehicles Involved In Accident as Obtained from the Police.

Type of Vehicle	Average Value	Percentage ( % )
Taxi	169	11
Private cars	381	25
Buses	236	15
Motor Lorry	196	13
Motorcycle	549	35
Bicycle	22	1

**Source:** Nigerian Police Force, Makurdi.

value of 284 accidents, similar trend was observed with the number of fatal, serious and minor accidents. Fatal and serious accidents constitute 38 percent and 35 percent annual mean value in percent of motorcycle accidents while minor accident accounted for 27 percent. This is a major source of worry as 73 percent of motorcycle accident resulted in injuries or loss of life. The high number of fatal accident as compared to serious and minor accidents might be due to police reports being pre-requisites to attendance to serious and fatal accident victims in the hospitals, and non-reporting of large number of minor accidents. This observation is in agreement with Slinn, Matthews, & Guest (2005)

report that an average of only 30 percent of minor accident involving personal injury are not reported to the police. Harmonized data obtained from the police and hospital presented in Figure 1. Showed that the average number of accident patients received in the hospital was 336 per year, with annual average death rate of 224 patients and average survival rate of 112 patients per year, which translates to an average survival rate of 33.3 percent per year. The age bracket that constitutes the viral workforce of any nation (18-35 years) constitutes 75 percent of the victims of motorcycle accidents as either riders or passengers as shown in Table 1, a situation that will likely affect the nation's work force.

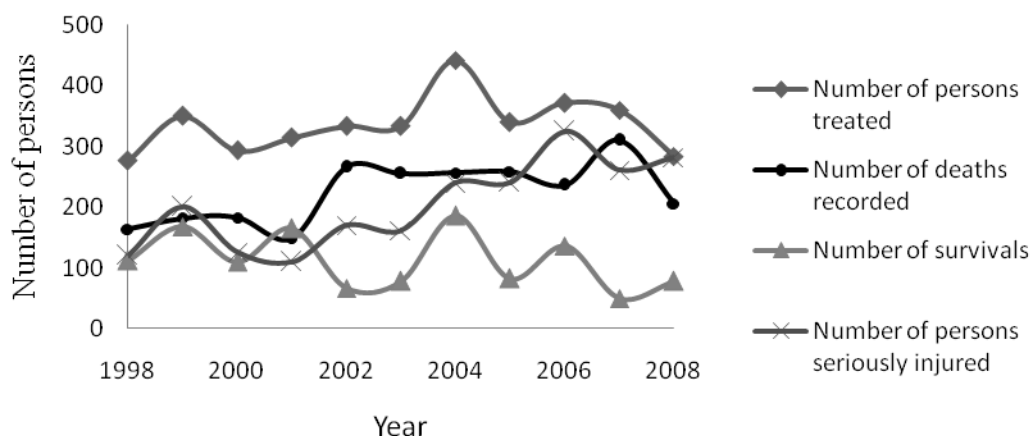


FIG. 1. Variation of Motorcycle Accident Injury, death and number of persons treated with years, as obtained from the Nigerian Police Force, Makurdi.

**Table 4:** Summary of Commercial Motorcycle Accident by Severity as Obtained from the Police.

Year	Number of Fatal Accident	Number of Serious Accident	Number of Minor Accident	Total Number of Accident
1998	82	62	43	187
1999	90	96	47	233
2000	98	63	41	202
2001	103	61	50	214
2002	132	85	79	296
2003	121	81	49	251
2004	127	119	36	282
2005	83	122	98	308
2006	93	159	119	371
2007	160	102	114	376
2008	104	138	161	403
Annual Average	108	99	76	284
Annual mean value in Percent. (%)	38	35	27	100

Source: Nigerian Police Force, Makurdi.

#### Classification of Motorcycle Accidents by Causes.

The annual mean causes of commercial motorcycle accident, converted to percentages and reflected in Table 5 shows that recklessness of commercial motorcyclists accounted for 28 percent of commercial motorcycle accident in Makurdi metropolis, this figure is close to values

of 26 percent and 28 percent obtained as responses from the analysis of questionnaires administered on traffic law enforcement agents and motorcycle riders respectively. This same factor accounted for 30 percent of death associated with motorcycle accident as reflected in Table 5. The recklessness exhibited by riders could be attributed to youthful exuberance as 55

percent, of riders involved in accident fell into the age bracket of 18- 30 years, (Table 1). Recklessness of commercial motorcyclist has to do with rider's negligence of motorcycle safety checks, carelessness at intersection, negligence and accident immunity syndrome mentality exhibited by most riders. Recklessness is more common among young riders in the age brackets of 18 – 35, and may likely be one of the reasons responsible for 24 percent and 31 percent, of accidents among these age groups. This observation is in agreement with O'Flaherty (2006<sup>b</sup>) that accident increases with reduction in age, and Chang and Yeh (2007) attribution of accident among the young riders to their being likely to disobey traffic regulations and higher tendency towards negligence of potential risk and motorcycle safety checks. The problem of recklessness is attitudinal and can be solved through appropriate education and prosecution of offenders.

Over speeding refers to speed above 50 km/h specified by the Nigerian Highway code (2008) for motorcycles. This factor accounted for 27 percent of commercial motorcycle accidents, and deaths as presented in Table 5. Responses to questionnaire in Table 2 by riders involved in accidents and personnel of traffic law

enforcement agencies showed that it accounted for 27 percent and 28 percent respectively of commercial motorcycle accidents. Injury severity according to Hurt, Ouellet & Thom (1981), increase with speed, facilitated among riders through the use of every available space in the traffic stream, a situation that normally leads to accident, that results in the injection of riders and passengers with severe force and the consequences of head injuries and fracture. Such head injuries are normally aggravated by the very low usage of crash helmet by commercial motorcycle riders and passengers as reflected in Table 1. This observation is in agreement with Olusanya, William and African Regional Health Education Centre (2007) that 96.5 percent of riders do not use helmets in Nigeria. The use of helmet as advocated by World Health Organization (WHO 2005) will reduce the risk of serious head and brain injuries by reducing the impact of a force or collision to the head. This issue can be overcome through proper training and education of riders in the bid to create attitude change, while the law enforcement agents should enforce the speed limit specified for riders, and the compulsory use of helmets.

**Table 5:** Number of commercial motorcycle Accident/Death Attributed to the Different causes of motorcycle Accidents.

Year	Causes of Motorcycle Accidents													
	Over Speeding		Recklessness Of Motorcycle Riders		Non Adherence to road Traffic rules		Defect on pavement		Vehicular Defect		Obstruction		Drunk/ Drug Riding	
	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
1998	64	65	59	50	18	16	11	11	11	6	14	12	10	6
1999	86	78	32	34	72	33	6	7	11	9	26	22	-	-
2000	63	38	81	102	31	16	1	2	7	8	15	12	4	2
2001	56	52	70	72	36	22	10	8	22	18	20	14	-	-
2002	63	66	101	92	65	57	3	5	5	4	52	42	7	-
2003	63	66	89	103	44	31	12	10	18	23	21	13	4	4
2004	73	78	74	80	43	34	4	4	13	10	68	44	7	6
2005	69	41	82	25	82	63	4	2	3	9	55	23	13	14
2006	83	26	76	14	61	34	12	6	18	16	115	79	6	11
2007	112	120	121	66	60	42	8	10	9	10	60	60	6	3
2008	107	22	104	62	57	36	14	8	24	12	88	66	9	-
AV	76	59	81	64	52	35	8	7	13	11	49	35	6	4
AV (%)	27	27	28	30	18	16	3	3	5	5	17	16	6	2

**Source:** Nigerian Police Force, Makurdi.

NA = Number of Accidents.  
ND = Number of Deaths  
AV = Annual mean value  
AV (%) = Annual mean value in percent.

Non-adherence to road signs and traffic rules accounted for 18 percent and 16 percent of commercial motorcycle accident and deaths in Makurdi metropolis. These values are higher than the values of 10 percent and 18 percent obtained from the analysis of questionnaire administered on personnel of traffic law enforcement agents, and riders that were involved in accident. Non adherence to road signs and traffic rules can be attributed to ignorance of the rules guiding the use of motorcycle on roads or disobedience of the rules on the part of commercial motorcycle riders as only 42 percent of commercial motorcycle riders involved in accidents own copies of the Highway Code. Another factor closely linked to this factor is inadequate training and unlicensed riding, as only 44 percent of riders who had accidents were licensed to operate as commercial motorcyclist. The problem of non-adherence to traffic rules can be solved through strict law enforcement programmes, to keep off untrained and unlicensed riders from the road, while educational programmes should be put in place to educate riders and the public. A defensive driving class could be offered to riders who violate traffic rules, or caused accidents; such classes could even be held in jail.

Obstruction on the road can be caused by level crossing by pedestrian, boarding and alighting from motorcycle by passengers, animal not under control, dislocated vehicles and vehicles parked on the road accounted for 17 percent and 16 percent of commercial motorcycle accident and death as reflected in Table 5. The summary of response to questionnaire administered on commercial motorcycle riders and personnel of law enforcement agents attributed 19 percent and 17 percent of commercial motorcycle accidents to obstruction. Adequate education of road users as regards crossing, timely removal of dislocated vehicle from the road, use of crossing facilities by pedestrian will go a long way in solving the problem of obstruction.

Drunk/drug riding accounted for 2 percent of commercial motorcycle accident and death in Makurdi metropolis. This figure is close to values of 7 percent and 2 percent obtained as

responses from personnel of law enforcement agents and riders to questionnaires. The act of consuming drugs/alcohol can be reduced through adequate education of commercial motorcycle riders on the dangers of drunk/drug riding and the use of adequate measures to apprehend and prosecute such riders.

Although the state of roads in Makurdi, are fairly good enough, 3 percent, of commercial motorcycle accidents and death respectively, were attributed to defect on pavements, as presented in Table 5. While response from questionnaires, administered on personnel of law enforcement agents and riders attributed 8 percent and 3 percent respectively, of commercial motorcycle accidents to this factor, this observation was in agreement with Hurt, Ouellet & Thom (1981) findings, in which 2 percent of motorcycle accident was attributed to this factor. Timely maintenance of road and the repair of such defect on the pavement will eliminate commercial motorcycle accidents, attributed to this factor.

The fractions of accident that is attributed to vehicular defect, which include failure of brakes, tires, defective lights as obtained from data in Table 2 is 4 percent with 5 percent of death attributed to this factor. Responses from questionnaires administered on riders attributed 5 percent of commercial motorcycle accident to this factor. Accidents caused by this factor can often be avoided through daily and annual vehicle inspections and educational campaigns to publicize the importance of such checks.

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

Commercial motorcycle accident in Makurdi metropolis, Benue state, Nigeria is generally on the increase. Human factor ranks high in the causes of commercial motorcycle accidents in Makurdi metropolis. A breakdown of contributory factors showed that the conduct of commercial motorcycle riders, over speeding and non-adherence to traffic rules, accounted for 28 percent, 27 percent and 18 percent respectively, of commercial motorcycle accidents.

The attitude of commercial motorcycle riders to safety measures was observed to be

very poor as only 2 percent of riders who were involved in accident possessed crash helmet, a factor responsible for high head injuries and deaths arising from such injuries.

To reduce commercial motorcycle accident, a multi-directional approach comprising education of riders, enforcement of rules on use of motorcycle and stiff penalty for defaulters will help reduce the number and severity of accidents. Based on findings from the study, the following specific recommendations are hereby put forward:

1. Strict enforcement of rule guiding the use of motorcycles on highway by personnel of the Federal Road Safety Commission (FRSC) and the Motor and Traffic Division (MTD) of the Nigerian Police Force, will help reduce commercial motorcycle accidents.
2. Ensuring an efficient and reliable licensing programme for all commercial motorcycle riders.
3. Establishing of an accurate accident report systems that will provide feedback data on commercial motorcycle accidents.
4. The use of motorcycle for commercial transportation within the metropolis should be discouraged and allowed at the suburb. Government should develop an effective and efficient mass transportation system for the metropolis.

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