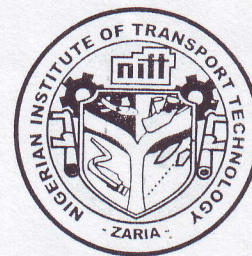


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AWARENESS OF HIGHWAY CODE AMONG COMMERCIAL MOTORCYCLISTS IN SAMARU, NIGERIA

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ABSTRACT

This paper examines Highway Code awareness among commercial motorcyclists in Nigeria. The study uses data generated from commercial motorcycle operators in Samaru, Zaria in Nigeria and; employed the logistic regression model to evaluate Highway Code awareness. It was found that about 41% of the operators are not aware of the existence of the booklet containing the Highway Code. The odds of Highway Code awareness increased with licence holding and experience but decreased with union membership and crash involvement. The Federal Road Safety Commission (FRSC) and the Vehicle Licensing Office should enforce the requirements of theory and practical tests often based on the Highway Code to increase awareness and; organised seminars and training for the operators in partnership with the Motorcycle Union using the local language.

Keywords: Highway Code; awareness; motorcycle; operators; enforcement.

1.0 Introduction

Motorcycle transport belongs to Class IV of the Classes of informal transport mode (Cervero, 2000:24). The use of motorcycles i.e. two-wheeled motorcycles, for public passenger transport has many appellations across Nigeria. In Sokoto, it is called kabukabu; achaba in Bauchi, Jos, and Yola; last flight in Benin City; express or going in Kafanchan, Okada in Ilorin and Jege; akauke or alalok in Cross Rivers and Akwa Ibom, etc. The most popular name in Nigeria is okada.

The use of this mode has its own negative impact on the environment in terms of crashes, pollution (noise and emission), robbery, etc. In Nigeria, okada is involved in one out of every four road crashes (see Appendix Table 1). The attempt to reduce the menace of motorcycle usage as public transport led to their ban and restricted usage in some cities in Nigeria. These measures are reactive. A more fundamental and proactive option is to effectively enforce pre-crash regulations such as compliance with driver licensing procedure. An effective driver licensing procedure is anchored on theory and practical tests, which would have acquainted the prospective driver the knowledge of the rules of the road as enshrined in the Highway Code. Driver licensing in Nigeria is generally devoid of the above, to say the least. The end results are; drivers who do not even know that the Highway Code booklet exists to guide their actions on the road and consequently drivers without the understanding of the rules of the road. It therefore becomes imperative to investigate whether these drivers, particularly commercial motorcyclists, are aware of the existence of the Highway Code booklet as a prelude to further research on their knowledge of some aspects of the basic rules of the road as contained in the booklet. This paper therefore examines awareness of the existence of Highway Code among commercial motorcycle operators in Nigeria.

2.0 Highway Code, road safety and economic development

The Highway Code is the official road safety manual of any nation. It is a compilation of rules of the road covering most issues that can lead to crisis on the use of the road. The Highway Code explains to all road users what rules to follow on the road and what constitutes safe behaviour. The issues concern animals, pedestrians, cyclists, drivers, road signs, road markings, vehicle markings, actions required in some circumstances, etc. Rules mentioned in the Highway Code can significantly reduce road crashes and its associated injuries (Graham, 2010). Prospective drivers are expected to purchase it, read and understand it in order to pass their driving test. The comprehensiveness of Highway Code is a reflection of the premium placed on human life and property on the highway. Highway codes of advanced economies are more comprehensive than those of developing economies.

The focus of the Nigeria Highway Code is to invigorate the public education and safety awareness campaign of the Federal Road Safety Commission (FRSC). The Code is 'compulsory for every road user' (FRN, 2008: vii). It costs N500 (US\$3.33). The Nigeria Highway Code is structured into three major parts namely: pre road use activities; road use activities and; post road use activities and other information. It is a document of 101 pages, which has illustrative pictures. It is written in English. The earlier edition had translations in local languages such as Hausa, Igbo and Yoruba (FRN, 1989).

Highway codes are not static; they are constantly reviewed to incorporate emerging issues in road traffic. The two basic objectives of the Highway Code are; to provide uniform rules of the road for a geographical entity and; through the uniform rules, all road users are expected to be careful and considerate towards others, and put safety first. The reason for the

above objectives is to protect precious lives and property on the roads.

Road crashes are a major cause of death and injury globally. An estimated 1.3million people are killed in road crashes annually and about 50million injured. Half of the world's road deaths are vulnerable road users namely pedestrians, bicyclists and motorcyclists (WHO, 2009). The Global Burden of Disease Model predicts that by 2020 road traffic injuries will be the sixth cause of death worldwide; third leading cause of Daily Adjusted Life Years (DALYs) lost. The situation is worse for low-income countries (Murray and Lopez, 1996; Peden, et al. 2004). Road crashes cost between 1 and 3 per cent of a country's Gross National Product (GNP). The global economic burden of road crashes is estimated at US\$518billion annually. For the low-income and middle-income countries the total cost of road crashes estimated at US\$65billion exceeds the annual flow of development assistance (Jacobs, et al. 2000). These economic costs are inimical to the development aspiration of nations, particularly poor countries.

Road crashes are a major cause of deaths in Nigeria, accounting for 46.7 percent of all preventable deaths. It surpasses death from notifiable diseases, which account for 43.6 per cent; other causes account for the rest (Arosanyin, 2008). The danger in road crashes as a cause of death is because it accounts for more deaths than notifiable diseases, which is a combination of 35 causes of death including Malaria, HIV/AIDS, Cholera, etc. Road crash costing in Nigeria is still at the embryonic stage. Studies using the human capital costing method have estimated the annual economic burden at 2.46 per cent of the Gross Domestic Product (GDP) (Arosanyin, 2008). The available studies only estimated lost output due to fatalities and injuries. The economic burden is therefore still seen as an underestimation due to the non computation of the other components of the human capital costing

model. An annual cost equivalent to 2.5% of the GDP in Nigeria is a serious burden.

Efforts at reducing the carnage on the road and its economic burden require a systems approach, which cuts across pre-crash, crash and post-crash measures. A crucial pre-crash measure is the issue of awareness of the Highway Code. Almost all road crashes are caused by or involve human error (RoSPA, 2004). Management of human errors in road crashes requires answers to two questions. One, is the driver aware of the existence of the Highway Code that is expected to guide his behaviour and actions on the road? If he is aware, how compliant is the driver?

The Highway Code is a preventive mechanism in road safety management. Awareness of the Highway Code is part of road safety education (RSE). Road safety education aims at providing road users with appropriate knowledge, skills and attitudes that will make them use the roads in a safe and responsible manner. A good understanding and adherence to the code will promote safety i.e. reduce road crashes, and consequently reduce the economic burden of road crashes on the economy.

On the other hand, poor awareness and compliance with the Highway Code impact negatively on safety i.e. increases the chances of road crashes, and consequently increases the burden of road crashes on the economy. As the economy develops, the structure and contents of its highway code improves; so also is the capacity and political will to enforce it by making road users to be aware and comply. This provided the main reason for the difference in the level of awareness and compliance to the Highway Code in advanced and developing countries. A major mechanism for ensuring awareness of the Highway Code in advanced economies is the requirement for a theory and practical tests before a driver license is issued. These requirements are on paper in most developing countries, but in

practices they are not followed in the issuance of driver license. A driver can get a driver license for instance in Nigeria without leaving his house i.e. procurement by proxy. This therefore justifies the need to examine whether drivers are aware of the Highway Code or not. Sayer and Downing (1981) examined drivers' knowledge of road safety matters in Jamaica, Pakistan and Thailand. They found that in all the three countries, most of the drivers underestimated their vehicle stopping distance. The drivers in Jamaica and Pakistan were found to lack understanding of the give-way rules at round- about, correct observation procedures at junctions and the meaning of flashing headlights. Most drivers in Pakistan were also found to give incorrect answer to questions regarding traffic lights, give-way signs and stop signs. In a study of 580 drivers of the Delhi Transport Corporation (DTC), which tested their knowledge of Highway Code, Jacobs and Downing (1982) found that out of the six questions on driving procedure, the drivers performed poorly on emergency stopping distance and the stop sign. Maunder and Pearce (1998) found that lack of knowledge of the Highway Code and general road use was one of the drivers' habits that led to bus accidents in Nepal. In Kenya, one of the contributors to the safety problems of the 'Matatu' transport is limited understanding of traffic rules and regulations (Opiyo and de Langen, 1998). In a basic driving theory test of over 2,500 drivers in the United Kingdom, only 1% of respondents answered all questions correctly. One in three drivers (34%) score less than 50%; and 8% (1 in 10) got every question wrong. The test further shows that 8 out of 10 drivers do not know the correct shape of a 'stop' sign (EasierFinance, 2008). The import of the above review is that awareness and good knowledge of the Highway Code is a crucial pre-crash issue in road safety management.

3.0 Methodology

The main purpose of this paper is to evaluate whether commercial motorcyclists are aware

of the existence of the Highway Code booklet, which guides their use of the road. The booklets here are the English version for the literate operators and the Hausa version for those without formal education. There are only two response options for the motorcyclist. He is either aware or not i.e. Highway Code awareness=1; 0, if otherwise. The nature of the response variable or the regressand in this study, awareness of Highway Code, is therefore not quantitative but qualitative. It therefore necessitates the use of qualitative response models (Maddala, 1983). The response is binary or dichotomous. Ordinary linear regression model cannot be used because the estimated values of Y could be negative and also in excess of one; also the problem associated with heteroscedasticity and its treatment make its application to the study at hand not appropriate (Gujarati, 2005). The above reasons make the use of binary logistic model appropriate.

If δ is the probability that Y, the dependent variable assumes 1 ($\delta = P(Y=1)$), and $1-\delta$ is the probability that Y assumes value zero, in the absence of other information, we would estimate δ by the simple proportion of cases for which $Y=1$. However, in the regression context, it is assumed that there is a set of predictors $x_1, x_2, \dots, x_p$, that are related to Y and therefore, provide additional information for predicting Y.

The model is given as;

$$\text{Log}\left(\frac{\pi}{1-\pi}\right) = \alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p \quad \text{-----1}$$

From Equation (1) we can obtain;

$$\pi = \frac{e^{\alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p}}{1 + e^{\alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p}} \quad \text{-----2}$$

Equation (2) can be rewritten as;

$$P(Y = 1 | x_1, x_2, \dots, x_p) = \frac{e^{\alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p}}{1 + e^{\alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p}} \quad \text{-----3}$$

Where Y= awareness of Highway Code and $X_1 \dots p$ is a vector of regressors. The categorical regressors are; highest educational attainment, household size, membership of

union, license holding, hours of operation or work, tribe, ownership of motorcycle and crash involvement. The non-categorical variables are age and experience. The different measurements of the variables, both categorical and non-categorical, are shown in Column 2 of Table 1. The estimation of the model is based on the maximum likelihood principle.

The primary data for the estimation were sourced from the 2009 general survey of motorcycle operators in Samaru, Zaria, where the main campus of Ahmadu Bello University, Zaria is located. Samaru, Zaria is located in Kaduna State, North-Western Nigeria. Commercial motorcycle transport is the study area is a male-dominated activity.

A total of 358 commercial motorcyclists were sampled out of the 716 registered with the

Ahmadu Bello University. The data were collected using a structured questionnaire. Out of the 358 copies of questionnaire that were administered, 334 were returned representing 93.3 and 46.6 per cent of the sampled motorcyclists and total registered motorcyclists respectively.

The study chose the sample using simple random sampling technique. The procedure adopted was the use of odd-even number relying on their registered numbers.

4.0 Results and Discussion

The descriptive statistics and percentages of the variables used for the estimation of the logistic regression are presented in Table 1. The percentages are shown for the variables that are categorical in nature while the mean, range and standard deviation are reported for variables that are not categorical in nature.

Table 1: Case processing summary of variables

Variable	Measurement /category	Marginal percentage (Statistics)
Highway Code awareness	Not aware=0 Aware=1	41.3 58.7
Age	Years	(mean =30.96) (Standard deviation=6.64) Minimum=18 Maximum=58
Experience	Months	(mean =52.8) (Standard deviation=36.1) Minimum=1 Maximum=240
Highest education attained	No schooling=0 Koranic =1 Primary education=2 Junior education=3 Senior secondary =4 Above senior secondary=5	9.9 16.5 32.9 20.7 15.0 5.1
Household size	1-6=1 7 and above=2	68.3 31.7
License holding	No license=0 Licensed=1	27.6 72.4

Ownership of motorcycle	Rented=0	55.6
	Owner-operated=1	44.4
Tribe	Hausa/Fulani=0	76.6
	Others=1	23.4
Hours of operation	<8 hours=1	2.1
	8-15 hours=2	83.8
	16 hours and above=3	14.1
Crash on motorcycle	No=0	63
	Yes=1	37
Union Membership	No=0	16.7
	Yes=1	83.3

The case processing summaries in Table 1 show that about 59 per cent of the operators are aware of the Highway Code either the English or Hausa version, while about 41 percent were found not be aware. The results of the logistic regression for Highway Code awareness are shown in Tables 2 and 3. Table 2 gives the full logistic regression result while Table 3 shows the result of the stepwise approach. The full result shown in Table 2 indicated that only license holding and accidents are significant factors (at 0.05) affecting the prediction of the probability that an okada rider is aware of the Highway Code. Membership of union was found to be significant at 0.1 (10%). The overall model is significant at 0.05 level with p-value =0.034 and R² (Nagelkerke) value of 0.094. The model was able to correctly predict 61.6 per cent of the cases.

Table 2: Full Logistic Regression Result for Highway Code Awareness

Regressors	Coefficient	Standard Error	Wald	Sig.	Exp(B)
Age	-0.002	0.024	0.007	0.937	0.998
Household size	0.116	0.327	0.127	0.722	1.123
License holding	0.662	0.291	5.179	0.023	1.940
Union membership	-0.651	0.371	3.072	0.080	0.522
Education	0.115	0.100	1.321	0.250	1.122
Experience	0.006	0.004	2.535	0.111	1.006
Ownership	0.021	0.266	0.006	0.937	1.021
Hours of operation	0.001	0.053	0.001	0.981	1.001
Ever crashed	-0.571	0.270	4.472	0.034	0.565
Tribe	0.181	0.322	0.317	0.573	1.199
Constant	-0.110	1.023	0.012	0.914	0.896

Summary statistics
Chi-square=19.505; prob=0.034
R² (Nagelkerke)=0.094
-2log likelihood=347.988
Cox&Snell R square=0.069
Cases correctly predicted=61.6%
No of cases=271

Table 3: Logistic regression result for Highway Code Awareness (stepwise)

Regressors	Coefficient	Standard Error	Wald	Sig.	Exp(B)
Constant	0.329	0.454	0.523	0.469	1.389
Licence holding	0.612	0.285	4.626	0.031	1.844
Union membership	-0.618	0.366	2.850	0.091	0.539
Experience	0.006	0.004	2.791	0.095	1.006
Ever crashed	-0.559	0.263	4.516	0.034	0.572

Summary statistics
Chi-square=17.33; prob=0.002
R² (Nagelkerke)=0.083
-2log likelihood=350.163
Cox&Snell R square=0.062
Cases correctly predicted=63.8%
No of cases=271

The result of the stepwise method in Table 3 shows an improvement over the initial result presented in Table 2. Four factors were found to be significant. They are license holding and accident at 0.05 (5% level of significance); and union membership and experience at 0.10 (10% level of significance). The overall model is significant at 0.01 with a p-value of 0.002. The number of cases correctly predicted is now 63.8% against 61.8 obtained in the full model. The stepwise result is therefore used for the evaluation.

The predicted probability of Highway Code awareness for an operator who has license; also a member of the union; with average experience and has been involved in a crash before is 0.5202. However a rider with the above features except that he has not been involved in a crash before has a predicted probability of 0.6547. An Okada rider without a license; not a member of union; least experienced and has had a crash has a predicted probability of Highway Code awareness equal to 0.4442.

In terms of odds ratio, for licence holding and taking licence = 1 as reference category, the odds of highway code awareness for motorcyclist holding license is 1.844 times higher than motorcyclist without license (license = 0). In another words, motorcyclists with license have 84.4% increases in odds of Highway Code awareness than motorcyclist without license.

For union membership, taking union membership = 1 as reference category, the odds of highway code awareness for motorcyclist belonging to a union is 0.539 times lower than motorcyclist who is not a union member (union membership = 0). This can as well be interpreted that motorcyclists belonging to union have 46.1% lower odds of Highway Code awareness than cyclists that do not belong to any union. In the case of crash involvement, using ever crashed = 1 as reference category, the odds of highway code

awareness for motorcyclists with at least a crash is 0.572 times lower than cyclists that have never had a crash. This implies that motorcyclists that have had a crash have 42.8% lower odds of Highway Code awareness than cyclists that have never had a crash.

Experience is measured in months, therefore a month increase in experience of a motorcyclist brings about 1.006 times higher odds of Highway Code awareness. In other words, an increase in experience of a cyclist by a month will bring about 0.6% higher odds of Highway Code awareness.

5.0 Implications for Road Safety

There are three major implications of the above findings on road safety, especially for motorcyclists.

One, a situation where about 41 per cent of commercial motorcycle operators are not aware of the rules of the road places a high road crash risk on them and other road users. Driver licensing requirements are clearly stated in terms of theory and practical tests. To pass the theory, a rider must have read the Highway Code. The above shows that theory and correct practical tests are not conducted. There is the need for the State Vehicle Inspection Office and the Federal Road Safety Commission (FRSC) to implement the rules.

The second implication is the fact that formal education was not found to be a significant factor in determining awareness. Most of the operators are poorly educated. About 25% had no formal schooling. Those who had not more than primary education, that is six years of education irrespective of the quality, accounted for about 57%. The Nigeria Highway Code is published in English language and selected but major Nigerian languages. There is the need to reprint the Highway Code in the three major languages in Nigeria, which should be the basis for education those without formal education.

Thirdly, the FRSC should intensify its awareness campaigns and enlightenment programmes using the commercial motorcycle operators union called Commercial Motorcycle Transport Union (COMTU). The partnership is crucial because, membership of union was found to be a significant factor in the model. The decrease in odds of awareness of Highway Code with respect to Union membership further confirms the fact that riders respect the unions more than the rules of the road. Some believe that once you join the union, you do not need to comply with rules. The right partnership in education and enlightenment campaigns will promote safety values among union members, who may have been operating without following due process. The FRSC will also be fulfilling one of its core mandates, which is road safety education of road users.

6.0 Conclusion

The paper has shown that there are drivers/riders on Nigeria roads who are not aware of the existence of the rules of the road i.e. Highway Code. The road safety record of Nigeria is very poor. If the tide must change for good there is the need for the traffic law enforcement agencies to enforce stated regulations on driver license approval, especially theory and practical tests. Also the agencies should partner with motorcycle unions for awareness campaigns and reprint the Highway Code in local languages. These will inculcate into the operators road rules that they did not learn before commencement of operation. The paper examined the awareness of Highway Code among okada operators. There is the need for further research on the knowledge of drivers especially okada operators on some fundamental aspects of the rules of the road as enshrined in the Highway Code. The areas include road signs, signals and markings. This is pertinent because awareness of Highway Code does not directly translate to right decision making and compliance.

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Appendix Table 1: Vehicle involvement in road crashes in Nigeria (2000-2009)

Year	Heavy vehicle	Light vehicle	Motorcycle	Total
2000	2092 (17.73)	4748 (40.23)	4961 (42.04)	11801
2001	2330 (17.05)	7172 (52.47)	4166 (30.48)	13668
2002	2626 (19.29)	7345 (53.97)	3639 (26.74)	13610
2003	2535 (19.14)	7759 (58.57)	2953 (22.29)	13247
2004	1343 (13.20)	4388 (43.14)	4441 (43.66)	10172
2005	736 (10.90)	4298 (63.67)	1716 (25.42)	6750
2006	726 (5.99)	9851 (81.27)	1544 (12.74)	12121
2007	1275 (9.02)	10905 (77.15)	1955 (13.83)	14132
2008	1513 (15.27)	5787 (58.40)	2610 (26.34)	9910
2009	1880 (20.42)	5236 (56.88)	2090 (22.70)	9206
Total	17056 (14.88)	67489 (58.88)	30075 (26.24)	114,620

Note: % share in parenthesis; computed by the Authors
Source: Federal Road Safety Commission, Abuja