A Synopsis of Factors of Injuries in Road Traffic Accidents in Lagos, Nigeria

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Abstract

The purpose of this study is to examine the factors of injuries from road traffic accidents in Lagos State, Nigeria and to suggest preventive and corrective safety measures towards reducing the traffic accidents in the study area. The reported number of injuries from road traffic accidents in the 20 Local Government Areas of Lagos State from 1970-2001 were compared using the Analysis of Variance (ANOVA). The result showed that for the two factors, Local Government Areas and years, the f-calculated of 21.34 and 9.77 respectively were higher than the f-tabular of 1.57 and 1.46 respectively at 0.05 level of significance. It then implies that the means for each of the factors, reported number of injuries across the 20 Local Government Areas in Lagos State and across different years, 1970-2001, were significantly different. The result of the multiple regression analysis was 0.61. This implies that the proportion of variation in the dependent variables (i.e. length of roads, presence of road safety corps and population) was 61%. The F-ratio of 14.34 was higher than table value of 2.92 at 0.05 level of confidence. This shows that at least one of the independent variable had significant influence on the dependent variable. Based on the findings, recommendations were proffered.

Keywords: Factors; injuries; traffic accident; synopsis; Lagos State

1. Introduction

In almost all countries of Africa, Asia and Latin America, road traffic crashes have become one of the leading causes of death in older children and economically active adults between the ages 30 and 49 years (Murray et al, 1996; Ross et al, 1991; Jacobs et al, 2000 and Atubi, 2012g). Despite this burgeoning problem, little attention has been paid to road traffic injury prevention and treatment in most developing countries. Efforts to combat the problem of injuries have, in most cases, been hampered by paucity of funds and lack of relevant data.

At the global level, road accidents have been ranked as the 9th leading cause of mortality (World Health Organisation, 1998). The World Health Organisation (WHO) estimated that 1.17 million deaths occur each year worldwide due to road traffic accidents. Succinctly, this accounts for about 70% of deaths in developing countries such as Nigeria. The increased rate of fatal road traffic accidents worldwide has been attributed to population explosion and increased motorization (Atubi, 2008 and 2012d). Increased motorization may be characterized briefly as the "automotive revolution", that is, the motorizing of urban population especially in the developing countries.

As in other developing countries, road traffic accidents in Nigeria are one of the most serious problems in need of pragmatic solutions. Yet this problem has been difficult to address probably because of the country's level of development. Nigeria is said to have the highest road traffic accident rate in Africa and second in the world (Obinna, 2007, p. 35; Atubi, 2012c).

Nigeria, like other developing countries, is experiencing a rapid increase in motorization without having adequate road traffic safety mechanisms in place to control the growing number of road traffic crashes and injuries. As reported for other low-and-middle income countries, the main victims are pedestrians, cyclists and public transport passengers (Nantulya et al, 2003; Downing, 1991).

It has been estimated that over 300,000 persons die and 10-15 million persons are injured every single year in road accidents throughout the world (Afukaar, 2003; Krug, 2003; Atubi, 2010a and 2011a). Detailed analysis of global accident statistics indicates that fatality rates per licensed vehicle in developing countries are very high in comparison with the industrialized countries. Moreover, road traffic accidents have been shown to cost around one percent of annual

gross national product (GNP) resources of the developing countries which they can ill-afford to lose (Afukaar, 2003; Atubi, 2011b, 2012d and Atubi and Onokala, 2009).

In Nigeria, road traffic accident situation over the last three decades has been particularly disturbing. In 1976, there were 53,897 road traffic accidents resulting in 7,717 deaths. Although in 1981, the magnitude reduced to 5,114 accidents, but the fatality increased to 10,236 which means that there was an average of 96 accidents and situation in subsequent years has not been any better. The number of people killed in road accidents between 1990 and 2005 rose from 28,253 and the fatality rate remains consistently high (Atubi, 2009c).

When compared with the road traffic accidents in the more developed countries of the world, it can be observed that the situation in Nigeria is simply pathetic. For example, while the road accident was as high as 14.45 per thousand in 23.16 per thousand in 2002, it was about 0.3 and 0.45 for north America and western Europe around the same time. This confirms the statement that RTA rates of Nigeria are as much as 20 times those of Europe and north America. Indeed Nigeria in the 21st century is in a far worse RTA situation than Europe and North America in 1930 and far worse than India, Pakistan, Thailand, Botswana, Niger, Kenya, Seri-Lanka and Tanzania in 2002 (Daramola, 2004; Atubi, 2006; 2012e).

All over the world the phenomenon of road traffic accident has become the most serious traffic problem in need of a pragmatic solution. In Nigeria this problem has been difficult to address probably because of the country's level of development. At the end of 2011, Nigeria was known to have topped the list of 155 countries worldwide with the highest records of death by road traffic accidents (WHO, 2012; Atubi, 2012h).

According to data from the Nigerian Federal Road Safety Commission, the country has the highest rate of death from motor accidents in Africa; leading 43 other nations in the number of deaths per 10,000 vehicle crashes (FRSC, 2006; Obinna, 2007, p. 35). Nigeria is followed by Ethiopia, Malawi and Ghana with 219, 183 and 179 deaths per 10,000 vehicles respectively (Daramola, 2004; Atubi and Onokala, 2009; Atubi, 2012f).

International comparison indicates that the chance of a vehicle killing someone in Nigeria is 47 times higher than in Britain. The proportion of fatalities to injuries reported is also very low. For example, while Czech Republic has only one death in 175 accidents, France one death in 175 accidents, Nigeria has one death in 2.65 accidents (Atubi, 2010b).

Road traffic accidents' statistics in Nigeria reveal a serious and growing problem with absolute fatality rate and casualty figure rising rapidly. In majority of developing countries, accident occurrence and related deaths are relative to either population or number of vehicles. Ironically, in Nigeria, studies have indicated that better facilities in terms of good quality and standardized roads have been accompanied by increasing number of accidents (Onakomaiya, 1988; Ghadamosi, 2002; Atubi, 2012g).

2. Research Methodology

The data that were used in this research work were sourced from secondary sources. This include records of Road Traffic Accidents (RTA) characteristics, such as total number of accidents, total number of injuries from road traffic accident in Lagos State for a period of 32 years (i.e. 1970-2001). Analysis of variance (ANOVA) statistics was used to test for the significance of variability in the reported number of injuries from road traffic accident in the study area. This is becsue analysis of variance allows us to compare simultaneously three or more sample means in order to determine whether the differences between the samples (referred to as the "between sample difference") are significantly higher than the differences that can be observed within each sample (referred to as the "within sample differences").

The multiple regression analysis tools were also used to investigate the factors that influence the number of reported injuries from road traffic accidents in the study area. The dependent variable was reported number of injured from road traffic accidents, while the independent variables considered include length of roads in Lagos State from 1970-2001, presence of Road Safety Corps and population.

3. Study Area

Lagos State is situated in the South Western corner of Nigeria. This elongated state spans the Guinea Atlantic coast for over 180km, from the Republic of Benin on the west to its boundary with Ogun State in the east (figure 1). It extends approximately from latitude $6^{0}2'$ north of $6^{0}4'$ north and from longitude $2^{0}45'$ East of its total area of 3,577sq.km, about 787sq.km or 22 percent is water. Such an environment is bound to affect settlement in Lagos, and that is why the town is composed of separate sections connected by bridges.

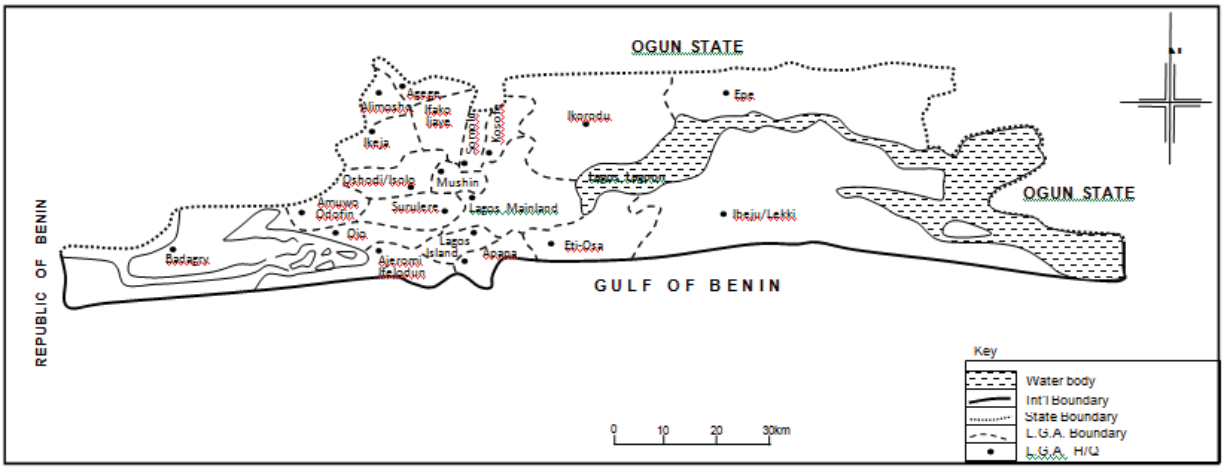

FIG. 1: Map of Lagos State Showing the 20 L.G.AS
Source: Lagos State Ministry of Environment and Physical Planning (1999)

4. Discussion of Results/Findings

The reported number of injured from road traffic accidents in the twenty Local Government Areas in Lagos State from 1970 to 2001 were compared using analysis of variance (ANOVA). Two one –way ANOVA was used, one for testing difference between the reported number of injured from road traffic accidents across the twenty Local Government Areas and the other for testing difference between the reported number of injured from road traffic accidents and across different years, 1970 to 2001. The result showing the ANOVA table for the mean comparisons are presented in table 1.

Table 1: Analysis of variance for reported number of injured from road traffic accidents in Lagos state.

Factor	Sources of variation	Sum of squares	Degree of freedom	Mean square	F.Cal.	F.Tab
Local Government Areas	Between L.G.A.	94477.49	19	4972.50	21.34	1.57
	Within L.G.A.	94138.28	404	233.02		
	Total	188615.77	423			
Years (1970-2001)	Between years	82220.67	31	2652.28	9.77	1.46
	Within years	106395.11	392	271.42		
	Total	188615.77	423			

The result shows that for the two factors, Local Government Areas and years, the calculated f-ratio of 21.34 and 9.77 respectively at 0.05 level of confidence were higher than the table F-ratios of 1.57 and 1.46 respectively. Since the F-calculated were higher than F-table value at 0.05, it then implies that the means for reported number of injured from road traffic accidents for each of the two factors, Local Government Areas and years were significantly different, Duncan New Multiple Range Test (DNMRT) was used for mean comparisons (see Appendix 1).

In order to determine the factors that determine the number of injured from road traffic accidents, a multiple regression analysis was done. Out of the three models tried, the linear form proved better than the double log form and log form considering the number of significant variables, sign of the coefficients with respect to a prior expectation and the size of R^2 value was 0.61. This implies that the proportion of variation in the dependent variable (injured from road traffic accidents) explained by the independent variable was 61%, F-ratio of 14.34 was higher than the table value of 2.92 at 0.05 level of confidence indicating that at least one of the independent variables had significant influence on the dependent variable (see appendix 2).

Table 2: Regression results of the factors of injuries from road traffic accidents in Lagos State

Independent variables	Regression coefficients	Std. Error	t-start	Remark
Length of roads (km)	1.866	0.553	3.371	5
Presence of road safety	95.453	69.76	1.368	NS

Population	-1.47×10^{-5}	0.000	-.955	NS
Constant	36.321	127.104	0.286	

S = Significant at 0.05 level of probability
NS = Not significant

From table 2, only the number of road (km) positively and significantly influenced injured from road traffic accidents. This shows that the higher the length of roads (km), the more the number of injured from road traffic accidents. Road safety has positive but not significant effects on injured from road traffic accidents while effects on injured from road traffic accidents while population had negative but non-significant influence on injured.

5. Policy Recommendations/Implications

For historical and operational convenience, road traffic law is enforced by the Nigerian police, but recently those functions has been shifted to the Federal Road Safety whose activities have been limited through insufficient resources for checking speed violation, careless and dangerous driving and parking offences. Laws and regulations may carry little force of the probability of detection and perceptions of detection are so low that they can safely be ignored; with the present situation the chances of getting caught in a traffic violation are remarkably small. A further escape route for offenders exists in the court which often has erratic patterns of sentencing for road traffic law violation. This situation needs to be improved upon, by ensuring that Federal Road Safety Corps is well funded as no amount should be considered too great for saving the nation of economic loss associated with road fatalities.

Moreover, road transport should be heavily circumscribed by legislation and regulation both in the details of how road space is to be used (e.g. speeds, one-way street, stop and "give way" instructions) and condition of vehicles (constant road worthiness test). To be added to this is the prohibition on the driver engaging in alcohol consumption and wearing of seat belts.

Furthermore, road safety problems do not avail themselves to immediate solutions. They also require strong political commitment to ensure on a long term basis, appropriate monitoring of the road accident situation on which pertinent decisions can be made. The financial implications are enormous and the budgetary constraints are extreme. A cost – effective approach to tackle and better tackle and better address the road safety issues is to implement innovative and well structured pilot programmes, rationally allocate funds for research, identify problems calling for remedial actions and coordinate road safety policies at regional and sub-regional levels.

Preventive measures should also be taken which would include proper design of road networks as well as the planning of the general public transport system to ensure that it runs in an effective and efficient manner as this would reduce the volume of vehicles plying the roads; these measures must be commenced in the early stages of urban planning.

6. Conclusion

While emphasizing an accident prevention policy, it is important that the policy of government emphasizes a reduction in the amount of people's exposure to the automobile through a deliberate reduction in the need for people to move. Polices such as land use planning measures and public transport measures should be properly implemented.

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APPENDIX 1

Descriptivesn Reported Number of Injured from accidents in Lagos State

	N	Mean	Std. Deviation	Std. Error	95% Confidence interval for Mean	
					Lower Bound	Upper Bound
Lagos Island	32	60.3125	24.4282	4.3183	51.5052	69.1198
Ikorodu	32	36.0938	13.1035	2.3164	31.3694	40.8161
Ajeromi	32	52.9375	20.8155	3.6797	45.4327	60.4423
Badagry	32	34.1250	8.5033	1.5032	31.0592	37.1908
Epe	32	30.5313	7.2778	1.2865	27.9073	33.1552
Ikeja	32	69.8125	21.1987	3.7474	62.1696	77.4554
Mushin	32	47.2500	18.9703	3.3535	40.4105	54.0895
Lagos Mainland	32	62.0313	22.7078	4.0142	53.8442	70.2183
Apapa	16	46.8125	15.2456	3.8114	38.6887	54.9363
Osodi/Isolo	16	36.6250	10.4491	2.6123	31.0571	42.1929
Surulere	16	35.0000	5.1121	1.2780	32.7760	38.2240
Shomolu	16	29.7500	9.3773	2.3443	24.7532	34.7468
Agege	13	33.6154	8.5784	2.3792	28.4315	38.7993
Ojo	13	32.6923	11.3606	3.1509	25.8271	39.5575
Eti-Osa	13	17.6154	3.8197	1.0594	15.3072	19.9236
Ibeju-Lekki	13	21.5385	4.7542	1.3186	18.6655	24.4114
Ifako-Ijaye	13	25.4615	5.1578	1.4305	22.3447	28.5783
Kosofe	13	21.5385	6.4490	1.7886	17.4875	25.2817
Alimosho	13	34.0769	9.7849	2.7138	28.1640	39.9899
Amuwo-Odofin	13	22.0769	4.5545	1.2632	19.3247	24.8292
Total	424	41.6698	21.1163	1.0255	39.6541	43.6855

Descriptives Reported Number of Injured from accidents in Lagos State

	Minimum	Maximum
Lagos Island	20.00	102.00
Ikorodu	15.00	60.00
Ajeromi	29.00	100.00
Badagry	19.00	60.00
Epe	20.00	47.00
Ikeja	38.00	105.00
Mushin	20.00	80.00
Lagos Mainland	30.00	101.00
Apapa	29.00	73.00
Osodi/Isolo	25.00	62.00
Surulere	26.00	42.00
Shomolu	4.00	43.00
Agege	20.00	50.00
Ojo	20.00	60.00
Eti-Osa	12.00	25.00
Ibeju-Lekki	16.00	30.00
Ifako-Ijaye	19.00	32.00
Kosofe	12.00	32.00
Alimosho	18.00	48.00
Amuwo-Odofin	18.00	32.00
Total	4.00	105.00

ANOVA

Reported Number of Injured from accidents in Lagos State

	Sum of Square	Df	Mean Square	F	Sign.
Between groups	94477.497	19	4972.500	21.340	.000
Within groups	94138.276	404	233.016		
Total	188615.77	423			

Post Hoc Tests

Homogeneous Subsets

Reported Number of Injured from accidents in Lagos State

Duncan[a,b]

Local Government Area	N	Subset for alpha = .05					
		1	2	3	4	5	6
Eti-osa	13	17.6154					
Kosofe	13	21.3846	21.3846				
Ibeju-lekki	13	21.5385	21.5385				
Amuwo-odofin	13	22.0769	22.0769				
Ifako-ijaye	13	25.4615	25.4615	25.4615			
Shomolu	16		29.7500	29.7500			
Epe	32		30.5313	30.5313			
Ojo	13		32.6923	32.6923			
Agege	13			33.6154			
Alimosho	13			34.0769			
Badagry	32			34.1250			
Surulere	16			35.5000			
Ikorodu	32			36.0938			
Oshodi/isolo	16			36.6250			
Apapa	16				46.8125		
Mushin	32				47.2500		
Ajeromi	32				52.9375	52.9375	
Lagos island	32					60.3125	60.3125
Lagos mainland	32					62.0313	62.0313
Ikeja	32						69.8125
Sig		.1750	.0550	.0670	.260	.092	.078

Means for groups in homogeneous subsets are displayed

a. Uses Harmonic mean sample size = 17.931

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type 1 error levels are not guaranteed.

Oneway

Year	N	Mean	Std. Deviation	Std. Error	95% Confidence interval for Mean	
					Lower Bound	Upper Bound
1970	8	32.3750	12.6258	4.4639	21.8196	42.9304
1971	8	34.1250	14.1162	4.9908	22.3235	45.9265
1972	8	32.0000	6.7188	2.3755	26.3829	37.6171
1973	8	66.3750	26.1967	9.2619	44.4740	88.2760
1974	8	48.3500	14.6361	5.1746	36.0139	60.4861
1975	8	58.5000	19.7918	6.9974	41.9537	75.0463
1976	8	64.5000	21.2199	7.5024	46.7600	82.2403
1977	8	60.0000	18.0079	6.3668	44.9450	75.0463
1978	8	66.2500	25.5273	9.0253	44.9086	87.5914
1979	8	70.1250	18.0510	6.3820	55.0340	85.2160
1980	8	75.7500	27.6961	9.7920	52.5955	98.9045
1981	8	67.6250	27.0340	9.5580	45.0240	90.2260
1982	8	57.5000	18.3925	6.5027	42.1234	72.8766
1983	8	50.1250	21.1555	7.4796	32.4386	67.8114
1984	8	51.8750	15.3571	5.4295	39.0362	64.7138
1985	8	72.5000	34.3386	12.1405	43.7922	101.2078
1986	12	52.1667	22.8904	6.6079	37.6228	66.7105
1987	12	46.4167	9.1498	2.6413	40.6031	52.2302
1988	20	60.5000	27.3546	7.8966	43.1197	77.8803
1989	20	38.8000	19.7580	4.4180	29.5530	48.0470
1990	20	34.4500	20.2081	4.5187	24.9923	43.9077
1991	20	32.2500	10.2489	2.2917	27.4534	37.0466
1992	20	29.6000	8.9760	2.0071	25.3991	33.8009
1993	20	34.6000	12.3689	2.7658	28.8112	40.3888
1994	20	37.6500	16.9776	3.7963	29.7042	45.5958
1995	20	31.7000	13.8530	3.0973	25.2166	38.1834
1996	20	31.7500	9.8562	2.2039	27.1372	36.3628
1997	20	32.1500	10.4794	2.3433	27.2455	37.0545
1998	20	31.3000	7.9280	1.7727	27.5896	35.0104
1999	20	29.8500	9.1667	2.0497	25.5598	34.1402
2000	20	29.1000	11.0449	2.4697	23.9308	34.2692
2001	20	31.6000	9.3999	2.1019	27.2007	35.9993
Total	424	41.6698	21.1163	1.0255	39.6541	43.6855

APPENDIX 2

Variables Entered/Removed[b]

Model	Variables entered	Variables removed	Method
1	Population Number of roads Road safety[a]	19	Enter

a. All requested variables entered
b. Dependent variable: reported number of injuries

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the estimate	Durbin-Watson
1	.529[a]	.280	.203	89.0028	1.026

a. Predictors: (Constant), population, number of roads, road safety
b. Dependent variable: Reported number of injuries

ANOVA[b]

Model	Sum of Square	Df	Mean Square	F	Sign.
1. Regression	86280.049	3	28760.016	3.631	.025[a]

Residual	221801.83	28	7921.494		
Total	308081.87	31			

a. *Predictors: (Constant), population, number of roads, road safety*
b. *Dependent variable: Reported number of injuries*

Coefficients[a]

Model	Unstandardized coefficients		Standardized coefficients	t	Sign.
	B	Std. Error	Beta		
1. (Constant)	-33.481	130.967		-.256	.800
Number of roads	1.697	.570	.876	2.976	.006
Road Safety	29.747	71.877	.150	.414	.682
Population	-2.380E-05	.000	-.659	-1.535	.136

a. *Dependent variable: Reported number of injuries*

Residual Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted value	281.5061	453.3016	364.9375	52.7563	32
Residual	-153.5301	173.7099	-3.20E-14	84.5866	32
Std. Predicted Value	-1.581	1.675	.000	1.000	32
Std. Residual	-1.725	1.952	.000	.950	32

Dependent variable: Reported number of injuries