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TREND OF HIGHWAY ACCIDENTS IN NIGERIA USING HIGHWAY ACCIDENT HAZARD INDEX

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ABSTRACT: The study examines the trend of highway accidents in Nigeria on state basis by comparing the accident data for the periods 1996-1998 and 2005-2007 using Highway Accident Hazard Index (AHI). In the study, states with AHI greater than one are classified as High Accident Locations (HAL) where safety programmes need to be intensified. The study shows that Gombe, Ondo, Ekiti, Delta, Cross River, Ebonyi, Kano, Adamawa, Rivers, Enugu, Bayelsa, Plateau, Oyo, Akwa Ibom, Benue, Osun and Ogun states and the Federal Capital Territory are HAL, while seven states which include Anambra, Edo, Lagos, Zamfara, Jigawa, Niger and Nasarrawa have improved on their accident fatality rate. Overall the study shows that the fatality accident rate in Nigeria increased in 2005-2007 study period when compared with the period 1996-1998 as 18 states are HAL in 2005-2007 when compared with 14 states that are HAL in 1996-1998 study period. Measures suggested for the reduction of casualties on Nigerian roads include promoting safer road use through training and enforcement of road traffic laws, provision of safer road infrastructures among others.

KEYWORDS: Accident Hazard Index, High Accident Locations, Safety

INTRODUCTION

Highway safety has been an issue of utmost concern to all since the advent of automobile. Road accident however continues to have devastating effects both financially and socially on humanity. It is reported that road deaths are on the increase in several of the low income regions of the world unlike what obtains in the highly motorized countries where road death has fallen (Nantulya and Reich, 2002). While in developing countries the accident fatality rate increased by 40 per cent (with the number of vehicles increasing by over 130 per cent), in developed countries the numbers of accidents reduced by 9 per cent, although the number of vehicles increased by only 21 per cent (Jacobs et al, 2000). Nigeria highway safety records is also alarming; a very high road accident rate of 14.45 per thousand was for example, recorded in Nigeria in 1980 compared with about 0.3 and 0.5 per thousand in North America and Western Europe respectively. Road accident has also been identified as a major cause of violent death in Nigeria. In a violent death figure of 274, 874 persons recorded in Nigeria between 1980 and 1995, road accidents alone accounted for 52.3% while notable diseases, murder and man slaughter accounted for 38.4%, 8.9% and 0.4% respectively (Arosanyi, 1991).

OBJECTIVE

The objective of the study is to analyze highway accident data in Nigeria in order to identify High Accident Locations (HAL) within the country and to examine whether there is an increase or decrease in accident rate in Nigeria, in the continuing attempt to improve highway safety.

METHODOLOGY - Accident Rate

A number of methods are used to determine accident rate, which is used in identifying HAL. Parameters which tend to reflect on accident frequencies and are used to normalize accident data in computing accident rate in an area include; travel kilometers/miles of vehicles, population, number of registered vehicles or kilometers/miles of paved highways associated with the area. The most effective of these parameters which is a true reflection of accident rate is travel kilometers/miles of vehicles (Box and Oppenlander, 1976). Vehicle-kilometers of travel is however difficult to use for a geographic area such as a state due to the difficulty involved in obtaining traffic volumes on all highways throughout such a region. Thus population, number of registered vehicles and kilometers/miles of paved highways are the parameters typically used to compute accident rate indices of an area. The accident rate indices computed from the above four mentioned parameters are:

- i. Accident rate per 100 million vehicle-miles or vehicle-kilometers (HMVM or HMVK) which is the travel-based accident index.
- ii. Accident rate per 100,000 populations (PAR) which is the population based accident index.
- iii. Accident rate per 10,000 registered vehicles (VAR) which is the vehicle based accident index.

iv. Accident rate per 1,610km (1000miles) of paved highway (KAR) which is the kilometreage (mileage) based accident index.

Another accident rate index that has been used in literature is Accident Hazard Index (AHI). AHI is computed from population-based accident rate index (PAI), vehicle-based accident rate index (VAI) and the kilometreage-based accident rate index (KAR) (Shen, 1986). PAI, VAI and KAI are computed from equations 1, 2 and 3 respectively.

$$PAI_{iy} = \frac{X_{iy} / P_{iy}}{\sum X_{iy} / \sum P_{iy}} \quad (1)$$

$$VAI_{iy} = \frac{X_{iy} / V_{iy}}{\sum X_{iy} / \sum V_{iy}} \quad (2)$$

$$KAI_{iy} = \frac{X_{iy} / K_{iy}}{\sum X_{iy} / \sum K_{iy}} \quad (3)$$

where PAI_{iy} = population-based accident index in state i for year y ; VAI_{iy} = vehicle-based accident rate index in state i for year y ; KAI_{iy} = kilometreage-based accident rate index in state i for year y ; X_{iy} = number of fatal and injury accidents in state i in year y , P_{iy} = population in state i in year y ; and K_{iy} = kilometreage of paved roads in state i in year y (Shen, 1986). AHI is obtained from the arithmetic average of PAI, VAI, KAI as

$$AHI_i = \frac{PAI_{iy} + VAI_{iy} + KAI_{iy}}{3} \quad (4)$$

Data

A 3-year accident data is considered as an adequate sample for comparison of accident rates among regions (Box and Oppenlander, 1976; Shen, 1986). The 3 years time period is considered as not long enough for the population, motor vehicles registration and highway physical characteristics to change significantly, while at the same time, is not so short that the disadvantage of bias from random accident fluctuation will exist, thereby invalidating the results or making the outcome unreliable (Box and Oppenlander, 1976).

Table 1: Reported Fatal and Injury Accidents by State for the Study Periods

State	1996	1997	1998	2005	2006	2007
Abia	89	155	59	148	122	254
Adamawa	93	105	386	633	320	471
Akwa Ibom	252	313	277	551	564	541
Anambra	257	326	541	183	213	149
Bauchi	295	19	75	323	384	232
Bayelsa	NA	268	77	130	141	159
Benue	319	610	529	1160	1019	911
Borno	104	91	74	160	207	258
Cross River	294	407	385	425	364	467
Delta	524	597	680	379	420	387
Ebonyi	NA	23	9	90	542	150
Edo	796	739	620	349	293	219
Ekiti	NA	48	57	151	235	211
Enugu	157	117	185	472	504	502
Gombe	NA	157	130	104	163	400
Imo	201	93	170	252	251	251
Jigawa	181	196	155	121	103	126
Kaduna	261	676	769	411	722	722
Kano	697	939	864	518	596	495
Katsina	244	245	103	550	351	287
Kebbi	29	42	47	144	184	190
Kogi	198	257	108	89	223	406
Kwara	108	126	111	154	123	174
Lagos	1788	2034	2081	399	380	279
Nassarawa	NA	136	208	121	147	191
Niger	400	364	314	355	144	147
Ogun	957	805	863	1087	1145	1011
Ondo	388	435	395	403	308	296
Osun	268	178	201	945	575	576
Oyo	541	576	717	951	845	532
Plateau	235	178	189	577	608	468
Rivers	380	567	502	254	744	538
Sokoto	134	200	138	127	132	129
Taraba	60	29	135	190	254	242
Yobe	134	92	118	224	155	305
Zamfara	NA	59	93	126	NAV	72
FCT	17	317	224	325	387	264
TOTAL	10401	12519	12589	13981	13858	13012

Source: Adapted from Federal Office of Statistics (1999)

NA: Not Applicable; NAV: Not Available

Reported accident data on states basis for a period of three years each for 1996 - 1998 and 2005 - 2007 was obtained. Data on population and paved highway for the same periods was also collected and used for the analyses.

Table 1 shows reported fatal and injury accidents in Nigeria by states and the Federal Capital Territory (FCT) for the study period 1996 - 1998 and 2005 - 2007. Table 2 shows Nigeria's population and paved federal highways by state. The 1991 census is projected to the three year study period of 1996 - 1998 using the growth rate of 2.83% (Federal Office of Statistics, 1999) while the 2006 population census is projected to the three year study period of 2005 - 2007 with the growth rate of 3.2% (National Bureau of Statistics, 2008).

Table 2: Population and Paved Federal Highway by State

State	1991 Population	Paved Federal Highway			2006 Population	Paved Federal Highway		
		1996	1997	1998		2005	2006	2007
Abia	1913917	517	519	574	2845380	607	607	607
Adamawa	2102053	816	816	920	3178950	1056	1056	1056
A/ Ibom	2409314	505	506	558	3902051	601.9	601.9	601.9
Anambra	2796475	674	518	515	4177828	554.4	554.4	554.4
Bauchi	2861887	1425	1425	1087	4653066	1280	1280	1280
Bayelsa	1121693	NA	NA	67	1704515	167.8	167.8	167.8
Benue	2753077	795	795	1048	4253641	1611	1611	1611
Borno	2536003	1394	1394	1419	4171104	2207	2207	2207
C/River	1911596	919	919	945	2892988	1075.2	1075.2	1075.2
Delta	2590491	643	643	695	4112445	732.5	732.5	732.5
Ebonyi	1453882	NA	NA	157	2176947	502.8	502.8	502.8
Edo	2172005	745	864	854	3233366	916.5	916.5	916.5
Ekiti	1535790	NA	NA	326	2398957	367.2	367.2	367.2
Enugu	2125068	737	833	833	3267837	858	858	858
Gombe	1489120	NA	NA	434	2365040	499	499	499
Imo	2485635	507	507	595	3927563	599.5	599.5	599.5
Jigawa	2875525	656	656	671	4361002	751	751	751
Kaduna	3935618	1666	1666	1680	6113503	1688	1688	1688
Kano	5810470	885	885	909	9401288	908.5	908.5	908.5
Katsina	3753133	787	787	787	5801584	842	842	842
Kebbi	2068490	573	573	641	3256541	862.4	862.4	862.4
Kogi	2147756	941	941	901	3314043	1133	1133	1133
Kwara	1548412	628	628	846	2365353	1044	1044	1044
Lagos	5725116	439	439	676	9113605	675.9	675.9	675.9
Nassarawa	1207876	NA	NA	601	1869377	887	887	887
Niger	2421581	1652	1652	1776	3954772	2177	2177	2177
Ogun	2333726	1048	1048	1072	3751140	1071.8	1071.8	1071.8
Ondo	2249548	947	947	722	3460877	724.4	724.4	724.4
Osun	2158143	504	504	559	3416959	628.5	628.5	628.5
Oyo	3452720	660	662	605	5580894	1060.5	1060.5	1060.5
Plateau	2104536	1236	1236	605	3206531	979.3	979.3	979.3
Rivers	3187864	554	554	593	5198716	657	657	657
Sokoto	2397000	1120	1120	482	3702676	582	582	582
Taraba	1512163	921	921	923	2294800	1624	1624	1624
Yobe	1399687	658	658	661	2321339	877.4	877.4	877.4
Zamfara	2073176	NA	NA	727	3278873	1035	1035	1035
FCT	371674	217	217	217	1406239	236.6	236.6	236.6
TOTAL	88992220	25769	25833	27681	140431790	34081.1	34081.1	34081.1

Source: Adapted from Federal Office of Statistics (1999) & National Bureau of Statistics (2008)

NA: Not Applicable

Limitation of Study

- The accident data for 1996 is not applicable for the six states that were created in that year, namely; Bayelsa, Ebonyi, Ekiti, Gombe, Nassarawa and Zamfara. The road lengths for these states for 1996 and 1997 are equally not available. Their KAR is therefore computed for only one year (i.e. 1998) for the study period 1996 - 1998.
- There is a limitation in using the expressions in equation 4 to obtain AHI. VAI could not be computed due to non-availability of data on the number of registered vehicles in Nigeria on state basis, therefore AHI is obtained in the study from the arithmetic average of only the PAI and VAI as

$$AHI_{iy} = \frac{PAI_{iy} + VAI_{iy}}{2} \quad (5)$$

RESULTS

Table 3a and Table 3b present the population-based accident rates (PAR) and the kilometrage-based accident rates (KAR) for the study periods 1996 - 1998 and 2005 - 2007 respectively for the 36 states in Nigeria and the FCT, with their rankings based on the average PAR and the average KAR.

Table 4 shows the accident hazard indices (AHI) for the states and the FCT with their rankings for study period 1996 - 1998 and 2005 - 2008.

Table 3a: Comparison of States' Population Based and Kilometrage Based Accident Rates for Study Period 1996 - 1998

State	Population Based Accident Rate (PAR)					Kilometrage Based Accident Rate (KAR)				
	1996	1997	1998	Annual Average	Rank	1996	1997	1998	Annual Average	Rank
Abia	0.40	0.58	0.22	0.40	8	0.43	0.62	0.23	0.42	7
Adamawa	0.38	0.36	1.30	0.68	17	0.28	0.27	0.92	0.49	16
A/ Ibom	0.89	0.92	0.81	0.88	21	1.24	1.28	1.09	1.20	26
Anambra	0.79	0.83	1.37	0.99	22	0.94	1.30	2.31	1.52	28
Bauchi	0.88	0.05	0.19	0.37	6	0.51	0.03	0.15	0.23	5
Bayelsa	NC	1.70	0.49	1.09	28	NC	NC	2.53	2.53	36
Benue	0.99	1.58	1.36	1.31	29	0.99	1.58	1.11	1.23	27
Borno	0.35	0.26	0.21	0.27	4	0.18	0.13	0.11	0.14	2
C/River	1.32	1.51	1.42	1.42	32	0.79	0.91	0.90	0.87	23
Delta	1.73	1.64	1.86	1.74	33	2.02	1.92	2.15	2.03	33
Ebonyi	NC	0.11	0.04	0.08	1	NC	NC	0.13	0.13	1
Edo	3.14	2.42	2.02	2.52	34	2.65	1.76	1.60	2.00	32
Ekiti	NC	0.22	0.26	0.24	3	NC	NC	0.38	0.38	10
Enugu	0.63	0.39	0.62	0.55	13	0.53	0.29	0.49	0.44	11
Gombe	NC	0.75	0.62	0.68	18	NC	NC	0.66	0.66	20
Imo	0.69	0.27	0.48	0.48	11	0.98	0.38	0.63	0.66	19
Jigawa	0.54	0.48	0.38	0.47	10	0.68	0.62	0.51	0.60	18
Kaduna	0.57	1.22	1.38	1.06	24	0.39	0.84	1.01	0.74	21
Kano	1.03	1.15	1.05	1.08	25	1.95	2.19	2.09	2.08	34
Katsina	0.56	0.46	0.19	0.40	8	0.77	0.64	0.29	0.57	17
Kebbi	0.12	0.14	0.16	0.14	2	0.13	0.15	0.16	0.15	3
Kogi	0.79	0.85	0.36	0.66	16	0.52	0.56	0.26	0.45	13
Kwara	0.60	0.58	0.51	0.56	14	0.43	0.41	0.29	0.38	8
Lagos	2.67	2.53	2.57	2.59	35	10.09	9.56	6.77	8.81	37
Nassarawa	NC	0.80	1.22	1.01	23	NC	NC	0.76	0.76	22
Niger	1.41	1.07	0.92	1.13	26	0.60	0.45	0.39	0.48	14
Ogun	3.51	2.45	2.61	2.86	36	2.26	1.59	1.77	1.87	29
Ondo	1.48	1.37	1.24	1.36	31	1.02	0.95	1.20	1.06	25
Osun	1.06	0.59	0.66	0.77	20	1.32	0.73	0.79	0.95	24
Oyo	1.34	1.19	1.47	1.33	29	2.03	1.80	2.61	2.14	35
Plateau	0.96	0.60	0.63	0.73	19	0.47	0.30	0.69	0.49	15
Rivers	1.02	1.26	1.11	1.13	26	1.70	2.11	1.86	1.89	30
Sokoto	0.48	0.59	0.41	0.49	12	0.30	0.37	0.63	0.43	12
Taraba	0.34	0.14	0.63	0.37	7	0.16	0.06	0.32	0.18	4
Yobe	0.82	0.47	0.60	0.63	15	0.50	0.29	0.39	0.40	9
Zamfara	NC	0.20	0.32	0.26	4	NC	NC	0.28	0.28	6
FCT	0.39	6.06	4.26	3.57	37	0.19	3.01	2.27	1.83	31

NC: Not Computed

Table 3b: Comparison of States' Population Based and Kilometrage Based Accident Rates for Study Period 2005 - 2007

State	Population Based Accident Rate (PAR)					Kilometrage Based Accident Rate (KAR)				
	2005	2006	2007	Annual Average	Rank	2005	2006	2007	Annual Average	Rank
Abia	0.52	0.40	0.96	0.63	9	0.60	0.46	1.10	0.72	13
Adamawa	2.00	1.02	1.60	1.54	31	1.47	0.75	1.18	1.13	19
A/Ibom	1.42	1.46	1.50	1.46	29	2.25	2.32	2.37	2.31	34
Anambra	0.44	0.52	0.38	0.45	5	0.81	0.95	0.71	0.82	15
Bauchi	0.70	0.84	0.54	0.69	12	0.62	0.74	0.48	0.61	11
Bayelsa	0.77	0.84	1.01	0.87	18	1.90	2.08	2.50	2.16	33
Benue	2.74	2.43	2.31	2.49	36	1.77	1.57	1.49	1.61	29
Borno	0.39	0.50	0.67	0.52	6	0.18	0.23	0.31	0.24	2
C/River	1.48	1.28	1.74	1.50	30	0.97	0.84	1.15	0.99	17
Delta	0.93	1.03	1.02	0.99	21	1.27	1.42	1.39	1.36	25
Ebonyi	0.42	2.52	0.74	1.23	27	0.44	2.67	0.79	1.30	23
Edo	1.08	0.92	0.73	0.91	19	0.94	0.79	0.63	0.79	14
Ekiti	0.63	0.99	0.95	0.86	17	1.01	1.59	1.52	1.37	26
Enugu	1.45	1.56	1.66	1.56	32	1.35	1.46	1.54	1.45	28
Gombe	0.44	0.70	1.83	0.99	20	0.51	0.81	2.12	1.15	20
Imo	0.64	0.65	0.69	0.66	10	1.03	1.04	1.10	1.06	18
Jigawa	0.28	0.24	0.31	0.28	28	0.40	0.34	0.44	0.39	6
Kaduna	0.68	1.20	1.27	1.05	26	0.60	1.06	1.13	0.93	16
Kano	0.98	0.64	0.57	0.73	14	2.48	1.63	1.44	1.85	31
Katsina	0.95	0.61	0.53	0.70	13	1.60	1.03	0.90	1.18	22
Kebbi	0.44	0.57	0.63	0.55	7	0.41	0.53	0.58	0.51	8

Kogi	0.27	0.68	1.32	0.76	15	0.19	0.49	0.95	0.54	9
Kwara	0.65	0.53	0.79	0.66	10	0.36	0.29	0.44	0.36	4
Lagos	0.44	0.42	0.33	0.40	4	1.45	1.39	1.09	1.31	24
Nassarawa	0.65	0.80	1.10	0.85	16	0.34	0.41	0.57	0.44	7
Niger	0.90	0.37	0.40	0.56	8	0.40	0.16	0.18	0.25	3
Ogun	2.91	3.09	2.91	2.97	37	2.49	2.65	2.49	2.54	35
Ondo	1.17	0.90	0.92	1.00	22	1.37	1.05	1.08	1.17	21
Osun	2.78	1.71	1.82	2.10	34	3.69	2.27	2.42	2.79	36
Oyo	1.71	1.53	1.03	1.42	28	2.20	1.97	1.32	1.83	30
Plateau	1.81	1.92	1.58	1.77	33	1.45	1.54	1.26	1.42	27
Rivers	0.49	1.45	1.12	1.02	24	0.95	2.81	2.16	1.97	32
Sokoto	0.34	0.36	0.38	0.36	3	0.54	0.56	0.58	0.56	10
Taraba	0.83	1.12	1.14	1.03	25	0.29	0.39	0.39	0.36	4
Yobe	0.97	0.68	1.42	1.02	24	0.63	0.44	0.92	0.66	12
Zamfara	0.39	0.00	0.24	0.21	1	0.30	0.00	0.18	0.16	1
FCT	2.32	2.79	2.03	2.38	35	3.37	4.05	2.94	3.46	37

Table 4: Comparison of the States by Accident Hazard Index

State	Accident Hazard Index (1996 - 1998)	Rank (1996 - 1998)	State	Accident Hazard Index (2005 - 2007)	Rank (2005 - 2007)
Ebonyo	0.104	1	Zamfara	0.184	1
Kebbi	0.144	2	Jigawa	0.335	2
Borno	0.208	3	Borno	0.379	3
Zamfara	0.270	4	Niger	0.402	4
Taraba	0.276	5	Sokoto	0.461	5
Bauchi	0.301	6	Kwara	0.511	6
Ekiti	0.311	7	Kebbi	0.528	7
Abia	0.410	8	Anambra	0.636	8
Sokoto	0.462	9	Nassarawa	0.644	9
Kwara	0.468	10	Kogi	0.650	10
Katsina	0.485	11	Bauchi	0.652	11
Enugu	0.491	12	Abia	0.674	12
Yobe	0.511	13	Taraba	0.693	13
Jigawa	0.535	14	Yobe	0.841	14
Kogi	0.557	15	Edo	0.849	15
Imo	0.572	16	Lagos	0.854	16
Adamawa	0.584	17	Imo	0.859	17
Plateau	0.608	18	Katsina	0.939	18
Gombe	0.672	19	Kaduna	0.989	19
Niger	0.807	20	Gombe	1.067	20
Osun	0.857	21	Ondo	1.082	21
Nassarawa	0.884	22	Ekiti	1.114	22
Kaduna	0.900	23	Delta	1.177	23
A/Ibom	1.039	24	C/Rivers	1.241	24
C/River	1.143	25	Ebonyi	1.263	25
Ondo	1.210	26	Kano	1.290	26
Anambra	1.256	27	Adamawa	1.337	27
Benue	1.269	28	Rivers	1.496	28
Rivers	1.512	29	Enugu	1.504	29
Kano	1.576	30	Bayelsa	1.516	30
Oyo	1.738	31	Plateau	1.592	31
Bayelsa	1.811	32	Oyo	1.629	32
Delta	1.885	33	A/Ibom	1.887	33
Edo	2.263	34	Benue	2.051	34
Ogun	2.365	35	Osun	2.447	35
FCT	2.699	36	Ogun	2.757	36
Lagos	5.698	37	FCT	2.918	37

DISCUSSIONS

The result for the 1996 - 1998 study periods was compared with that of 2005 - 2007, a time interval of about a decade to assess if there is decrease or increase in accident rate in Nigeria. The result shows that fourteen states namely Akwa Ibom, Cross River, Ondo, Anambra, Benue, Rivers, Kano, Oyo, Bayelsa, Delta, Edo, Ogun, Lagos and FCT have AHI higher than one (locations with AHI higher than one are considered as HAL). In the period 2005 - 2007 however, the number of states with AHI higher than one increased to eighteen. The increase indicates a worsening situation in Nigeria accident rate. It is concluded that serious highway safety problems exist in HAL and measures should be taken to address their peculiarities.

States that were HAL in 1996 - 1998 but are not HAL in 2005 - 2007 include Anambra, Edo and Lagos. These states together with Zamfara, Jigawa, Niger and Nasarrawa have improved on their AHI between 1996 - 1998 study period and 2005 - 2007 study period. States that were not HAL in 1996 -

1998 but are HAL in 2005 - 2007 include Gombe, Ekiti, Ebonyi, Adamawa, Enugu and Plateau states; indicating great worsening of road accidents in the states.

FRSC (2010) identified the main causes of road traffic accidents in Nigeria to include overspeeding, non-adherence to use of safety helmet and safety belts, dangerous overtaking and flagrant disregard to traffic regulations. The poor state of road infrastructures and poor emergency services in form of providing medical services to the injured and also in responding quickly to road incidents such as accidents and breakdown of vehicles are known to have led to deaths and fatal accidents respectively. Strategies to creating safe travel on Nigeria roads should therefore include having safer drivers through training and testing, safer road infrastructures, safer speeds, safer vehicles, safer motorcycling, safer pedestrians and cyclists, better enforcement of traffic laws and promoting safer road use.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are made:

1. Identified states that are classified as high accident locations (HAL) based on their accident hazard index (AHI) which integrates both population-based accident rate (PAR) and kilometreage-based accident rate (KAR) include Gombe, Ondo, Ekiti, Delta, Cross River, Ebonyi, Kano, Adamawa, Rivers, Enugu, Bayelsa, Plateau, Oyo, Akwa Ibom, Benue, Osun, Ogun and the Federal Capital Territory. Safety programmes should be improved in these states.
2. States that were HAL in 1996 - 1998 but are not HAL in 2005 - 2007 include Anambra, Edo and Lagos. These states together with Zamfara, Jigawa, Niger and Nasarrawa have improved on their AHI in 2005 - 2007 study periods when compared with 1996 - 1998 study period.
3. States that were not HAL in 1996 - 1998 but are HAL in 2005 - 2007 include Gombe, Ekiti, Ebonyi, Adamawa, Enugu and Plateau states; indicating great worsening of road accidents in the states.
4. The study shows that there is no improvement in the accident rate in Nigeria, unlike the trend in the developed world.
5. Identified main causes of road traffic accidents in Nigeria include overspeeding, non-adherence to use of safety helmet and safety belts, dangerous overtaking and flagrant disregard to traffic regulations. Poor condition of road infrastructures and poor emergency services are also contributory factors.
6. Safety measures should be taken by all relevant agencies to improve safety on Nigerian highways. Strategies to creating safe travel on Nigeria roads should include having safer drivers through training and testing, safer road infrastructures, safer vehicles, safer motorcycling, safer pedestrians and cyclists and better enforcement of traffic laws among others.

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