

Causes of visual impairment among commercial motor vehicle drivers in Uyo metropolis, Akwa Ibom State, Nigeria

Emem G Abraham¹
Udechukwu F Ezepue²
Rich E Umeh²
Uwemedimbuk Ekanem¹

¹Department of Ophthalmology
University of Uyo Teaching
Hospital
Uyo
Akwa Ibom State
Nigeria

²Department of Ophthalmology
University of Nigeria Teaching
Hospital
Enugu
Enugu State
Nigeria

Author for Correspondence

Emem G Abraham
Department of Ophthalmology
University of Uyo Teaching
Hospital
Uyo
Akwa Ibom State
Nigeria.

E-mail:
ememabraham@yahoo.com
Phone: +234-803-349-7769

Accepted 20th June, 2010

ABSTRACT

Background: Commercial motor vehicles are a very important means of transport in Nigeria where most people do not own personal vehicles and the railway system is not functioning.

Aims and Objectives: The aim of the study is to assess the ocular health status of commercial motor vehicle drivers in Uyo metropolis and to determine the causes of visual impairment amongst them.

Materials and Methods: Uyo is the capital city of Akwa Ibom State in the South-South geo-political zone of Nigeria with a population of 305,961 according to 2006 National population census. This is a cross sectional survey of commercial motor vehicle drivers in all the eleven functional motor parks in Uyo as at the time of the study. A total of two hundred and ninety-one (291) drivers who consented to the study were recruited, interviewed with a standardized questionnaire and examined. Examination included distant visual acuity with Snellen's Chart and near visual acuity with near chart, tonometry using Schiotz's tonometer; penlight and magnifying loupe were used to examine the anterior segment, color vision test was with Ishihara chart, funduscopy with direct ophthalmoscope and visual field assessment by confrontation amongst other tests. Data were analysed with SPSS10 soft ware package.

Results: Mean age of drivers was found to be ± 41.5 years. Prevalence of road traffic accident (RTA) in the study was 24.7%. Human factor contributed 27.7% to the cause of accidents. Causes of visual impairment included refractive error, glaucoma and cataract.

Conclusion: There was no statistically significant association between RTA and visual impairment but there was statistically significant association between RTA and visual field defect ($P=0.037$).

Recommendation: Visual field assessment at least by confrontation should be made a requirement before issuance of motor vehicle driving licence and proper visual field assessment of suspected drivers be done by an ophthalmologist before issuance of license. A State-wide survey of visual status of commercial motor vehicle drivers is recommended.

Keywords: Cataract, drivers, refractive error, road, transportation.

INTRODUCTION

The road is the major means of transportation in Nigeria today. A large percentage of the population does not own motor vehicles and thus depends on commercial means of transport to move from one place to another. Commercial motor vehicles are commonly available in the form of taxi, buses of various capacities, trucks and vans. Studies¹ have shown that safety on the roads is a function of good driving, good vehicles and good roads.

www.ajol/journal/ojm

However, efforts at reducing death toll and morbidity due to traffic accidents (RTA) on our roads have been unevenly concentrated on improving the conditions of our roads and occasional road safety education.

The Federal Road Safety Corps (FRSC) was established in 1988³ by Decree 45 of 1988. This body in 1990⁴ stipulated the minimum visual requirement for issuance of driving licence to be a visual acuity (VA) of 6/12 in the better eye and 6/36 in the poorer eye of private drivers and

6/9 in the better eye and 6/12 in the poorer eye of commercial motor vehicle drivers. The difference in the standards between the two groups of drivers was introduced because the commercial drivers drive for longer periods and under diverse conditions and weather.

There is no provision for re-testing the eye before renewal of licence for motor vehicle drivers. Furthermore, with advancement in age, there is increased prevalence of certain eye diseases such as age-related cataract, primary open angle glaucoma, age-related macular degeneration in the general population and commercial drivers are part of this general population.

Although the population attributable risk of visual status in the causation of road traffic accident is not known in this country, the authors hypothesize that this may amount to a significant percentage. Denying applicants who fail the FRSC vision test driving licence would significantly reduce RTA in our roads. This study intends to determine the causes of visual impairment amongst commercial motor vehicle drivers in Uyo metropolis.

MATERIALS AND METHODS

Uyo, the capital city of Akwa Ibom State is situated at 5° 70' N and 8° 05' E⁵. Uyo falls within the rain forest zone of Nigeria with a mean annual rainfall of 2434.9mm. Temperatures are uniformly high throughout the year with the maximum range of 31°-33°C and minimum of 25°-27°C⁶.

By 2006 census the population of the metropolis was 305,961. At the time of the study it had only five approved government parks, nine approved private motor parks and two tipper parks.

The study population included all registered drivers who are practising in Uyo metropolis

including those whose licences had expired but are still driving. A driver must be in the business of commercial driving for at least three months to be eligible for inclusion in the study. Those excluded from the study were all retired drivers and those who did not consent to participate.

A minimum sample size was calculated using the formula⁷: $n = \frac{z^2 p(1-p)}{d^2}$

n = minimum sample size

z = 1.96 at 95% confidence interval

p = estimated prevalence of drivers with visual impairment from previous work⁸

d = absolute precision required on either side of the proportion = 2%

n = 166 with 10% attrition rate. This can be corrected to 170.

A cross sectional survey of all the drivers in all the eleven functional motor parks in Uyo metropolis was carried out. In each park visited all the drivers present at the time of the visit and who consented to the study were recruited.

All the subjects were registered and interviewed using a standard questionnaire/protocol form that had been developed, pre-tested and fine-tuned for the study.

Distant vision was assessed with standard Snellen's chart and E chart at 6m, near vision was assessed with the use of near vision chart. Visual field assessment was done by confrontation test after the researcher had had her fields earlier tested with Optifield EP-910+v-1.42 automated visual field analyzer and found to be normal. Criteria for visual field testing in this study included: cup-disc ratio >0.5; cup disc ratio disparity between the two eyes of up to 0.2 or more, abnormal disc pallor (localized or generalized).

Colour identification was done using Ishihara pseudoisochromatic plates; tonometry was done using Schiottz tonometer after instillation of

topical lignocaine 1%; anterior segment examination was done with a pen torch and x7 magnifying loupe; and extra-ocular muscle motility assessment was done in all directions of gaze. Posterior segment examination was done with a direct Welch Allen ophthalmoscope through un-dilated pupils. Dilated funduscopy was done in five drivers and the indications for dilatation were very low vision, miosed synechic pupil and dense cataract.

Data was entered into the computer using SPSS 10 (1999) software. For test of statistical significance, the chi-square test or its variant was applied. Observed difference was the probability of occurring by chance (p -value<0.05) was considered statistically significant.

RESULTS

Table 1 describes the 291 drivers in terms of age. The majority are between 30 and 49years of age.

Table1: Distribution of 291 drivers in Uyo metropolis by age

Age group(yrs)	No. of subjects (n)	%
20-29	52	17.9
30-39	71	24.4
40-49	100	34.4
50-59	51	17.5
>/60	17	5.8
Total	291	100.0

Table 2 shows the distribution of visual acuity in the drivers' better eye. Majority (93.2%) had visual acuity of at least 6/9.

Table2: Visual acuity in the better eye of the 291 drivers in Uyo metropolis

VA	No. of drivers (n)	(%)
6/6 or better	249	85.6
6/9	22	7.6
6/12	10	3.4
6/18	5	1.7

6/24	3	1.0
6/36	1	0.3
6/60	1	0.3
Total	291	100.0

Table3: Causes of visual impairment and monocular blindness in the worse eye of the 291 drivers

Causes	No. of drivers (n)	%
Refractive error	7	25.9
Cataract	7	25.9
Glaucoma	2	7.4
Corneal opacity	2	7.4
Refractive error/glaucoma	2	7.4
Aphakia	1	3.7
Pseudophakia	1	3.7
Optic atrophy	1	3.7
Macular hole	1	3.7
Cataract/glaucoma/AMD	1	3.7
Amblyopia	1	3.7
Trauma	1	3.7
Total	27	100

Table 3 shows the causes of visual impairment and monocular blindness in the worse eye. Expectedly the most common causes were refractive error and cataract 25.9% each. Causes of monocular blindness were trauma 3(50%) (resulting in corneal opacity 1, optic atrophy 1, aphakia 1), glaucoma, cataract and age related macular degeneration.

Table 4: Visual field by road traffic accident in 291 drivers of Uyo metropolis

Visual Field Defect	RTA Involvement		Total
	Yes	No	
Constricted both eyes	1	5	6
Only right eye constricted	-	6	6
Only left eye constricted	1	-	1
Total	2	11	13

Table 4 shows the relationship between visual field defect and road traffic accident; visual field is positively correlated with occurrence of RTA; $p=0.037$; relative risk = 0.628

DISCUSSION

In Uyo metropolis, a good number of people

patronize commercial motorcycles, in competition with the available intra-city taxi/bus services. Expectedly, the number of motor drivers in the metropolis was small and as a result the number of drivers recruited and examined for the study was 291. Most of the drivers were under 60 years (94.2%), a good number (5.8%) were 60 years and above. The mean age of drivers was 41.5 years with a standard deviation \pm 11.1 years (table 1). This mean age was higher than what was obtained in Enugu⁸ (38.1years), Ibadan⁹ (38.9years) and Lagos¹⁰ (38.8years), respectively. The difference may be because of the study location, Uyo being a comparatively smaller town than any of the other three cities where previous studies were done is likely to experience more rural-urban migration by younger people for more profitable ventures.

One hundred and nine (37.5%) had their eyes tested before obtaining license. This figure was higher than Erkitola's¹⁰ in Lagos among Mushin taxi/danfo drivers with only 24.1% of the drivers having their eyes tested before issuance of licence. It is also higher than the Australian study¹¹ in which only 15% of the drivers had the test. This positive development may be due to more effectiveness of the FRSC. There was no statistically significant association between lack of test before issuance of driving licence and road traffic accident $p=0.51$.

The prevalence of road traffic accidents in this study was 24.7%. This included both major and minor accidents⁸. Only one driver admitted to being involved in a major road accident. A major accident in this study defined as one resulting in serious damage of the vehicle and/or causing any form of injury or death to person(s) or livestock⁸. This finding was lower than that found by Bassey⁸ but higher than the finding at Ibadan⁹ in which only 3.5% admitted to

being involved in any form of road traffic accident.

There was no way of confirming the findings in this information as this was retrospective and the ability of the driver to recall an unpleasant event such as road traffic accident was being tested. In the case of a major road traffic that had involved the life of the driver, the affected driver will not be available to give the report and this can also account for the small number of the reported accident cases. Besides this, not all accidents (especially minor ones) are reported to the police² therefore, making records incomplete. The lower prevalence of traffic accident in the Ibadan study could be because of the population - the government drivers who maybe more careful on the wheels so as to secure their jobs and possibly earn an accident free bonus at the end of the year. But, at times it may be due to under reporting of accidents particularly the minor ones in order not to jeopardize their jobs. The age distribution of drivers who reported accident in this study was 30-59 years. This is similar to findings in other studies⁸.

The causes of motor vehicle accidents could be divided into four major groups¹² viz. human factors (over speeding, improper overtaking, misjudgment, alcohol intake, traffic violation); vehicle (overload, bad vehicle); traffic environment (bad weather, bad roads); and other causes (reckless crossing of road by pedestrian/motor cycle riders, being hit from behind by another vehicle).

In this study, these factors contributed as follows; vehicle 27.7%, human factor 27.7%, traffic environment 8.2%, and other causes 36.1%. This is different from the finding by Odero, *et al*², in which human factor accounted for 85.5%, vehicle 5.1%, road environment 2.9%, other factors 6.4%. This difference may be due to the difference in the population of

study and the method of gathering data. This study was just a cross sectional study, whereas, Odero, *et al*² got data from a variety of published and unpublished data.

It was also found that buses and taxis² were more involved in road traffic accidents than other types of commercial drivers because they drive for longer hours and longer distances. This is similar to the findings by Mock, *et al*¹³ in which commercial vehicles, principally buses and taxis, were more involved in road traffic accident.

As many as 76.3% of the drivers admitted to ingesting of alcohol, kola nut and cigarettes in various combinations. This is similar to the findings by Basse⁸ in Enugu in which 78.2% of the drivers admitted to alcohol ingestion. These drugs induce insomnia, alter visual perception and delay reaction time especially when consumed in large quantities. Chronic consumption leads to toxic amblyopia⁹. A comparative analysis of alcohol consumption and road traffic accident was not statistically significant $p=0.44$. This is not surprising as the only source of information on accident involvement were the drivers themselves (as efforts to get information on accident rate from the police was not successful) therefore, there may have been a tendency to hold back vital information, thus making the result unreliable. Though this was not statistically significant, yet the relative risk = 1.5 was significantly high. Necessary apparatus for checking blood alcohol level of drivers involved in road traffic accidents and other road mishap as done elsewhere will be a good development.

Ethyl alcohol depresses the CNS just as general anesthesia. The problem is not with the driver who is too drunk to drive but with those with sub-clinical intoxication¹⁴. Alcohol causes depression of centers with

consequent release of inhibition thus causing the driver to over estimate his ability while underestimating his mistakes. There is also a decreased awareness and reaction time to sensory stimuli-visual acuity and ability to register words are impaired⁸.

The laws of Akwa Ibom¹⁵ state that ‘a person under the influence of alcoholic drink or drugs to such an extent as to be incapable of having proper control of such vehicle is guilty of an offence’. This law allows far too much discretionary and subjective decision instead of establishing a definite blood alcohol level allowed for driving¹⁶ above which one should be found guilty as is obtained in other countries which would assist in detecting possible accident offenders in an accident.

Carbon monoxide is produced when smoking and this can reduce oxygen intake by red blood cells¹⁷ and impair retinal sensitivity. The laws of the state do not prohibit a driver from smoking while on duty but from smoking or eating any manner of thing that will make it impossible for him to hold the steering with both hands whilst the vehicle is in motion because of divided attention thus predisposing to road traffic accident. With chronic usage tobacco smoking can result in tobacco amblyopia¹⁸, which is dose dependent. As much as 65(22.3%) of the study population took kola nut only while on duty but 12(4.0%) took kola nut with other CNS stimulants while on duty. The active ingredient in kola nut is caffeine¹⁹, which is a CNS stimulant.

The World Health Organization (WHO) definition of blindness is best corrected vision of less than 3/60 in the better eye or central visual field of less than 10⁰ in the better eye and visual impairment as a visual acuity of less than 6/18 up to or equal to 3/60 in the better eye. In this study, the WHO definition was used. Five (1.7%) (Table 2) of the study population was seen to be visually impaired. This is similar to

the findings by Bassey⁸ (1.6%), Erikitola in Lagos (1.7%). The prevalence of visual impairment in the general population is not known, but studies in neighbouring Anambra State by Nwosu²² showed a prevalence of visual impairment of (1.7%) and Ezepue³⁰ (1.8%) of the general population. Cataract was the leading cause of visual impairment in the better eye (60%) of the affected drivers. This is consistent with WHO classification as number one cause of blindness the world over.

Causes of monocular blindness were trauma (50%) (corneal opacity 1, optic atrophy 1, aphakia 1) glaucoma, cataract and age related macular degeneration. There was no statistically significant relationship between visual impairment and road traffic accident ($p=0.622$ [*chi square*=0.265] *df*=1). Table 4 shows a positive correlation between road traffic and visual field defect ($P=0.937$, relative risk=0.628). Visual field estimation by confrontation was the only feasible method in a field survey of this type in our own environment although it is rather subjective and less reliable. The researcher carried out the examination inter-observer error.

In this study one hundred and eighty-one eyes (30.2%) had symptoms of presbyopia. This is not surprising considering the fact that 4/5 of the drivers in the study were aged ≥ 30 years with a mean age of 41.52 years. Presbyopia is believed to start earlier in Africans than the Caucasians. The finding of pterygium as one of the commonest ocular disease was consistent with the findings amongst taxi drivers in Enugu¹². As they are engaged in an outdoor job, drivers are exposed to some of the aetiological risk factors for pterygium²⁰. Refractive error affected 93 eyes (15.6%) of the drivers. The pattern of the error could not be determined

in a field setup. However, such affected drivers were referred to the University of Uyo Teaching Hospital for further investigation.

Pale-cupped disc seen in 65 eyes (10.9%) was the next most common ocular abnormality. Glaucoma is the second commonest cause of blindness in Nigeria^{21, 22, 23}. In the South-South town of Uyo, it was seen to precede cataract. This is an area that must be looked into again. This finding was higher than that of previous studies^{8, 9} but close to the results of Erikitola¹⁰. Glaucoma has been shown to be a cause of frequent outpatient visits to hospitals in Ibadan²⁴, Lagos²⁵ and Onisha²⁶. Cataract accounted for 59 eyes (9.9%) and majority was age-related. Result was similar to what Akinsola²⁷ had (8%) but lower than Erikitola¹⁰ (19.3%). Cataract is the most common cause of blindness in Nigeria.^{22, 27, 28, 29}

The causes of blindness in the general population where the study sample was taken from was not known but results from studies done in Delta State,²⁹ a neighbouring South-South geo-political State and Anambra State^{22, 30} showed that the causes were not too different from that of the general population neither did drivers have more problems than expected for their age range.

Good distant vision is important for a driver but only five (1.7%) of the two hundred and ninety-one drivers admitted to wearing glasses for distant vision even though the researcher did not see any of them with it. Seventy-three (25.1%) used glasses for reading only, and twenty-six (8.9%) for cosmesis. Other findings in the fundi were consistent with expected changes with age since 57.7% of the studied population was aged 40 years and above. Conjunctivitis was detected in three (0.8%) of the drivers. This was much smaller than the findings by Erikitola¹⁰ 23.2%, and this may be due to the season during which the research was carried out, being the rainy

season and Uyo is in the rain forest zone and epidemic conjunctivitis is more common in the dry season.

CONCLUSION

Majority of the drivers studied had one eye complaint or the other. Presbyopia, pterygium, refractive error, glaucomatous disc cupping and cataract were the common ocular findings. The common causes of visual impairment found in this study included cataract, refractive error and amblyopia. There was no statistically significant association between road traffic accident and visual impairment, but there was significant association between road traffic accidents and visual field defect. Glaucomatous disc cupping was more common than cataract.

RECOMMENDATIONS

Visual field assessment at least by confrontation should be made a requirement before issuance of motor vehicle driving licence. Also, proper central visual field assessment for those suspected cases of glaucoma or other diseases known to affect visual field should be done by an ophthalmologist before issuance of motor vehicle licence. Provision should be made for compulsory general medical fitness and eye test for those >50 years of age and compulsory eye test for those <50 years at renewal of licence. A statewide survey of the visual status of commercial motor vehicle drivers is suggested.

LIMITATIONS

The size of the study population was small since the metropolis is small and the majority of the people prefer motorcycle for intra-city transportation. We lacked some instruments e.g. Titmus or TNO for stereopsis; Farnsworth Munsell 100 hue test for colour vision would have been preferred

to the Ishihara pseudoisochromatic plates that were used. Also a more sensitive instrument for visual field (e.g. Goldman perimeter) would have been more appropriate.

ACKNOWLEDGEMENT

I wish to thank the Sector Commander of the Federal Road Safety Commission, Akwa Ibom State, Cdr Raymond Uduche, and the Senior Vehicle Inspection Officer, Ministry of Works and Transport, Akwa Ibom State for their various assistance.

REFERENCES

1. Ali B.O. Death on our roads. *Niger Med J* 1979; 9:767-770.
2. Odero W, Khayesi M and Heda PM. Road traffic injuries in Kenya: Magnitude, causes and status of intervention. *Injury Control and Safety Promotion* 2003; 10 (1-2): 53-61.
3. Federal Republic of Nigeria Official Gazette. The Federal Road Safety Commission Decree No. 4 Federal Government Press Lagos 1988; 7(82)A 813-824.
4. Agunloye O. In: Guidelines for National Drivers Licence Scheme. Public Education Department Headquarters, Lagos, Federal Road Safety Commission 1990; 6-9.
5. Ogende CI: Diurnal urban traffic flow in Uyo metropolis. Dissertation submitted to Dept of Geog/Regional Planning. Faculty of Social Sciences, University of Uyo Uyo 2005; 6-8.
6. Inyang IB. In: South-Eastern Nigeria; It's Environment. Kaduna: Abam Publishing Co. 2000; 11-102.
7. Bankole MA (ed): Handbook of Research Methods in Medicine. In: Bamgboye EA (ed). Statistics in Medical Research. Lagos Nigerian Educational Research and Development Council, 1991; 127-132.
8. Basse Blessing E. Visual Status of Taxi Drivers in Enugu, Nigeria. Dissertation submitted to National Postgraduate Med. College of Nigeria Nov 1993; 1-62

9. Nwosu SN. Vision Survey of Government Motor Vehicle Drivers in Oyo State. Dissertation submitted to National Postgraduate Med. College of Nigeria May 1988; 1-86.
10. Erikitoa G. Ocular status of motor park drivers as seen in Mushin LGA, Lagos state; Dissertation submitted to National Postgraduate Med College of Nigeria, May 1998; 1-38.
11. McConnell RA, Spall AD Hirst LW and Williams G. Survey of the visual acuity of Brisbane drivers; *Med J* 1991 July 15; 155(2):107-11.
12. Bener A, Ahmed MF and El-Tawil S. Visual impairment and motor vehicle accident. *Middle East J Medicine*. March 2004;1-8.
13. Mock C, Amegashie J and Darteli K. Role of commercial drivers in motor vehicle related injuries. *Inj Prev* 1999Dec; 5(4):268-71.
14. Hayes MMM. Road traffic accidents; their causes and prevention with particular reference to Rhodesia. *Cent Afr J* 1977; 23:71-73
15. Laws of Akwa Ibom State and certain Federal enactments: Dec 2001; 5:591-604.
16. Heng K, Hargerten S, Layde P, Craven A and Zhu S: Moderate alcohol intake and motor vehicle crashes:the conflict between health advantage and at-risk use. *Alcohol-Alcohol* 1941 Jul-Aug; (4):451-4.
17. Maurel A, Apovo M. Y, Boynard M and Lagme G:Effect of smoking on blood rheology. *J. Mal Vasc* 1997 Oct; 22(4):239-43.
18. Kanski Jack J. In: A systematic approach. London, Butterworth-Heinemann 2007; 6th Ed; 2-32.
19. Kim K and Frey JR. Kola nut. Encyclopaedia of alternative medicine; Answers.com: 1-7.
20. Johnson GJ. Pterygium and the prevention of blindness. I.C.E.H. London 1984; 4.
21. Olurin O. Causes of Blindness in Nigeria. A study of 1,000 hospital patients. *West Afr Med J*; 1973 Dec; 22(6): 97-107.
22. Nwosu SN: Ocular problem in young adults in rural Nigeria. *Int Ophthal* 1998; 22(5):259-63.
23. Oluleye TC, Ajaiyeoba AI, Akinwale MO and Olusanja BA:Causes of blindness in southwestern Nigeria- A general hospital clinic studies. *Euro J Ophthal* 2006 Jul-Aug; 16(4):604-7.
24. Olurin O. Primary glaucoma in Nigeria. *East Afr Med J*. 1972;49(10):762-734.
25. Majekodumi A. Glaucoma in Lagos. *Ghana Med J* 1978; 17(1):23-25.
26. Oji EO and Lindau B. The incidence of chronic simple glaucoma and angle closure in the Niger River Clinic, Onitsha, Anambra State, Nigeria. *Ghana Med J* 1980; 19(2):24-27.
27. Akinsola FB, Majekodumi AA, Obowu CB and Ekanem EE. Patteren of Eye Diseases in adults (16years and above) in Ikeja and Alimoso Local government areas of Lagos. *Niger Postgrad Med J* 1995; 2(2):56-61.
28. Umeh RE. The causes and profile of visual loss in onchocerciasis endemic forest-savannah zone in Nigeria. *Ophthalmic Epidemiol*. 1999 Dec; 6(4):303-15.
29. Patrick FG Ashaye AO and Qureshi BD. Blindness and low vision in adults in Ozoro rural community in Delta State. *Niger J Med* 2005 Oct-Dec; 14(4):390-395.
30. Ezepue UF. Magnitude and causes of blindness and low vision in Anambra State of Nigeria. *Public Health* 1997 Sept; 111(5):305-309.