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Journal of Environmental and Occupational Science

available at www.scopemed.org

Original Research

Prevalence of visual impairment among commercial motor vehicle drivers in Uyo, South- South Nigeria

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Received: July 10, 2013

Accepted: September 9, 2013

Published: September 16, 2013

DOI : 10.5455/jeos.20130909012739

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Key words: Visual impairment, drivers, road traffic accident

Abstract

Background: Road transport system is the most patronized system of transport in Nigeria. Most people do not own personal vehicles and so rely solely on commercial motor vehicles for movement from one place to another

Aims and Objective: The aim of this study is to assess the prevalence of visual impairment amongst commercial motor vehicle drivers in Uyo metropolis.

Method: This was a cross sectional survey of 291 commercial motor vehicle drivers carried out in Uyo metropolis between June and July 2006. Anterior and posterior segment examinations were done using appropriate available instruments. Data so obtained was analyzed and the result represented as simple frequency tables and $p<0.05$ was taken as statistically significant.

Result: Mean age of drivers studied was 41.5years ±11.1 years. Prevalence of visual impairment was 5 (1.7%) in the better eye and 21(7.2%) in the worse eye and 6 (2.1%) were monocularly blind. The common causes of visual impairment included cataract, refractive error, and glaucoma. There was a statistically significant association between visual field defect and road traffic accident ($P=0.037$) while there was no statistically significant association between road traffic accident and visual impairment ($P=0.622$).

Conclusion: The prevalence of visual impairment among commercial drivers in Uyo was 1.7% in the better eye and 7.2% in the worse eye and this is statistically significant. We recommend that routine medical and visual reports should be a mandatory requirement before issuance or renewal of license to commercial drivers in Nigeria.

INTRODUCTION

Road transportation is the major means of transport in Nigeria today. A large percentage of the population do not own motor vehicles and thus depend on commercial means of transportation 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. A good number of people venturing into the profession of commercial motor driving have subnormal vision and are unaware of it [1] and this exposes them and other road users to the dangers of road traffic accidents (RTAs).

Introduction of compulsory eye test before issuance of license [2] has not been strictly enforced by the relevant authorities such as the Federal Road Safety Commission (FRSC). The FRSC which was established by decree 45 of 1983 [3], stipulated the minimum visual requirement for issuance of driving license as visual acuity of 6/12 in the better eye and 6/36 in the poorer eye for private motor vehicle drivers while visual acuity of 6/9 in the better eye and 6/24 in the poorer eye was adopted for commercial motor vehicle drivers with or without glasses [4]. The difference in standard between the two groups of drivers was introduced because commercial motor vehicle drivers drive for longer periods and under diver's conditions and weather.

With advancement in age, there is increased prevalence of certain eye diseases such as age related cataract, open angle glaucoma, age related macular

degeneration in the general population and the commercial drivers are not exempted [5, 6, 7]. Mortality and morbidity due to road traffic accident (RTA) involving commercial motor vehicle drivers are on the high side [8] and the economically active age groups are the most affected [9]. This study intends to determine the prevalence of impaired vision among commercial motor vehicle drivers in Uyo metropolis.

MATERIALS AND METHODS

This was a prospective study carried out in Uyo metropolis, the capital of Akwa Ibom State, in South-South Nigeria between June and July 2006. Uyo is urban city with an estimated population of 554,006 people [10] comprised predominantly of Ibibio, Annang and Oron tribes.

At the time of this study, Uyo metropolis had 14 approved motor parks out of which 5 were government motor parks, and 9 were private motor parks. There were two tipper parks in addition totaling 16 motor parks, however only 11 of these were functional

Inclusion criteria:

- Drivers who consented to participate in the study
- Drivers who must have been driving commercially for at least three months.
- Drivers with valid, expired or no license who were still actively driving.

Exclusion criteria:

- Drivers who did not consent to participate
- Retired commercial drivers

The minimum sample size (n) was calculated using a standard formula [11] where n=166 (corrected to 170) with10% attrition rate.

A cross- sectional survey of all the drivers in the eleven functional motor parks in Uyo metropolis was carried out. In each park visited, all the drivers present at the time of each visit and who gave informed consent to the examination were recruited into the study, interviewed by the researcher and trained assistants using a structured questionnaire that had been developed for the study. The questionnaire form was in five parts viz: personal biographic data, driving history, general medical and social history, ocular history and ocular examination.

Each driver underwent a panel of 5 eye tests for the purposes of eye screening, which included visual acuity, anterior segment examination, posterior segment examination, colour vision test and visual field test. Distant visual acuity (VA) was assessed with standard Snellen's alphabet chart and E chart at 6m. Near vision was assessed with the use of near vision chart. Visual field assessment was done by confrontational test by the chief researcher alone to remove observer error after the researcher had had her fields earlier tested using 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; and abnormal disc pallor (generalized or localized). Colour identification was performed using Ishihara pseudoisochromatic plates. Tonometry was performed using Schiotz tonometer after instillation of topical lignocaine 1%. Anterior segment examination was done with a pen torch and x7magnifying loupe. Extraocular muscle motility assessment was done in all directions of gaze. Posterior segment examination was done using direct Welch Allen ophthalmoscope through undilated pupil. Dilated funduscopy was done in 5 drivers. Indication for dilatation included very low vision, miosed synechic pupil and dense cataract.

The World Health Organization (WHO) [12] definition of visual acuity was used in this study. 6/9 or better is normal, 6/12-618 is near normal, 6/24-6/48 is moderate visual impairment, 6/60-3/60 is severe visual impairment, ≤ 3/60 is blindness. CF was used for counting finger at 1meter; PL perception of light; NPL, nil perception of light. Data was analyzed using SPSS 10 (1999) software and presented as simple percentages in frequency tables. Chi-square test was used to calculate all statistical significance a p value of less than 0.05 was considered statistically significant.

RESULTS

Although a minimum of 170 drivers was our calculated sample size for this study, we recruited a total of 291 drivers at the end of the study. The age range was 23-65years with a mean age of 41.5 years ±11.1 years. Table1 shows the age distribution and age group of involvement in road traffic accident (RTA) of the 291 commercial drivers in Uyo metropolis. A total of 72 drivers had been involved in an RTA. Most drivers were in the 40-49year age group followed by those in the 30-39year age group. The age group distribution with highest involvement in RTA in this study was between 30-49 years and human factor accounted for 27.7% (20 out of 72). One hundred and nine(37.5%) drivers had their eyes tested before issuance of driving license and there was no statistical association between lack of eye test before issuance of driving license and road traffic accident P=0.510.

Table 1. Age distribution and Age of involvement in road traffic accidents of 291 commercial motor vehicle drivers in Uyo, South-South Nigeria

Age Group (years)		Involvement in RTA
	Frequency (%)	Frequency (%)
20-29	52 (17.9)	11 (15.3)
30-39	71 (24.4)	23 (31.9)
40-49	100 (34.4)	20 (27.8)
50-59	51 (17.5)	13 (18.1)
60-69	17 (5.8)	5 (6.9)
Total	291 (100.0)	72 (100.0)

Table 2 shows the frequency distribution of visual acuity in the better and worse eye of 291 commercial drivers in Uyo. By WHO definition [12] of visual acuity, majority (286) or 98.3%, had visual acuity of 6/9 or better and 5(1.7%) had visual impairment. Counting finger [CF],light perception [PL], no light perception [NPL]each was seen in the worse eye of 2(0.7%) of the 291 commercial drivers . The most common cause of visual impairment in the better eye was cataract (3 out of 5 cases), followed by refractive error (1 out of 5 cases) and glaucoma (1 out of 5 cases), while in the worse eye, the most common causes were cataract and refractive error (7 out of 21 cases) each and the prevalence increased with age (data not included). Association between visual impairment and RTA was not statistically significant (P=0.622) (Table 3). None of the 72 drivers who had been involved in RTA admitted that visual problem was a cause. Prevalence of visual field defect was 13(4.4%) for at least one eye and 6(2.1%) for both eyes and association between visual field defect and RTA was statistically significant P=0.037 (Table 3). Colour vision defect was seen in10 (2.2%) of the drivers. Some drivers (3.4%) had glare problem. Association between glare and road traffic accidents was not statistically significant in this study (P=0.780) (data not included).

Table 2. Visual acuity in the better and worse eye of the 291 commercial motor vehicle drivers in Uyo, South-South Nigeria

Visual Acuity	Frequency in the better eye (%)	Frequency in the worse eye (%)	WHO classification of visual acuity
6/6 or better	249 (85.6)	215(73.9)	normal
6/9	22 (7.6)	23(7.9)	normal
6/12	10(3.4)	16(5.5)	near normal
6/18	5(1.7)	11(3.8)	near normal
6/24	3(1.0)	11(3.8)	moderate visual impairment
6/36	1(0.3)	6(2.1)	moderate visual impairment
6/60	1(0.3)	4(1.3)	severe visual impairment
CF*	-	2(0.7)	blindness
PL†	-	2(0.7)	blindness
NPL‡	-	2(0.7)	blindness
Total	291(100.0)	291(100.0)	

CF*: Counting finger at 1M, PL†: Perception of light, NPL‡: Nil perception of light

Table 3. Visual impairment and visual field defect by involvement in road traffic accidents in 291 commercial motor vehicle drivers in Uyo, South-South Nigeria

Road traffic accident	Yes	No	Total
Visual impairment (VI)			
Yes	2	3	5
No	70	216	286
Total (VI)	72	219	291
Visual field defect (VFD)			
Yes(Constricted both eyes)	1	5	6
Yes(Only right eye constricted)	0	6	6
Yes(Only left eye constricted)	1	0	1
No	70	208	278
Total (VFD)	72	219	291

Visual impairment: P =0.622, Visual field defect: P=0.037

DISCUSSION

The National Road Traffic Regulations of 2004 stipulates that a driving license should not be issued to an applicant unless the applicant furnishes the concerned authority with certificates of visual acuity test and general medical fitness from a Government hospital [13]. At the time of this study, most people in Uyo metropolis patronized commercial motorcycles which were in competition with the available intra-city taxi/bus services.

The mean age of the drivers in this study was 41.5 ± 11.1years. This was slightly higher than, but in keeping with what was obtained in Enugu [9] (38.1years), Ibadan [14] (38.9years) and Lagos [15] (38.8years).

WHO [12] defined blindness as best corrected vision of less than 3/60 or central visual field of less than 10^0 in the better eye and visual impairment as best corrected visual acuity of less than 6/18 up to or equal to 3/60 in the better eye, normal/near normal vision as visual acuity 6/18 and better. In this study, 5 (1.7%) of the drivers were visually impaired in the better eye. This is similar to the findings by Bassey [9] in Enugu (1.6%) Erikitola [15] in Lagos (1.7%). Although the prevalence of visual impairment in the general population in Uyo is not known, studies by Nwosu [18] and Ezepue [19], in neighboring Anambra state showed a prevalence of visual impairment of 1.7% and 1.8% respectively. The prevalence of visual impairment amongst government motor vehicle drivers in Ibadan, in a study by Nwosu [14], was 3.1%. This high prevalence was probably due to the author's criteria for impaired vision, which was not based on the WHO definition. The prevalence of monocular blindness in this study was 6 (2.1%). This is similar to the findings by Nwosu [14] in Ibadan (2.4%). The causes of monocular blindness included trauma (3) 50% of the cases, glaucoma (1) 18.8%, cataract (1) 18.8% and age related macular degeneration (1) 18.8%.

The prevalence of visual impairment in this study increased with increasing age, which is consistent with other studies [9,14,15]. Alakija [20] in a study of randomly selected drivers in Benin City had a prevalence of 31.7%. He defined impaired vision as a visual acuity of less than 6/5.In our study, 85.6% of these drivers had visual acuity of 6/6 or better. This figure is higher than the findings by other workers [8,14] but similar to that obtained by Erikitola [15] 81.2%. In our study, the association between visual impairment and RTA (P=0.622) was not statistically significant. This is similar to the findings by Erikitola [15] and Cashell [21] who concluded that there was no evidence that visual defects (visual impairment) in drivers may be regarded as having an effect on RTAs. Owsley [22] et al also concluded that there is no strong association between visual impairment and unsafe driving in a driving population. None of the seventy-two drivers who had been involved in RTA in this study admitted that visual problem was as a cause of RTA. In contrast, the studies of Nwosu [14] in Ibadan and Bassey [9] in Enugu which they found that the association between visual impairment and RTA, was statistically significant. Also Bener et al [8] in a cross - sectional study of 1480 drivers in the United Arab Emirates (UAE), concluded that visual impairment was a risk factor for motor vehicle accident. It appears that there is no clear consensus amongst researchers on whether static visual acuity is an important risk factor to causation of RTA or not. Cataract was the commonest cause of visual impairment. Twenty one (7.2%) of the drivers had visual impairment in the worse eye.

In this study, the prevalence of visual field defect was (13) 4.4% for at least one eye and (6) 2.1% for both eyes The confrontational method of estimation of visual field defect was the most feasible method in a field survey in a low resource environment like ours although it is rather subjective and less reliable. The prevalence in this study is higher than that of studies by Bassey, Nwosu, and Erikitola [9, 14, 15] using similar method of examination for reasons yet unknown although it appears that central visual field constriction especially from glaucomatous cupping is more prevalent in south-south town of Uyo. There was statistical significant association between visual field defect and road traffic accident P=0.037. This is similar to the findings by Elkington et al [23] in a survey of two hundred and fourteen glaucoma patients showed that visual field loss had a great influence on driving performance. Also Fishman et al [24] in a study of forty-two patients with retinitis pigmentosa (RP) were seen to be more involved in isolated road accident than the control group. However, 50% of them were not involved in any RTA over the five-year study period. In this study by Fishman et al when the association between driving performance of patients with retinitis pigmentosa and the case controls were examined, the difference in the number of accidents between the two groups was significant.

A study by Szlyk et al [25] of 40 glaucomatous patients and 17 normally sighted subjects indicated that visual field reduced to less than 100% of horizontal extent may place patients with peripheral field loss at greater risk of RTA. Owsley et al [26], in a study of 198 patients to identify the risk factor for vehicle crashes by elderly drivers and 115controls concluded that the restricted useful field of view and glaucoma were the only significant predictors of injurious crash. It can also be said, therefore, that in the matter of association between visual field defect and driving, there appears to be no real agreement amongst the researchers.

Colour vision defect was seen in ten (2.2%) of the drivers. None of the colour defective drivers was involved in RTA. Unlike visual impairment and visual field defect it appears that a good number of workers agree that there is no correlation between color defect and increased RTA.

About 3.4% of the drivers had glare problem. This is in line with the findings by Joane M et al [27] in a study of 46 subjects. Association between glare and road traffic accidents was not statistically significant in this study (P=0.780).

The causes of motor vehicle accidents could be divided into four major groups [17]. These include human factors (over speeding, improper overtaking, misjudgment and poor vision, alcohol intake, traffic violation); vehicle (overload, bad vehicle); traffic environment (bad weather, bad roads); other causes (reckless crossing of road by pedestrians / motor cycle riders, being hit from behind by another vehicle). In this study, human factor contributed 27.7% (20 out of 72) to the causes of accidents. This is in contrast to the findings of Odero et al [17] in Kenya in which human factor accounted for 85.5%. In their study, Odero et al [17] obtained data from variety of published and unpublished work.

Seventy two of the drivers admitted to being involved in at least one RTA in the last five years, hence the 24.7% prevalence of RTA in this study. This included both major and minor accidents [11]. Only one driver admitted to being involved in a major road accident. This finding was higher than that of Ibadan [14] (3.5%). In the Ibadan study, the drivers were all government employed who were more likely to be careful so as to preserve their jobs unlike commercial drivers who are often self employed. We could not verify the history of RTAs in the drivers in our study as the police records were incomplete and most people do not report particularly minor accidents to the police. The age group distribution of drivers with highest rate of involvement in RTAs in this study was between 30 - 49 years (59.7%). This is similar to findings in other studies [9].

Only 109 (37.5%) drivers had their eyes tested before obtaining license. This was higher than what was obtained by Erikitola [15] in a survey in Lagos among Mushin taxi/ “danfo” (rickety city buses) drivers with only 24.1% of the drivers having their eyes tested before issuance of license. It is also higher than the Australian study [16] in which only 15% of the drivers had their eyes tested before issuance of driving license. This difference may be as a result of improved eye health and safety education by concerned government agencies. There was no statistically significant association between lack of eye test before issuance of driving license and road traffic accident P=0.510.

This study was limited by the lack of certain appropriate instruments such as automated perimeter. The inability of some drivers to recollect past RTAs and other relevant information may have also constituted recall bias.

CONCLUSION AND RECOMMENDATIONS

In Uyo, Nigeria, 1.7% of commercial drivers were visually impaired in the better eye and 7.2% were visually impaired in the worse eye. There was no statistically significant association between road traffic accident and visual impairment (P=0.622).There was statistically significant association between visual field defect and road traffic accident (P=0.037).

We recommend that the relevant regulatory bodies ensure that the requirement of routine medical and visual reports from commercial drivers should be enforced before issuance and renewal of drivers' license.

REFERENCES

1. Nwosu SNN, Osuntokun O, Ajayi BGK. Prevalence of subnormal vision among government motor vehicle drivers in Oyo State of Nigeria. Nig Med J 1991; 21 [2]: 51-53.
2. Road Traffic Ordinance, Cap. 184. Laws of the Federation of Nigeria and Lagos, 1958:3313-3336 Government Printer 1978; Vol.IV cap.115.
3. Federal Republic of Nigeria Official Gazette. The Federal Road Safety Commission Degree No.4 Federal Government Press Lagos 1988; 7(82):813-824.
4. Agunloye O. In: Guidelines for National Drivers License Scheme. Public Education Department Headquarters, Lagos, Federal Road Safety Commission 1990:6-9.
5. Olurin O. Causes of blindness in Nigeria. A study of 1,000 hospital patients. West Afr Med J 1973; 22(6):97-107.
6. Ayanru JO. Blindness in Mid Western State of Nigeria. Trop Geogr Med 1974; 26:325-332.
7. Osuntokun O. Blindness in Ibadan. Dokita 1974; 6(2):173-175.
8. Bener A, Ahmed MF, El-Tawil S. Visual Impairment and motor vehicle accident. Middle East J Med 2004; 1-8.
9. Bassey BE. Visual Status of Taxi Drivers in Enugu Nigeria. Dissertation submitted to National Postgraduate Medical College of Nigeria 1993:1-62.
10. Http://www.aksgonline.com. [Accessesed July 1 2013].
11. Bankole MA: Handbook of Research Methods in Medicine. In: Bamgboye EA ed. Statistics in Medical Research. Lagos: Nigerian Educational Research and Development Council 1991: 127-132.
12. WHO: Categories of visual impairment: Strategies for the prevention of blindness in national programs. Technical report series: No 10 Geneva 1984; 703.
13. Federal Republic of Nigeria official Gazette: Traffic Regulations 2004. The Federal Government press, Lagos, Nigeria 79(91)B173-B303.
14. Nwosu SN. Vision survey of government motor vehicle drivers in Oyo State. Dissertation submitted to National Postgraduate Medical College of Nigeria 1989:1-86.
15. Erikitola G. Ocular status of motor park drivers as seen in Mushin L.G.A of Lagos state. Dissertation submitted to National Postgraduate Medical College of Nigeria 1998:1-38.
16. McConnell RA, Spall AD, Hirst LW, Williams G. Survey of the visual acuity of Brisbane drivers. Med J Aust 1991; 155(2):107-11.
17. Odero W, Khayesi M, Heda PM. Road Traffic Injuries in Kenya: Magnitude, Causes and Status of Intervention. Injury Control and Safety Promotion 2003; 10(1 – 2):53 – 61.
18. Nwosu SN. Ocular Problem in Young Adults in Rural Nigeria. Int Ophthamalmol 1998; 22 (5):259 – 63.
19. Ezepue UF. Magnitude and causes of blindness and low vision in Anambra state of Nigeria. Public Health 1997; 111(5):305-9.
20. Alakija W. Poor visual acuity of drivers as a possible cause of motor traffic accidents in Bendel state. Nig J Soc Occup Med 1981; 16:7-10.
21. Cashell GTW. Visual Function in Relation to Road Traffic Accidents. Trans Ophthalmol Soc UK 1966; 76:624.
22. Owsley C, Mcgwin G.Vision impairment and driving. Surv Ophthalmol 1999; 43 (6):535-549.
23. Elkington AR Mackeen JM. Glaucoma and driving. Brit Med J 1982; 285:777-778.
24. Fishman GA, Anderson AJ, Stinson L , Haque A: Driving performance of Retinitis pigmentosa patients. Br J Ophthalmol 1981; 65:122-126.
25. Szlyk JP. Mahler CL, Wilensky JT. Driving performance of glaucoma patients correlates with peripheral visual field loss. Glaucoma 2005; 145-50.
26. Owsley C, Slavery BT, Welles J, Sioane ME, McGwin G Jr. Visual risk factor for crash involvement in older drivers with cataract. Arch of Ophthalmol 2001; 119(6): 881-7.
27. Wood JM, Trutbeck RJ. Effect of age and visual impairment on driving and vision performance. A paper presented at Jan1994 Transportation Research Board annual meeting.