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Visual function survey of commercial intercity vehicle drivers in Ilorin, Nigeria

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ABSTRACT • RÉSUMÉ

Objective: To determine the prevalence of visual impairment among commercial intercity vehicle drivers (CIVDs) in Ilorin, Nigeria.

Design: A cross-sectional descriptive study.

Participants: Among the estimated 450 drivers operating in 5 motor parks for CIVDs in Ilorin, 399 drivers participated in the study.

Methods: A structured questionnaire was administered at the motor parks to consecutive and consenting drivers, and basic ocular examinations were done.

Results: Using the Federal Road Safety Commission's requirement for commercial drivers in Nigeria, the prevalence of drivers with inadequate visual acuity (VA) was determined to be 11.5%, and 3.3% had monocular blindness. The prevalence of abnormal colour vision and visual field loss was 4.3% and 5.5%, respectively. There was no statistically significant relationship between visual impairment (VA and visual fields) and involvement in road traffic accidents ($p > 0.05$). Uncorrected refractive error, cataract, and glaucoma were the commonest causes of visual defects. Three hundred thirty-seven drivers (84.5%) did not have their eyes tested at first licensing and 370 drivers (92.7%) did not have testing at least once during renewals.

Conclusions: A significant number of CIVDs in Ilorin are operating with VA that is far below the expected for their class of licence, and another unacceptably high percentage did not undergo any form of ocular examination prior to obtaining their driving licence. There is a need for renewed efforts to enforce a compulsory basic ocular examination for all prospective commercial drivers, and to ensure that the visual requirement for driving is met.

Objet : Établissement de la prévalence de la déficience visuelle chez les chauffeurs de véhicules commerciaux interurbains (VCI) d'Ilorin, au Nigeria.

Nature : Enquête transversale.

Participants : Parmi les quelque 450 chauffeurs de 5 parcs de VCI d'Ilorin, 399 ont participé à l'étude.

Méthodes : On a administré consécutivement un questionnaire structuré auprès des chauffeurs consentants du parc de véhicules, qui ont aussi subi un examen oculaire de base.

Résultats : En regard des exigences de la Commission fédérale de sécurité routière du Nigeria, on a établi à 11,5 % la prévalence des chauffeurs qui avaient une acuité visuelle (AV) inadéquate et à 3,3 % ceux qui avaient une cécité monoculaire. La prévalence de la vision anormale des couleurs et la perte de champ visuel s'établissaient à 4,3 % et à 5,5 %, respectivement. Il n'y avait pas de rapport statistiquement significatif entre la déficience visuelle (AV et champs visuels) et l'implication dans les accidents de la circulation ($p > 0,05$). Les erreurs réfractives non-corrigées, la cataracte et le glaucome étaient les causes les plus communes des anomalies visuelles. Trois cent trente-sept chauffeurs (84,5 %) n'avaient pas subi d'examen oculaire quand ils ont obtenu leur premier permis de conduire et 370 (92,7 %) n'avaient pas subi de test au moins une fois lors des renouvellements.

Conclusions : Un nombre important de chauffeurs de VCI d'Ilorin conduisent avec une AV qui est bien en deçà des exigences de leur catégorie de permis, et un autre pourcentage inacceptable de chauffeurs n'a subi aucune forme d'examen oculaire avant d'obtenir leur permis de conduire. Il faut renouveler les efforts pour appliquer l'examen oculaire de base obligatoire à tous les éventuels chauffeurs commerciaux et veiller à faire respecter les exigences visuelles pour les chauffeurs.

Commercial intercity vehicle drivers (CIVDs) constitute a very important part of a community, especially in Nigerian society, where a majority of people use public vehicular transport because other modes of transportation (rail, air) are largely nonfunctional or unaffordable.

The most important sensory factor in driving is visual.[1] However, various researchers have found no association between the impairment of some aspects of visual function, such as visual acuity (VA), which is the one most measured, and the occurrence of road traffic accidents (RTAs).[2–6] On the other hand, some investigators have found a correlation,[7–13] although most are weak.[9,11]

The minimum VA requirement for driving in Nigeria as set by the Federal Road Safety Commission (FRSC), to be

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tested at a distance of 6 m, is 6/9 in the better eye and 6/24 in the second eye for commercial drivers.[14] Visual field is not included.

Bearing in mind the pivotal role that CIVDs play in the transportation system and socio-economic life of our country, this study was conducted to determine the visual function status of CIVDs in Ilorin, Nigeria.

Methods

A cross-sectional descriptive study was carried out in Ilorin, capital of Kwara State, in the northwestern part of Nigeria. The 5 major motor parks for CIVDs in Ilorin were the study venue. Of the estimated 450 drivers, 399 consecutive and consenting drivers were included in the study. This study was approved by the Ethical and Research Committee of the University of Ilorin Teaching Hospital, Ilorin.

Four assistants were trained in the administration of the questionnaire and how to perform VA tests. VA testing was done in broad daylight at the motor parks using Snellen (or the illiterate E) charts placed 6 m from the respondents. Each eye was tested separately. The unaided VA, as well as VA with pinhole (when VA was <6/6), were assessed and recorded.

The questionnaire was then administered by face-to-face interview. This elicited information concerning biographical data, driving history, history of involvement in RTAs, ocular history, and general medical history.

One of the authors (B.J. Adekoya) conducted the ocular examinations. Colour vision was tested binocularly using the Ishihara pseudoisochromatic plates. Visual field was tested using the confrontation method. A pen torch was used to examine the lids, conjunctiva, cornea, anterior chamber, pupils, and lens. Fundoscopy was done by direct ophthalmoscopy. Intraocular pressure was checked using the Perkins applanation tonometer, after anaesthetizing the cornea with a tetracaine–fluorescein eye drop.

The participants found to require further assessment, refraction, or surgery were referred to the University of Ilorin Teaching Hospital. The data collected on the questionnaire were analyzed using the Statistical Package for Social Sciences 12.0.1 software (SPSS Inc, Chicago, Ill.). Frequency counts were generated for variables, and χ^2 was used to test for correlation between variables.

Definition of key terms for this study

- Visual impairment: VA in the better eye <6/18, blindness VA <3/60 with the best available correction (World Health Organization definition);[15] 6/9 in the better eye and 6/24 in the second eye for commercial drivers (FRSC definition);[14]
- Cataract: defined for the purpose of this study as the presence of lens opacity causing reduction in VA;
- Glaucoma: presence of a pale, cupped disc with a cup-to-disc ratio of 0.7 or more;
- Uncorrected refractive error: improvement in VA with the use of a pinhole;
- Abnormal colour vision: the inability to correctly identify 1 or more pseudoisochromatic plates; and
- Abnormal visual field: the presence of 1 or more abnormal quadrants on confrontation perimetry.

Results

Three hundred ninety-nine CIVDs participated in the study. This represents about 88.7% of the total estimated population of CIVDs in the 5 parks. All were males. Fig. 1 shows the age distribution of respondents. The mean age was 44.7 (SD 10.1) years. Most participants (39.1%) were between 41 and 50 years old.

One hundred sixty-eight (42.1%) had no formal education, whereas 149 (37.3%) had at least primary education. Sixty-eight (17.0%) and 14 (3.5%) had secondary and postsecondary educations, respectively.

Three hundred thirty-seven drivers (84.5%) did not have their eyes tested at first licensing and 370 drivers (92.7%) did not have testing at least once during renewals. Two (0.5%) of the drivers admitted to driving without the necessary licence.

Table 1 shows the presenting VA of the better and second eyes. Most of the drivers had VA of 6/9 and above in the better and second eyes. The prevalence of drivers with visual impairment, according to the World Health Organization definition,[15] was 2.8%. However, by FRSC standards,[14] 46 drivers (11.5%) had inadequate VA for holding a commercial vehicle licence on account of VA <6/9 in the better eye and (or) VA <6/24 in the second eye. Thirteen drivers (3.3%) had monocular blindness, with VA <3/60 in 1 eye.

Table 2 shows the causes of inadequate VA in the CIVDs examined. Uncorrected refractive error and cataract were

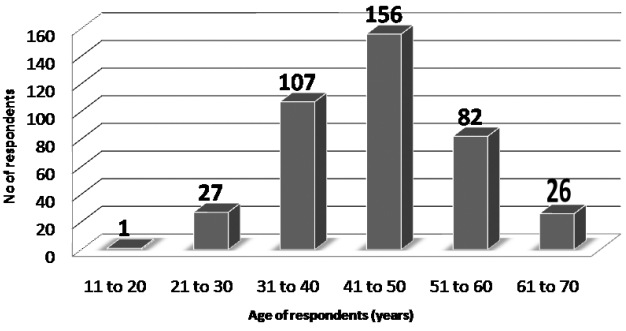

Fig. 1—Age distribution of commercial intercity vehicle drivers in Ilorin.

Table 1—Visual acuity in the better and second eyes

	Better eye		Second eye	
Visual acuity	*n*	%	*n*	%
6/4–6/18	388	97.2	363	91.0
<6/18–6/60	11	2.8	21	5.2
<6/60–3/60	0	0.0	2	0.5
<3/60	0	0.0	13	3.3
Total	399	100.0	399	100.0

the commonest in the better eyes, whereas glaucoma and cataract were more predominant in the second eyes. Two drivers had complications from previous cataract surgeries; these were bullous keratopathy and suspected retinal detachment. Glaucoma (38.4%) was the commonest cause of monocular blindness, followed by cataract. Nine of the 13 drivers with monocular blindness believed that their vision was good enough for commercial driving.

Seventeen (4.3%) of the drivers had abnormal colour vision. Eight of them had VA of 6/4 to 6/6 and no other ocular comorbidity. Eight others had cataract and 1 had glaucoma.

Visual field defects were seen in 4 (1.0%) and 22 (5.5%) drivers' better and second eyes, respectively. Causes of visual field defects in the better eyes were cataract (n = 3) and advanced pterygium (n = 1).

Eighty-three drivers (20.8%) had a history of RTA. Table 3 shows the correlation of VA and visual field with accident records.

In this study, 66.2% of the drivers were between 41 and 50 years of age. This finding is higher than those from other similar studies in Nigeria[16–18] and could have been due to selective recruitment of younger drivers in these studies, unlike in our own. About half (42.1%) of our study population was without formal education, which may have affected their ability to read and interpret road signs.

Table 2—Causes of visual impairment (FRSC standard) in the better and second eyes of the respondents

	Better eye (n = 27)		Second eye (n = 32)	
Causes	n	%	n	%
Uncorrected refractive error	10	2.5	6	1.5
Cataract	10	2.5	8	2.0
Glaucoma	1	0.3	8	2.0
Pterygium	4	1.0	1	0.3
Optic atrophy	0	0.0	2	0.5
Complications from cataract surgery	0	0.0	2	0.5
AMD	2	0.5	2	0.5
Presumed ocular toxoplasmosis	0	0.0	1	0.3
Cornea opacity	0	0.0	2	0.5

Note: FRSC, Federal Road Safety Commission; AMD, age-related macular degeneration.

Table 3—Relationship between vision and involvement in road traffic accidents in last 10 years

	Involvement in road traffic accidents, n		
Vision	Yes	No	Total
Visual acuity better eye*			
Adequate	77	295	372
Inadequate	6	21	27
Total	83	316	399
Visual acuity second eye†			
Adequate	75	292	367
Inadequate	8	24	32
Total	83	316	399
Visual fields‡			
Normal	76	301	377
Abnormal	7	15	22
Total	83	316	399

*$\chi^2 = 0.035$, df = 1, $p = 0.851$.
†$\chi^2 = 0.372$, df = 1, $p = 0.542$.
‡$\chi^2 = 1.715$, df = 1, $p = 0.190$.

Most of the drivers examined did not have their eyes tested at first licensing and at least once during renewal. This is in agreement with the findings of other authors in Nigeria.[7,8,17] There is a need to address this through an aggressive public awareness campaign and an enforcement by those charged with the responsibility of issuing driving licences.

Even though most of the drivers had adequate VA, a significant number (11.5%) still fell below the expected VA. This compares favourably with the findings of a previous researcher[17] who used the same standard. A study of VA in drivers in Brisbane, Australia showed that 8% failed to meet the Queensland VA requirements for their class of licence.[19] However, Nwosu et al.[18] found a prevalence of 3.1% with a definition of subnormal VA as 6/18 or less in the better eye, whereas McMoli and Ogunmekan,[20] with a definition of <6/9 in the better eye, reported a prevalence of 9.1% among some Nigerian drivers. These variations may be explained by the different standards used by different researchers. The absence of a statistically significant relationship between poor VA and RTA in this study may be due to the multifactorial nature of road crashes, which were not accounted for. Studies have shown that dynamic VA has a better correlation with the occurrence of RTA.[21,22] Also, drivers with poor vision might have been involved in an accident and killed or have been incapacitated and stopped driving.

Most of the drivers with inadequate VA were either unaware of it or had a wrong perception of what constitutes an adequate VA for driving. This is because most of them (80.4%) actually believed their vision was good enough to drive a commercial vehicle. Two of the drivers with monocular blindness found out for the first time in the course of this study, which emphasizes the importance of regular eye tests in all prospective drivers, commercial drivers in particular.

Colour vision abnormality findings in this study were similar to the findings of other authors[16,18] in Nigeria. They were, however, lower than the findings of other authors in Europe.[23,24] Defective colour vision is not a barrier to driving private and commercial vehicles in most countries;[14,25–28] however, colour vision defects may be hazardous if they cause confusion in identifying traffic lights. They have been shown to contribute to some difficulties in driving,[29,30,31] although a direct link with increased crash risk has not been established.

The use of the confrontation method to detect visual field defects because of the nonavailability of more sensitive tests is a limitation. Visual fields tests are currently not included in the minimum visual standards for drivers in Nigeria. However, Alli[32] has suggested a minimum standard of a horizontal binocular visual field of 140° or more and that any visual field <110° should be a contraindication for driving in Nigeria. This study, however, did not reveal any significant association with impaired confrontation fields and accident records.

Conclusions

A significant percentage of CIVDs studied had an inadequate level of VA for their class of licence, and a much larger percentage did not undergo any form of eye test, either at first licensing or at renewals. However, no significant relationship was found between visual defects (VA and visual fields) and self-reported accident records. Despite this, it is necessary to mandate a compulsory eye test for potential applicants, especially commercial drivers, and to refer those who fail the basic vision test to ophthalmologists for proper assessment, to prevent potential accidents.

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