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# PREVALENCE OF PRESBYOPIA, REFRACTIVE ERRORS AND USAGE OF SPECTACLES AMONG COMMERCIAL INTERCITY VEHICLE DRIVERS IN JOS, NIGERIA.

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## ABSTRACT

**Aim:** *To determine the prevalence of presbyopia, refractive errors and usage of spectacles among Commercial Intercity Vehicle Drivers in Jos-Nigeria.*

**Method:** *A descriptive cross-sectional survey of commercial intercity vehicle drivers at the Bauchi Road Motor Park, Jos, was undertaken in November 2006. The study instrument was a semi-structured questionnaire. Information obtained included demographic data, operational route, history of involvement in road traffic accident (RTA), cause of RTA and ocular history, type and usage of corrective spectacles if any. Each participant had a detailed ocular examination.*

**Result:** *Up to 221 of 268 drivers were recruited (coverage: 82.5%). Their age ranged from 20-90 years (mean: 44.2 years, SD 9.2). 78 (35.3%) persons complained of difficulty in reading small prints while 17(7.7%) persons complained of poor distant vision. Ten (4.5%) drivers had a visual acuity of <6/12 and thus did not qualify to possess a driving licence. Presbyopia was the most common ocular diagnosis observed in 94(42.5%) persons. Most presbyopes 63 (67.0%) needed +1.50 to +2.00 DS correction. Only 10(10.6%) presbyopes had spectacles with presbyopic correction. Six (2.7%) persons had myopia while one person (0.5%) had unilateral aphakia.*

**Conclusion:** *The prevalence of Presbyopia is high. Myopia is the most common refractive error. Usage of corrective spectacles is very low. There is an urgent need for enforcement of minimal visual standards for the purpose of certification and re-certification for drivers licence in Plateau State and Nigeria at large.*

**Key words:** *Drivers, Vision, Spectacles*

## Introduction

Driving, a very important practice worldwide is necessary for various purposes which include work, social life, pleasure and entertainment among others. It facilitates the performance of routine daily activities and is thus an integral part of the concept of quality of life.<sup>1</sup>

Annually, an average of 10,000 Nigerians are killed while another 25,000 are injured from road traffic accidents (RTAs).<sup>2,3</sup> More than half the people killed in traffic crashes are young adults aged between 15 and 44 years,<sup>3-5</sup> often the breadwinners in a family. This high rate of accidents on our roads could be attributed in part to urbanization, industrialization, as well as the increase in the

number of motor vehicles on the roads. Though the likelihood of involvement in RTAs is multifactorial; one of the most important factor is impaired vision. Up to 95% of the sensory input required for driving is visual.<sup>6</sup> Several studies have shown a strong relationship between RTAs and drivers vision.<sup>7-12</sup> Driving in unfamiliar areas also involves the ability to read signs, for which good acuity is necessary. The importance of the visual system as the input channel for sensory information necessary when driving cannot be over-emphasized.<sup>6</sup> Accidents attributed to poor vision resulting from an underlying refractive error can be easily prevented if such patients are identified and provided the corrective spectacles. Efforts to

address road safety are minimal in comparison to this growing human suffering.

The primary purpose of public policy requiring vision testing for driver's license issuance and renewal is to identify individuals with functional vision impairment and when necessary, to restrict their driving. In Nigeria, though there is a minimum legal requirement for visual acuity before a driver's license can be issued,<sup>13</sup> this is however not adhered to in practice.

The public automobile transport system is the sole means of transportation for majority of the Nigerian populace. Therefore, the assessment of ocular morbidities of public transport drivers is essential from the preventive point of view.

Jos, the administrative capital of Plateau State, Nigeria, has several intercity public transport motor parks. The largest and most popular of these, is the Bauchi Road Motor park, managed by the National Union of Road Transport Workers (NURTW). There has been no study on the prevalence of refractive errors among drivers in this motor park so as to make suggestions to improve eye health of drivers in the public sector. We thus conducted a study to address this issue.

### **Study definitions**

**Refractive error:** was defined as a presenting visual acuity of less than 6/9 which improved with the aid of a minimum of 0.50 diopter sphere or 0.25 diopter cylinder.<sup>14</sup>

**Presbyopia:** was defined as difficulty seeing small prints at a reading distance of 33 centimeters in subjects aged 40 years or more, which is correctable with convex lenses of at least 0.5 diopter sphere.<sup>14</sup>

**Aim:** To determine the prevalence of presbyopia, refractive errors and usage of spectacles among Commercial Intercity Vehicle Drivers in Bauchi Road motor park Jos-Nigeria.

### **Methodology**

This was a descriptive cross-sectional survey. The target population were all registered commercial intercity vehicle drivers (CIVDs) who use the Bauchi Road Motor Park as an operational base. Ethical approval for the conduct of the study was obtained from the Medical Research Ethics Committee of Jos University Teaching Hospital. An informed consent was obtained from the Chairman of the National Union of Road Transport Workers, Bauchi Road Motor Park and from all recruited drivers. The study was conducted at the motor park in November 2006 and lasted for one week.

The survey team comprised two ophthalmologists and two ophthalmologist-in-training. The study instrument was a semi-structured questionnaire which was administered to each participant on a one-on-one basis. Information obtained during the interview included demographic data, operational route, history of involvement in road traffic accident (RTA), cause of RTA, ocular history, type and usage of corrective spectacles if any. Thereafter, each individual had visual acuity (VA) testing done by an ophthalmologist-in-training. The VA was assessed unaided, then aided with glasses or pin hole using an un-illuminated snellen or "E" chart outside in daylight from a test distance of 6 meters. Near VA was assessed with the Jaeger's reading chart held at a distance of 33cm. Ocular examination was conducted by an ophthalmologist. The anterior segment of the eye was examined with pen-torch. The posterior segment was examined with a direct ophthalmoscope. The principal cause of visual loss for each eye and for the person was documented in accordance with WHO guidelines. The major cause is attributed to the primary disorder. When two primary disorders exist, the preventable or treatable cause of visual loss is selected.<sup>15</sup> Refraction was done by an ophthalmologist-in-training using a Keeler streak retinoscope, trial frame, trial lens set, snellen chart and Jaeger's reading chart for presbyopic correction. To determine the presence of underlying refractive error, an objective refraction was conducted with a streak retinoscope first, this was then followed by a subjective refraction. A presenting VA of less than 6/9 which improved with the aid of at least 0.50 diopter sphere were considered significant refractive error. Eyes with visual acuity of less than 6/18 were considered to be visually impaired in line with International Statistical Classification of Diseases and related Health problems, tenth revision (ICD-10).<sup>16</sup>

Those who required intraocular pressure measurement, visual field assessment and surgery were referred to Jos University Teaching hospital for further assessment.

A total of 221 data were collected and entered into Epi-info version 6.04d, WHO, Geneva, Switzerland. Data entry validation was done through duplicate entry. Frequency tables and proportions were used for data summarization.

### **Results**

Of 268 registered commercial intercity vehicle drivers (CIVDs) in the motor park, 221 were recruited and assessed (coverage: 82.5%). All the

drivers were male. Their age ranged from 20-90 years (mean age: 44.2 years, SD: 9.2). Majority 214 (96.8%) were within the productive age group of 20-59 years and 162 (73.3%) were aged 40 years or more (table 1). All the six geo-political zones of the country including the Federal Capital Territory are covered by drivers operating in the motor park.

A total of 58 (26.2%) drivers reported involvement in Road Traffic Accident since they started working as CIVDs. Seventy-eight (35.3%) persons complained of difficulty in reading small prints while 17 (7.7%) persons complained of poor distant vision. Most drivers were not visually impaired by WHO classification as 213 (96.4%) persons had a visual acuity of 6/18 or better (Table 2). However, ten (4.5%) drivers had a visual acuity of <6/12 and thus did not qualify to possess a driving licence (table 2). Up to 7 (3.1%) drivers were visually impaired while 1(0.5%) had severe visual impairment by WHO definition (table 2). A total of 8 (3.6%) respondents had low vision.

Presbyopia was the most common ocular diagnosis in the study cohort, observed in 94 (42.5%) persons. Presbyopic correction among the study cohort ranged from +0.50 diopter sphere (DS) to +3.00 DS. Most presbyopes in the study cohort 63 (67.0%) needed correction ranging from +1.50 to +2.00 DS. Only 10 (10.6%) drivers had spectacles with presbyopic correction. Of these only 4 (40%) used them regularly. The other cases of refractive error needing corrective spectacles were due to myopia observed in 6 (2.7%) persons. One person (0.5%) had unilateral aphakia and was not offered spectacle correction. The range of corrective spectacles among the 12 myopic eyes in the study cohort was -1.00 to -2.00DS (Figure 1). No myope in the study cohort was using spectacles.

Majority 57 (98.3%) of drivers who reported involvement in RTA had a VA that was  $\geq 6/18$  and were thus not visually impaired by WHO classification. Only 1(1.7%) driver with history of involvement in RTA had a VA less than 6/18. This study did not reveal any correlation between poor distant vision (VA<6/18) and risk of involvement in RTA.

**Table 1:** Age Distribution of the study population

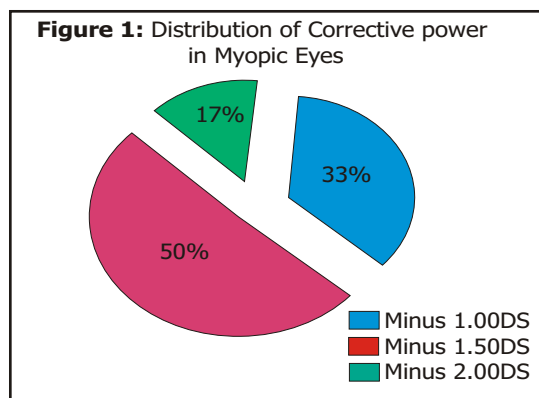
Age Group	No	%
20-29	9	4.1
30-39	50	22.6
40-49	97	43.9
50-59	58	26.2
60-69	4	1.8
70-79	2	0.9
80+	1	0.5
<b>Total</b>	<b>221</b>	<b>100</b>

**Table 2:** Distribution of visual status of the study population

Category of VA	WHO Category of Vision	No	%
6/6-6/12	No Visual Impairment	211	95.5
<6/12-6/18	No Visual Impairment	2	0.9
<6/18-6/60	Visual Impairment	7	3.1
<6/60-3/60	Severe Visual Impairment	1	0.5
<b>Total</b>		<b>221</b>	<b>100</b>

**Table 3:** Distribution of Presbyopic correction

Correction (Diopter Spheres)	No	%
+0.50	1	1.1
+0.75	1	2.1
+1.00	5	5.1
+1.50	25	26.6
+1.75	8	8.5
+2.00	30	31.9
+2.25	4	4.3
+2.50	15	16.0
+2.75	2	2.1
+3.00	2	2.1
<b>Total</b>	<b>94</b>	<b>100</b>



**Discussion**

This study revealed that close to three-quarter of the CIVDs in the main motor park in Jos metropolis are aged  $\geq 40$  years similar to what was observed in Ilorin-Nigeria.<sup>17</sup> Older people comprise the fastest growing sector of the driving population with important implications for road safety as the prevalence of ocular morbidity increases with age.<sup>18</sup> Presbyopia, was the most common ocular morbidity observed in this study, similar to what was observed in Ilorin<sup>17</sup> and Ibadan.<sup>19</sup> A higher proportion of respondents had presbyopia compared to findings from Ilorin and Ife.<sup>7,20</sup> This is not surprising as a higher proportion (73.3%) of this study population were aged  $\geq 40$  years. Presbyopia is an ocular condition that is characterized by a gradual decline in the accommodative amplitude of the eye with onset from about the age of 40 years in emmetropes. The most common symptom of presbyopia is difficulty seeing small prints. Though a significant proportion of drivers were presbyopic, only slightly



above 10% had spectacles with presbyopic correction, which is less than what was observed in Ibadan (32.3%).<sup>19</sup> However, the range of dioptric correction we found, is similar to what was observed in Ibadan (+1.25DS to +3.00DS).<sup>19</sup> The prevalence of refractive error observed in this study is similar to what was observed in Ilorin (4.2%)<sup>17</sup> but far less than what was observed by Bekibele in Ibadan (16.7%),<sup>19</sup> and Nwosu in Oyo state (20.2%).<sup>21</sup> This variance could be due to the highly selective nature of the study cohort in these two studies as the study cohorts were employees in government institutions, for which some level of literacy was mandatory. Though our study did not reveal any correlation between visual impairment from refractive error and the risk of being involved in RTA, there may have been some concealment of RTA history by the drivers in the study cohort for fear of losing their jobs. The commonest type of refractive error was simple myopia observed in 12 eyes similar to what was observed by Adegbehingbe et al<sup>22</sup> and Ositelu et al<sup>23</sup> who all reported myopia as the most common refractive error among patients from Western Nigeria. This is however in variance to what was observed by Bekibele et al<sup>19</sup> and Nwosu<sup>21</sup> who both documented hypermetropia as the most common refractive error in their respective studies. The fact that some drivers in the study cohort were visually impaired in both eyes due to uncorrected refractive errors reveals the urgent need for periodic visual screening exercise and the need for law enforcement agencies to ensure that CIVDs have ophthalmological assessment before issuance or renewal of driver's license. It is obvious that drivers in the public transport system take their ocular health for granted.

The very low proportion of drivers who were wearing corrective spectacles among the study cohort is of great concern. A qualitative study in Nigeria revealed that most drivers wrongly believe that wearing glasses was a sign that something was wrong with their eyes and this could in some way affect their driving.<sup>19</sup> Cost and lack of awareness have also been implicated as barriers to spectacle wear in Nigeria.<sup>24</sup> This study also reveals the need for health education among drivers in the public transport system.

**Conclusion:** The prevalence of Presbyopia is high. Myopia is the most common refractive error. Usage of corrective spectacles is very low. There is an urgent need for enforcement of minimal visual standards for the purpose of certification and re-

certification for drivers licence in Plateau State and Nigeria at large.

#### References

1. **Owsley C, McGwin G Jr.** Vision impairment and driving. *Surv Ophthalmol*, 1999; 43 (6):535-550
2. **The Nigeria Police Force Management services and Research department.** Data on establishment of force. Force Headquarters Lagos, 1989. p. 1-19
3. **Oyemade A.** Epidemiology of road traffic accidents in Ibadan and its environs. *Nig Med J* 1973; 3:174-177
4. **Krug EG, Sharma GK, Lozano R.** The Global Burden of Injuries. *Am J Pub Health* 2000;9(4):523-6
5. **Asogwa SE.** Some characteristics of drivers and riders involved in road traffic accidents in Nigeria. *East Afr Med J* 1980;57:399-404
6. **Taylor JF.** Vision and driving. *Practitioner* 1982;226:885-9
7. **Humphries D.** Three South African studies on the relation between road accidents and drivers' vision. *Ophthalmic Physiol Opt* 1987; 7:73-79
8. **Allen MJ.** Automobile visibility problems. *J Am Optom Assoc* 1965; 36(9): 807-810
9. **Laberge-Nadeau C, Dionne G, Maag U et al.** Medical conditions and the severity of commercial motor vehicle driver's involvement in road accidents. *Accid Anal Prev* 1996;28(1):43-51
10. **Owsley C, McGwin G Jr, Ball K.** Vision impairment, eye disease and injurious motor vehicle crashes in the elderly. *Ophthalmic Epidemiol* 1998;5:101-103
11. **Leibowitz HW, Owens DA, Tyrell RA.** The assured clear distances ahead rule: implications for night time traffic safety and the law. *Accid Anal Prev*, 1998;30(1): 93-99
12. **Szyk JP, Seiple W, Viana M.** Relative effects of age and compromised vision on driving performance. *Human Factors* 1995;37:430-436
13. **Agunloye O.** Guidelines for the National Drivers Licence Scheme. Public Education Department Headquarters Lagos. Federal Road Safety Commission 1990:6-9
14. **Thiagalingam S, Cumining RG, Mitchell P.** Factors associated with under corrected refractive errors in an older population: The blue maintain eye study. *Br J Ophthalmol* 2002 ; 86:1041-1045
15. **World Health Organization.** Programme for the Prevention of Blindness and Deafness. Coding instructions for the WHO/PBL eye

- examination record (version III). Geneva: WHO, 1988:117
16. **Thylefors B, Negrel AD, Pararajasegaram R et al.** Global data on blindness. Bull WHO 1995; 73: 115-121
  17. **Adekoya BJ, Owoeye JF, Adepoju FG et al.** Pattern of Eye Diseases among Commercial Intercity Vehicle Drivers in Nigeria. Nig J Ophthalmol 2008;16(2):55-59
  18. **Resnikoff S, Pascolini D, Etya'ale D et al.** Global Data on Visual Impairment in the Year 2002. Bull. World Health Organ. 2004;82:844-851
  19. **Bekibele CO, Fawole OI, Bamgboye AE et al.** Prevalence of refractive error and attitude to spectacle use among drivers of public institutions in Ibadan, Nigeria. Ann Afr Med 2007;6:26-30
  20. **Oladehinde MK, Adeoye AO, Adegbehingbe BO et al.** Visual Function of commercial drivers in relation to road traffic accidents in Nigeria. Ind J Occup Env Med 2007;11(2):71-75
  21. **Nwosu SNN.** Vision survey of government motor vehicle drivers in Oyo State. National postgraduate Medical College of Nigeria, Lagos, 1989
  22. **Adegbehingbe BO, Majekodunmi AA, Akinsola FB et al.** Pattern of refractive errors at Obafemi Awolowo University Teaching Hospital, Ile-Ife, Nigeria. Nig J Ophthalmol 2003; 11:76-79
  23. **Adefule-Ositelu AO.** Refractive errors in Lagos, Nigeria. Nig Med J 1995; 29:101-103
  24. **Faderin MA, Ajaiyeoba AI.** Barriers to wearing glasses among primary school children in Lagos, Nigeria. Nig J Ophthalmol 2001; 9:15-19