Poor vision, refractive errors and barriers to treatment among commercial vehicle drivers in the Cape Coast municipality

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Abstract

Objective: To determine the relationship between poor vision and occurrence of road traffic accidents (RTAs) and the barriers to uptake of refractive error services among commercial drivers in the Cape Coast Municipality of Ghana.

Methods: A cross-sectional descriptive study was conducted involving commercial drivers in the municipality. Participants underwent an eye examination comprising visual acuity, colour vision test using Ishihara pseudo-isochromatic plates, confrontational visual fields, external and internal ocular eye health examinations. Structured questionnaire were also administered to the participants to collect demographic data, history of driving and RTAs and utilization of eye care services as well as identification of the colours of the traffic light.

Results: A total of 206 male drivers were interviewed and examined. Over 12% of the commercial drivers do not have the minimum visual acuity required for driving while 6.8% had visual impairment (VA < 6/18 in the better eye). There was no association between occurrence of RTAs and visual impairment ($p = 0.050$), visual field ($p = 0.741$) and colour vision defect ($p = 0.343$). A poor utilization of refractive error services was noted and the barriers to uptake of eye care services were largely due to unawareness of visual status. Refractive errors are the commonest ocular finding followed by cataracts.

Conclusion: There are barriers to uptake of refractive error services among commercial drivers in the Cape Coast Municipality. These barriers could be addressed by health education targeting commercial vehicle drivers at their stations.

Keywords: Commercial drivers, RTA, visual impairment, Ghana, barriers.

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Introduction

The majority of people in many developing and low income countries of the world rely greatly on commercial mode of transport for commuting between and within cities and towns. This reliance on commercial drivers makes operators of commercial vehicles an important component of the socioeconomic development of the Cape Coast municipality. Vision is one of the most important sensory factors in driving accounting for about 95% of all sensory requirements[1]. Other abilities required for driving include mental ability, motor ability and compensatory abilities. One of the most important and frequently used visual function tests is visual acuity. Visual acuity is therefore the most widely used criterion for determining eligibility for driving. In Ghana, a visual acuity of 6/9 is specified as the criterion for driving as indicated on the Drivers and Vehicle Licensing Authority (DVLA) form.

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Mock et al[2] have reported the role of commercial drivers in motor vehicle related injuries in Ghana. Although commercial drivers knew that poor vision is related to road traffic accidents (RTAs), only a few had ever had any eye examination. The study concluded that commercial vehicle drivers are an important group to target in road safety programs. The relationship between visual function (visual acuity, visual field, colour vision etc.) and road traffic accidents (RTAs) have been equivocal. Some studies have found no association between the impairment of visual function and the occurrence of RTAs[1, 3 – 6]. Others on the other hand have reported a relationship[7 – 10]. Refractive error is a commonly reported ocular morbidity among drivers[6, 8, 11]. It is commonly observed that majority of commercial vehicle drivers with refractive error do not wear the spectacle correction while driving.

The purpose of the present study was to determine the prevalence of visual impairment and refractive error among commercial drivers in the Cape Coast municipality, study the barriers to the use of eye care services and spectacle correction and explore the relationship between visual function and the occurrence of RTAs.

Methods

A descriptive cross-sectional study design was carried out in the Cape Coast municipality of Ghana. Six major commercial vehicle parks (designated as lorry stations) in the municipality were selected for the study. The station masters estimated that there are a total of about 400 commercial vehicle drivers in six of the eight stations in the municipality. A purposive sampling technique was used to select participants for the study. This method was adopted because it afforded all drivers who were present at the lorry stations during the period of the study to be included in the study

All the drivers in each station were educated on the purpose of the study. The consent of the drivers was sought after the purpose of the study was explained to the participants. This was necessary to secure the cooperation so they would not assume that the exercise was being organised by the DVLA with a view to revoking their driver's license. All participants gave a verbal consent. They were also given a health education to emphasize the need for regular eye examination Institutional approval was sought and obtained from the Department of Optometry, University of Cape Coast, Ghana.

A structured questionnaire was administered in the local language to each participant by face-to-face interview. Items of the questionnaire include demographic data, duration of driving, knowledge of the colours of the traffic light, history of RTA and previous eye examination. Information on barriers to utilization of eye care services was obtained from participants with a visual acuity of < 6/9.

Each participant underwent an ocular examination. The ocular examination comprised of presenting visual acuity using the illiterate E chart, ocular motility examination, external eye examination using the penlight and a magnifying loupe and internal eye examination with the direct ophthalmoscope. Ishihara pseudo-isochromatic plate was used to test the colour vision of the participants while the visual field was assessed by confrontation. The Ishihara pseudo-isochromatic plate was used in a similar study by Adekoya *et al*[5]. The Ishihara pseudo-isochromatic colour vision test plates have the limitation that it only identifies congenital colour defects. Subjective and objective refractions were also performed on the subjects. Objective refraction was performed using the retinoscope in a darkened room.

Normal vision was defined as a visual acuity ≥6/9 in the better seeing eye in consonant with the standard specified by the DVLA for eligibility to drive in Ghana. Visual impairment was defined as a visual acuity < 6/18 in the better seing eye[12]. The visual field was assessed based on the result of the confrontational visual field.

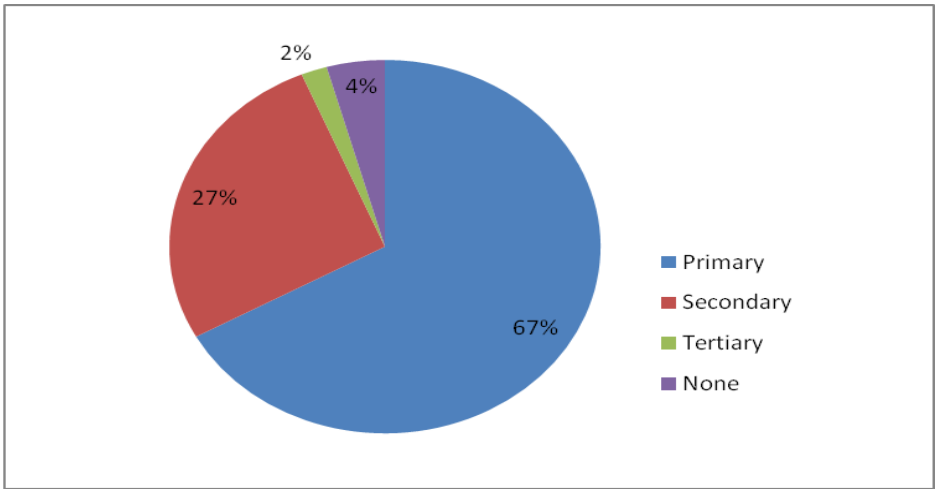
The data were coded and data analysis was done using the Statistical Package for Social Sciences (SPSS) version 12.0.1. Appropriate descriptive statistical analyses were used to present the results. Relevant tests of association were used to determine the association between variables of interest.

Results

Study subjects

A total of 206 commercial drivers were interviewed and examined for the study. All the participants were males. They were aged 18 – 68 years (mean = 39.2 years, SD = 11.8 years 95% CI = 37.6 to 40.8 years). Over 95% of the participants have at least basic education (fig 1). The mean duration for which the participants have been driving was 15.8 years (95% CI = 14.4 to 17.2 years, SD = 10.4 years). The longest serving commercial driver has been driving for 48 years. There was a strong positive correlation between the age of the participants and the duration of driving (r = 0.878, p < 0.01).

Figure 1: Pie chart showing the level of education of participants



Visual Acuity

Majority of the respondents had normal vision (using the standard defined for eligibility to drive in Ghana by the DVLA, 6/9 or better in the worse eye). These were 181 (87.9%) while 25 (12.1%) had a visual acuity of > 6/9 and thus were not eligible to drive. Of the total participants, 14 (6.8%) had visual impairment (defined as VA < 6/18 to 6/60 in the better seeing eye) [12]. Visual impairment was not significantly associated with a positive history of RTA (chi-square = 5.982, p = 0.050). Table 1 shows the distribution of visual impairment with history of RTA.

Table 1: Relationship between visual impairment and RTA

Visual acuity	History of RTA		Total (%)
	Yes (%)	No (%)	
6/18	2 (50)	9 (90)	11 (78.6)
6/24	2 (50)	0 (0)	2 (14.3)
6/36	0 (0)	1 (10)	1 (7.1)
Total	4 (100)	10 (100)	14 (100)

chi -square = 5.982, df = 2, p = 0.050

Eye Examination

Only 10 (4.9%) of the participants reported owning and wearing spectacle correction. Of these, 7 (70%) wear their correction for near work while 2 (20%) wear correction for distance and 1 (10%) wears a bifocal correction. Interestingly, 7 (70%) of those who reported wearing correction obtained their glasses from roadside vendors without having an eye examination. This indicates that they did not have any eye examination before obtaining their correction. The use of spectacle correction was associated with level of education (chi square = 43.701, p = 0.000). Table 2 shows the relationship between level of education and spectacle use.

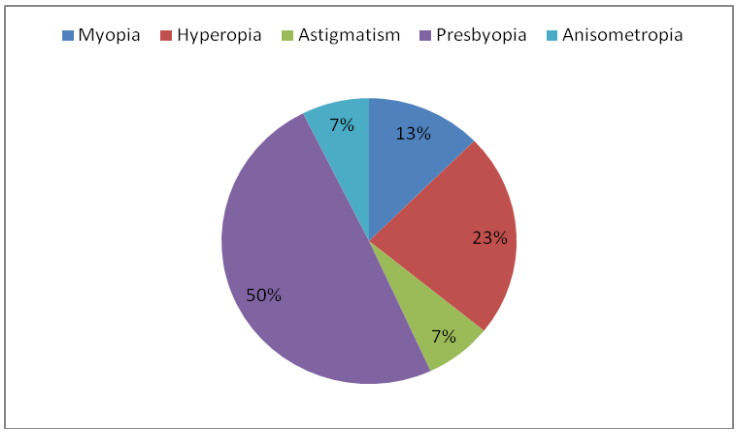
Table 2: Relationship between spectacle usage and level of education

Level of education	Spectacle usage		Total (%)
	Yes (%)	No (%)	
Primary	5 (50)	133 (67.9)	138 (67.0)
Secondary	2 (20)	53 (27.0)	55 (26.7)
Tertiary	3 (30)	1 (0.5)	4 (1.9)
None	0 (0)	9 (4.6)	9 (4.4)
Total	10 (100)	196 (100)	206 (100)

chi-square = 43.701, p = 0.000

Refractive error was the commonest ocular finding. It was present in 66 (32%) of the drivers examined. This was followed by cataract 17 (8.3%). Besides presbyopia, hyperopia was the most frequently occurring refractive error (10.7%) followed by myopia (5.8%) (See fig 2) Ten (4.9%) of the respondents reported wearing spectacles. Of these only 2 (20%) reported wearing their spectacle for distance vision without indicating whether they wear their glasses while driving.

Figure 2: Distribution of refractive errors among respondents



Visual field was constricted in 14 (6.8%) of the subjects. Of these, 2 (14.3%) reported a history of RTA. Visual field was not significantly associated with the occurrence of RTA (OR = 0.54, 95% CI 0.016 to 18.452, Yates corrected chi square = 0.21, p = 0.741).

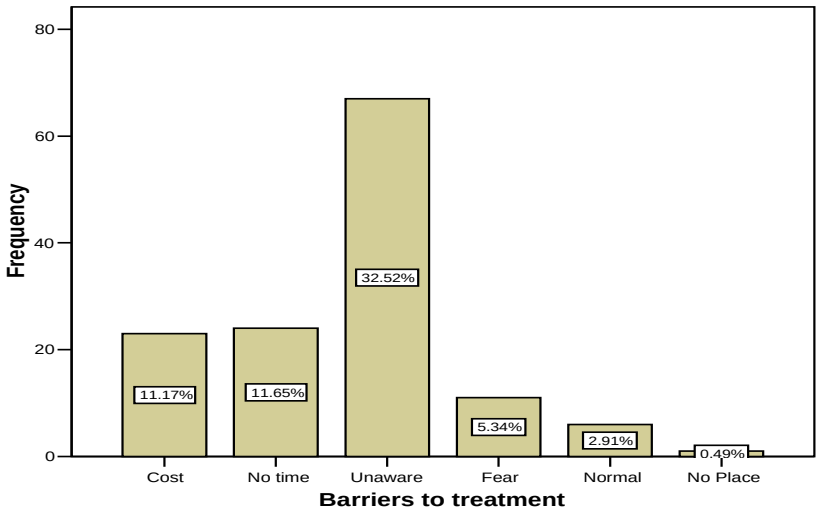
When asked if participants could see the colours of the traffic light, 205 (99.5%) reported in the affirmative. However when they were asked to give the order of the traffic light, 30 (14.6%) could not give the correct order while 176 (83.4%) gave the correct order. Although two of these could not name the colour order, they indicated the actions to be taken when the colours of the traffic light is on (Stop, Ready, Go). They were therefore thought to know the order of the colour of the traffic light.

The ability to name the order of the colour of the traffic light was associated with level of education (chi square = 71.403, p = 0.000). Seven subjects (3.4%) had colour vision deficiency. None of these reported a history of RTA. There was no association between colour vision defect and the occurrence of RTA (xhi square = 2.142, p = 0.343).

Barriers to eye care utilization

The most reported barrier to treatment reported was ignorance. The majority of respondents 67 (32.5%) indicated that they were not aware of their visual problem while 24 (11.7%) could not make out time to go for an eye examination. Another 23 (11.2%) reported cost as the reason for not having an eye examination. Fig 3 shows the distribution of the barriers to treatment reported by the respondents. One subject (0.5%) does not know where to have an eye examination.

Figure 3: Reported barriers to treatment by respondents



Discussion

In the present study, of the estimated 400 commercial vehicle drivers in the selected lorry stations in Cape Coast municipal, only 206 (51.5%) were interviewed for the study. This low participation rate was due to the nature of the operations of commercial vehicle drivers. They are mostly itinerant moving from one point to another. Besides, the estimates of 400 drivers given by the station manager was not based on any official record. The purposive sampling technique employed in this study ensured that all the commercial vehicle drivers present at the stations over the period of the study were interviewed for the study. Commercial drivers in Ghana have reported knowledge of the association between poor vision and occurrence of RTAs and only a few have ever had an eye examination[2]. Thus in addition to investigating the association of impaired visual function with RTAs, we studied the barriers to treatment by commercial drivers.

Consistent with many studies, our study shows that 12.1% of commercial drivers had a visual acuity below the visual acuity requirement for eligibility to drive in Ghana (VA = 6/9). This is comparable to 11.5% commercial inner-city vehicle drivers in Nigeria[6], 9.1% reported by McMoli and Ogunmekan[13] and 8% reported for Australian drivers[14]. These findings underscore the fact that some commercial drivers who fail to meet the stipulated criteria for eligibility to drive do obtain licenses to drive. There is the need to strictly enforce this component of the laws by the Drivers and Vehicle Licensing Authority (DVLA). Of more significance is that more than half (6.8%) of those who fail this criteria have moderate to severe visual impairment.

Our study shows that there was no significant association of visual impairment with the occurrence of RTAs. This is similar to the findings in previous studies[1, 6, 9, 18] on the subject. It is however not

consistent with some other studies[7 – 10, 15]. Adekoya et al[6] has attempted to proffer reasons for the lack of association between visual impairment and the occurrence of RTAs. They hold that this could be due to the multifactorial causation of RTAs. Drivers with poor vision who might have been involved in RTAs may have died in the RTA or may have stopped driving and therefore are not available for interview at the motor parks.

Consistent with previous studies[8, 15], we did not find any association between visual field and occurrence of RTAs. Some studies[16 – 17] have reported an association between visual field and RTAs. The use of the confrontation test for visual field suffers limitation in correctly quantifying visual field defect. The relatively small sample used in this study compared to Johnson & Kitler's study[16] may also be responsible for failing to recognize an association between visual field and RTAs.

None of the 7 (3.4%) of those who had colour vision defect had a history of RTA. No association was found between colour vision defect and RTAs. Similarly no association was found between RTAs and ability to identify the colours of the traffic light. This is in agreement with other studies[8, 15, 18]. The Ishihara test for colour vision is sensitive only to congenital colour defect and may under-report the proportion of colour vision defect. Level of education was associated with identification of colour defect. Of note here is the fact that 99.5% of the respondents indicated that they could tell the colours of the traffic light; whereas only 83.4% could correctly tell the order. There is the need for prospective drivers to actually tell the order of the traffic light rather than report if they could see the colour of the traffic light.

Although refractive error was a common ocular condition among drivers (32%), only 4.9% of respondents reported wearing glasses. Of these 20% (representing about 1% of the total respondents) wear their glasses for distance without indicating whether they wear their glasses while driving. Compared to studies among public institution drivers in Nigeria [11], while 16.7% of drivers have refractive errors, 56.3% of these wear glasses when driving. This difference in utilization of glasses reflects the study population. In the Nigerian study, the subjects were employed drivers in public institutions (a University and a University College Hospital). The awareness of spectacle use may be considerably higher in this population compared to the subjects in the present study. In the present study, there was a significant association between level of education and spectacle use. There is the need for health education to promote the use of glasses by commercial vehicle drivers.

The study also reported on the barriers to use of spectacle by commercial vehicle drivers. The major reported barriers included ignorance of visual status, not having time to visit the eye clinic, cost of care and fear. A few reported that they thought their vision was normal while one respondent reported not knowing where to access eye care. This reported barriers points to the need for an aggressive eye health education targeting commercial drivers. This can fill the knowledge gap reported among Ghanaian commercial drivers[2]. A concerted effort, involving the various stakeholders, should be put in place to provide regular eye care services to commercial drivers at their various stations. This will help to identify previously undiagnosed refractive errors and other ocular condition among commercial drivers and appropriate treatment provided.

Conclusion

We can conclude that there is no association between visual impairment, visual field defect, colour vision and RTA among commercial drivers in the Cape Coast Municipality. The study also found that 12.1% commercial vehicle drivers were not eligible to drive in Ghana while 6.8% of them had visual impairment. There was under-utilization of eye care services and spectacles among the studied population. Several barriers were also reported. We recommend an eye health education and public enlightenment targeting commercial vehicle drivers. Regular eye examinations are also recommended for commercial drivers.

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