

## Ocular Status of Inter-State Commercial Drivers: A Cross Sectional Study in Odisha, India

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**Conflict-of-interest statement:** The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper.

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Received: November 8, 2016

Revised: November 26, 2016

Accepted: December 1, 2016

Published online: December 31, 2016

### ABSTRACT

**INTRODUCTION:** Road traffic accident is a major health problem worldwide. Driving is a visually intensive task which requires several sets of abilities which include sensory ability (mainly visual). In view of the importance of good vision in safe driving this study was conducted to assess the ocular status of inter-state commercial drivers in Berhampur Odisha.

**MATERIALS AND METHODS:** This descriptive cross-sectional study was conducted over three months among inter-state truck drivers. All the respondents had their eyes examined. Their visual acuities and colour vision were assessed with the aid of Snellen's chart and Ishihara pseudochromatic plates respectively. The data obtained was collated and analysed with the aid of Statistical Package for Social Sciences (SPSS) 20.0.1 statistical software.

**RESULTS:** 195 truck drivers were included in this study. The duration of driving experience of the respondents revealed that majority of the respondents (38%) had more than 20 years driving experience. Few respondents (7.7%) used recommended glasses

while majority (92.3%) did not use recommended glasses. Most respondents (94.35% and 91.28%) had visual acuity of 6/5- 6/18 in the better eye and second eye respectively. Most respondents with eye problem (65.1%) did not seek eye treatment. All the respondents had normal colour vision. Most of the respondents (70.2%) did not have ocular morbidity. Few respondents 37 (19%) had history of involvement in RTA while driving and the remaining 158 (81%) had not been involved in RTA. The visual acuity in the better and second eye did not significantly affect involvement in road traffic accident with a *p*-value of 0.94 and 0.61 respectively.

**Key words:** Community ophthalmology; Eye Problems; Truck drivers; Visual acuity

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Kshatri JS, Pradhan PC, Patro S, Tripathy RM. Ocular Status of Inter-State Commercial Drivers: A Cross Sectional Study in Odisha, India. *International Journal of Ophthalmic Research* 2016; 2(4): 188-191 Available from: URL: <http://www.ghrnet.org/index.php/ijor/article/view/1923>

### INTRODUCTION

Road traffic accident is a major health problem worldwide. It is a leading cause of death from trauma<sup>[1]</sup>. Each year an estimated 1.2 million people are killed in road traffic crashes and up to 50 million injured worldwide<sup>[2]</sup>. It has been predicted that by 2020, road traffic injuries will rank as high as third among causes of disability-adjusted life years (DALYs) lost<sup>[3]</sup>. The annual cost of road crashes is in excess of 500 billion dollars and in the developing world the estimated cost is about 65 billion dollars each year<sup>[4]</sup>. The developing countries account for more than 85% of all road traffic accidents in the world<sup>[5-7]</sup>.

Vision is a fundamental component of safe driving<sup>[8]</sup>. Driving is a visually intensive task which requires several sets of abilities which include sensory ability (mainly visual), mental ability, motor ability and compensatory abilities<sup>[9]</sup>. One needs different kinds of vision to be able to drive safely<sup>[10]</sup>. Ocular functions like visual acuity, visual

field, distance vision, accommodation, depth of perception, colour vision, adaptation, contrast sensitivity etc all have a role in driving.

The mounting toll of road traffic accident deaths in India constitutes a public health problem which requires urgent attention since these deaths are preventable. As per the Motor Vehicles Act, 1988, and Central Motor Vehicles Rules, 1989, a self-declaration medical certificate from a registered medical practitioner is sufficient to qualify in the vision test for a driving licence, making the law relaxed. In contrast, visual acuity, visual field and colour vision are the mandatory vision requirements in countries like Canada, Germany, the USA and Australia.

In view of the importance of good vision in safe driving this study was conducted to assess the ocular status of inter-state commercial drivers in Berhampur Odisha.

## MATERIALS AND METHODS

This descriptive cross-sectional study was conducted over three months between June and August 2016. Ethical clearance was obtained from the IEC, MKCG Medical College prior to commencement of this study. The study participants were inter-state truck drivers. The permission of the leadership of Road Transport Workers' Union in the community was sought and obtained before data collection. The required sample size of 195 was estimated from the formula  $(1.96)^2 pq/d^2$ ; where the prevalence of ocular problems was assumed from previous studies as 33% and the relative precision was set at 20%<sup>[11]</sup>. The respondents were selected using a random number generator app and matching the number with the vehicle registration number. Informed consent was obtained from all the respondents. They were interviewed with the aid of semi-structured questionnaire by the authors and two research assistants. The research assistants were trained in administration of semi-structured questionnaire and assessment of visual acuity. The study participants were interviewed by the authors and research assistants at the rest houses along the inter-state check point of Girisola at the border between the states of Odisha and Andhra Pradesh. Data elicited from the respondents with the aid of the study instrument (semi-structured questionnaire) included their bio-data, duration of driving, history of ocular problem and use of recommended glasses. All the respondents had their eyes examined. Their visual acuities and colour vision were assessed with the aid of Snellen's chart and Ishihara pseudochromatic plates respectively. Visual acuity was assessed with the aid of the Snellen's chart placed 6 m from the respondents in broad day light at the study venues. The respondents had their eye examined with the aid of pen torch and direct ophthalmoscope. All respondents who had ocular problems were referred to the Department of Ophthalmology at MKCG Medical College for further evaluation and management. The data obtained was collated and analysed with the aid of Statistical Package for Social Sciences (SPSS) 20.0.1 statistical software. Cross tabulation of visual acuity with involvement with road traffic accident was done with chi-square test and statistical significance was set at  $p \leq 0.05$ .

## RESULTS

195 truck drivers were included in this study. Their ages ranged between 22 and 65 years with a mean age of 46.4 years  $\pm$  8.5 years. The respondents were all males. The majority of the respondents were married (75.7%) and 24.3% were single. Most of the respondents were from the state of Andhra Pradesh (23.3%) and Punjab (18.6%). Half of the respondents (50.2%) had secondary education, 24.2% had primary education, 25.6% had no formal education. The respondents

were predominantly Hindu (78%) while 10% were Muslims and the rest Sikhs.

The duration of driving experience of the respondents revealed that majority of the respondents (38%) had more than 20 years driving experience (Table 1). All the respondents had a valid driver's licence.

Few respondents (7.7%) used recommended glasses while majority (92.3%) did not use recommended glasses.

Most respondents (94.35% and 91.28%) had visual acuity of 6/5-6/18 in the better eye and second eye respectively (Table 2).

Most respondents with eye problem (65.1%) did not seek eye treatment. All the respondents had normal colour vision. Most of the respondents (70.2%) did not have ocular morbidity while the remaining had ocular morbidity. The ocular findings of the respondents revealed that 48.2 had presbyopia and 39.6% had immature cataract (Table 3).

Few respondents 37 (19%) had history of involvement in RTA while driving and the remaining 158 (81%) had not been involved in RTA. The visual acuity in the better and second eye did not significantly affect involvement in road traffic accident with a p-value of 0.94 and 0.61 respectively (Table 4).

**Table 1** Duration of driving experience

Duration(Years)	Frequency	Percentage(%)
< 5 years	17	8.71
5-10 years	28	14.35
11-15 years	32	16.41
16-20 years	44	22.56
> 20 years	74	37.94
<b>Total</b>	<b>195</b>	<b>100</b>

**Table 2** Visual acuity of better and second eyes.

Visual acuity	Betteryeye		Secondeye	
	Frequency	Percentage (%)	Frequency	Percentage (%)
6/5-6/18	184	94.35	178	91.28
6/18-6/60	11	5.65	17	8.72
<b>Total</b>	<b>195</b>	<b>100</b>	<b>195</b>	<b>100</b>

**Table 3** Ocular findings of respondents.

Ocular findings	Frequency	Percentage (%)
Presbyopia	28	48.2
Immaturecataract	23	39.6
Glaucoma	4	6.9
Allergicconjunctivitis	3	5.2
<b>Total</b>	<b>58</b>	<b>100</b>

**Table 4** Cross tabulation of visual acuity and involvement in RTA.

Involvement inRTA	Visual acuity in bettereye		Total
	6/5-6/18	6/18-6/60	
Yes	35	2	37
No	149	9	158
<b>Total</b>	<b>184</b>	<b>11</b>	<b>195</b>
$\chi^2 = 0.005; p = 0.94$			
Involvement inRTA	Visual acuity in secondeye		Total
	6/5-6/18	6/18-6/60	
Yes	33	4	37
No	145	13	158
<b>Total</b>	<b>178</b>	<b>17</b>	<b>195</b>
$\chi^2 = 0.25; p=0.61$			

## DISCUSSION

All our respondents were males and this finding is expected in view of the fact that the commercial driving is an exclusive preserve of males in India. The mean age of 46 years is in tandem with an active work force that the respondents belong to, as commercial driving is a demanding occupation. With increasing age there is a decline in sensory cognitive function. It has been reported that older drivers have more accidents per mile than their younger counterparts<sup>[12]</sup>. Furthermore if an older driver is involved in road traffic accident, it is more likely to be fatal<sup>[13]</sup>. After the age of 50 years, there is rapid decline in sensory vision resulting in reduction in visual acuity, contrast sensitivity, stereo acuity and visual field sensitivity<sup>[14]</sup>.

Good understanding of how functional changes with age affect driving ability is likely to improve road safety<sup>[15]</sup>. Vision is the most important source of information during driving and driving related injuries have been associated with visual problems. Therefore, visual assessment of drivers is a major health issue. The prevalence of visual impairment in this study in the better eye was 2.2% and this finding is close to a Nigerian study by Oladehinde *et al* which reported prevalence of visual impairment in the better eye of 3.3%<sup>[16]</sup>. A study carried out by Adekoya *et al* reported a prevalence of visual impairment of 2.8% in the better eye<sup>[17]</sup>. A study by Verma and Bharadwaj in Indian truck drivers reported a higher prevalence of refractive errors at 19%<sup>[18]</sup>. The definition of subnormal vision in the latter study may have accounted for the relatively high prevalence rate reported. The current study utilized presenting visual acuity as opposed to corrected visual acuity which could possibly have reduced the prevalence of visual impairment.

None of the respondents had monocular blindness. This finding is a pointer to the fact that the drivers enjoyed relatively good eye health. There was no significant association between involvement in RTA and visual impairment in this study ( $p$  value = 0.94 and 0.61 respectively). This finding is in contrast with the findings of other studies by Oladehinde *et al* and Nwosu *et al*<sup>[16,19]</sup>. None of the respondents had colour vision abnormality. However, a limitation of this study is the use of Ishara pseudoisochromatic plate for colour vision assessment which could only detect congenital colour defect as opposed to other tests such as Fanswort Munsell 100 Hue test which could detect acquired colour vision. However, defective colour vision is actually not a barrier to driving private and commercial vehicles in most countries<sup>[20]</sup>. Colour vision defect may constitute hazard to safe driving as drivers with colour vision defect may have difficulty in identifying road signs and recognizing traffic lights. A direct link between increased risk of road traffic accident and colour vision defect has not been established<sup>[21]</sup>. Refractive error was present in most of our respondents with ocular morbidity and this brings to fore the need for improvement in optical services to take care of people in need. Immature cataract was the second leading cause of ocular morbidity in this study and this is expected as cataract is the commonest cause of visual impairment and blindness worldwide. Cataract reduces visual acuity, contrast sensitivity and also causes an increase in disability glare and self-reported difficulties with the tasks of daily driving<sup>[22-24]</sup>. Removal of cataract is associated with a marked improvement in both health related quality of life and driving performance<sup>[25,26]</sup>.

## CONCLUSION AND RECOMMENDATIONS

Few respondents had ocular morbidity. The prevalence of visual impairment in the better eye was very low. This finding would go a long way in ensuring that most of them would meet the minimum

visual requirement for driving. Majority of the respondents did not have ocular examination at the time they were issued drivers' licence. Based on the findings, the following recommendations are arrived at:

1. Ocular examination should be introduced as part of the compulsory test process for issuing and renewing drivers license in India.
2. In view of the fact that only few of the respondents used recommended glasses, there is need to make optical services readily accessible to commercial drivers so that they can easily obtain recommended glasses whenever the need arises.

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**Peer reviewer:** Muawyah Al Bdour