

# Visual Function in Professional Drivers In A Coastal Town of South India and Their Perceptions About Ocular Health

Vidya Hegde, Rashmi Jain, Rashmi Shambu, Anupama Bappal, Rajarathna Hegde

Department of Ophthalmology, Yenepoya Medical College, Mangalore, India.

## Abstract

**Introduction:** Good visual function is essential for drivers during driving. Many ocular conditions affect visual function. There is a need for the drivers to undergo ocular evaluation and awareness about eye health would motivate them to do so.

**Aim:** To assess vision acuity, field of vision, colour vision, contrast and depth perception of drivers and to assess their knowledge, attitude and practice about ocular health.

**Materials and methods:** A cross sectional, descriptive study was done among drivers for duration of six months. (May to October 2016) After obtaining ethics committee approval & informed consent from participants, a detailed ocular evaluation was done. The drivers were given a validated semi-structured self-administered questionnaire that included demographic details and questions pertaining to awareness about ocular health. It was collected on same day. Descriptive statistics was used for analysis of data.

**Results:** A total of 102 male drivers participated. The mean age of drivers was 36.19 years (SD  $\pm$ 14.50). Ocular findings observed included refractive errors (n=38), allergic conjunctivitis (n=23), pseudophakia (n=7), diabetic retinopathy (n=4), cataract, pterygium, strabismus and glaucomatous cupping (n=1 each). Vision impairment was seen in 19 drivers. Colour vision was normal in all. None of the drivers had undergone ocular examination at the time of issue or renewal of license or at the time of employment. Sixty drivers were aware that field of vision can be affected by eye diseases. Fifty seven drivers were not aware of about cataract and diabetic retinopathy affecting the vision.

**Conclusion:** The study showed good visual function in drivers and they were less knowledgeable about cataract and diabetic retinopathy. They need to undergo periodic ocular evaluation.

Delhi J Ophthalmol 2021;31: 67-71; Doi <http://dx.doi.org/10.7869/djo.660>

**Keywords:** Visual Function, Drivers, Eye Health, Perceptions

## Introduction

Road traffic accidents (RTAs) are of major concern and many factors are responsible for this. These may be related to vehicles, roads or drivers.<sup>1</sup> An estimated 1.2 million people are killed in RTAs every year worldwide.<sup>2</sup> In 2017, there were 464,910 road traffic accidents in India and 147,913 fatalities, accounting for an accident every minute and a death every 3.5 minutes.<sup>3</sup> Vision is the most important source of information to driver during driving. Good vision is essential to judge distances, to see road signs and also for responding to changes in environment quickly. Various studies have shown equivocal results between visual function and road traffic accidents.<sup>4-6</sup> Vision specific requirements for driving vary from country to country.

Many ocular conditions like cataract, glaucoma, age related macular degeneration and diabetic retinopathy can affect vision, field of vision and contrast. Hence it is very much essential for the drivers to undergo ocular evaluation. Employers are also responsible for ensuring the health and safety of the employees at work. Very few studies have been done to assess visual function in drivers in India.<sup>7,8</sup> The purpose of the study was to assess vision acuity, field of vision, colour vision, contrast and depth perception of drivers and also to assess their knowledge, attitude and practice about ocular health.

## Methodology

The study was cross sectional, descriptive type done for a period of six months from May 2016 to October 2016. It was done in outpatient department of Ophthalmology of a tertiary care centre amongst professional drivers after obtaining approval from Institution Ethics Committee. For the purpose of study, professional driver is defined as a person who earns his livelihood by driving vehicles of any category with a valid driving license. Drivers in any age group employed by private individuals, institutions and travel agencies were included for the study. The services of medico social work department of the hospital were utilized for contacting the drivers. The drivers were approached during the general health & eye camps conducted by the institution. The community members were informed of this study. They were requested to inform the drivers to visit the Ophthalmology OPD for checkup. The auto drivers in and around the institutions were also contacted and by snow balling technique were asked to publicize the ocular examination of drivers occurring at our institute. All the drivers who visited the OPD and consented for the study were included. All the investigators were involved in the examination of the participants. A written informed consent was taken from the participants. The study group underwent ophthalmic evaluation in the outpatient department of ophthalmology. The examination was done using torchlight and slit lamp for anterior segment evaluation and an ophthalmoscope (direct or indirect) for the posterior

segment. Distant vision was assessed using Snellen chart optotypes and near vision by near vision optotypes. Each eye was tested unaided, with pinhole if vision was < 6/6 and with spectacles if using. Vision acuity of 6/6 – 6/18 was considered normal, vision <6/18 – 6/60 as moderate visual impairment, vision <6/60 – 3/60 as severe visual impairment and vision <3/60 as blindness.<sup>9</sup> Best Corrected Visual Acuity (BCVA) was defined as Visual acuity achieved with refractive correction as measured on Snellen’s chart .Refractive status of the study group was determined by using streak retinoscope. Full field visual field assessment was done by using Humphreys Field Automated Perimeter (Zeiss). Gross stereopsis was assessed by using Stereo fly test (Stereo Optical Company, Inc) and fine depth discrimination by a graded series Stereotest circles. Ishihara’s pseudoisochromatic charts were used for colour vision. Contrast sensitivity assessment was done using I chart (Appasamy Associates). Intraocular pressure measurement using GoldmannApplanation Tonometer was done for patients with vertical cup:disc ratio of 0.5 and above or asymmetry of equal to or greater than 0.2.

A semi-structured, self-administered questionnaire in vernacular language, validated for content by subject experts, was administered to the participants. The questionnaire contained demographic details of the drivers and had 20 questions that assessed their awareness about significance of ocular health. The filled questionnaire was collected and analyzed.

**Statistical analysis**

The data was entered in Microsoft excel sheet and analyzed using IBM Statistical Package for the Social Sciences (SPSS) for windows version 23.0. Chicago, SPSS Inc. Descriptive statistics like mean, standard deviation, percentage were used. The privacy of participants and confidentiality of data was maintained. The clinical examination findings were not disclosed to the employer, as assured to the participants.

**Results**

The study included 102 drivers. The age of the study group ranged from 19 to 70 years with mean age being 36.19 years (SD ±14.50). Majority (48.03%) were in the age group of 20 to 30 years and 77.49% (n=77) were from urban area. All the drivers were males. The demographic data of the study group is as shown in (Table 1).

In the study group, 4 had history of diabetes mellitus and hypertension, 2 had hypertension alone and one had only diabetes. Five drivers had history of cataract surgery and one of ocular trauma. Ocular findings seen in the study group are as shown in (Table 2). Twenty two drivers had more than one ocular finding. Refractive error was the most common ocular finding seen in 38 out of 102 drivers.

Visual impairment (Vision ≤6/18 -6/60) was seen in 19 participants, the cause being refractive error in 17 and diabetic retinopathy with refractive error in 2. BCVA of 6/6 in both eyes was seen in 87 drivers. Colour vision was normal in all drivers. Contrast sensitivity was affected unilaterally

in 6 and binocularly in 7 drivers. Gross and fine stereopsis was normal in 101 drivers and was absent in one driver who had strabismus. Twenty three out of 102 participants agreed to undergo automated perimetry. Eleven drivers had normal fields.

**Table 1: Showing demographic data of study group**

Variable	Attribute	Frequency n (%)
Education	Primary	13(12.74%)
	Middle School	25(24.50%)
	Secondary	53(51.10%)
	Higher secondary	4(4.90%)
	Graduate	7(6.86%)
Income (per annum)	<Rs 50,000	63(61.76%)
	>Rs 50,000	39(38.24%)
Type of vehicle	Autorickshaw	51(50%)
	Car	31(30.39%)
	Taxi	3(2.94%)
	Bus	17 (16.67%)
Employer	Educational Institution	31 (30.39%)
	Traval agency	1(0.98%)
	Private	70(68.62%)
Duration of drtving license (m years)	1-10	55(53.92%)
	11-20	19(18.63%)
	21-30	15(14.71%)
	-31-40	12(11.76%)
	41-50	1(0.98%)

**Table 2: Showing demographic data of study group**

Ocular finding	Number
Refractive errors	38
Allergic conjunctivitis	23
Pseudophakia	7
Diabetic retinopathy	4
Cataract	1
Pterygium	1
Strabismus	1
Glaucomatous cupping	1

All the drivers had undergone ocular examination for ocular complaints and none at the time of issue or renewal of driving license. All the drivers were involved in day driving and had a valid driving license. The average duration of holding driving license was 14.78 years. Forty one drivers were using spectacles while driving. The common ocular complaints experienced by the drivers while driving are as shown in (Figure 1).

Perceptions by the study participants regarding employer support for undergoing eye checkup are as shown in (figure 2). None of the drivers had knowledge regarding required frequency of eye checkup. Twenty seven study participants

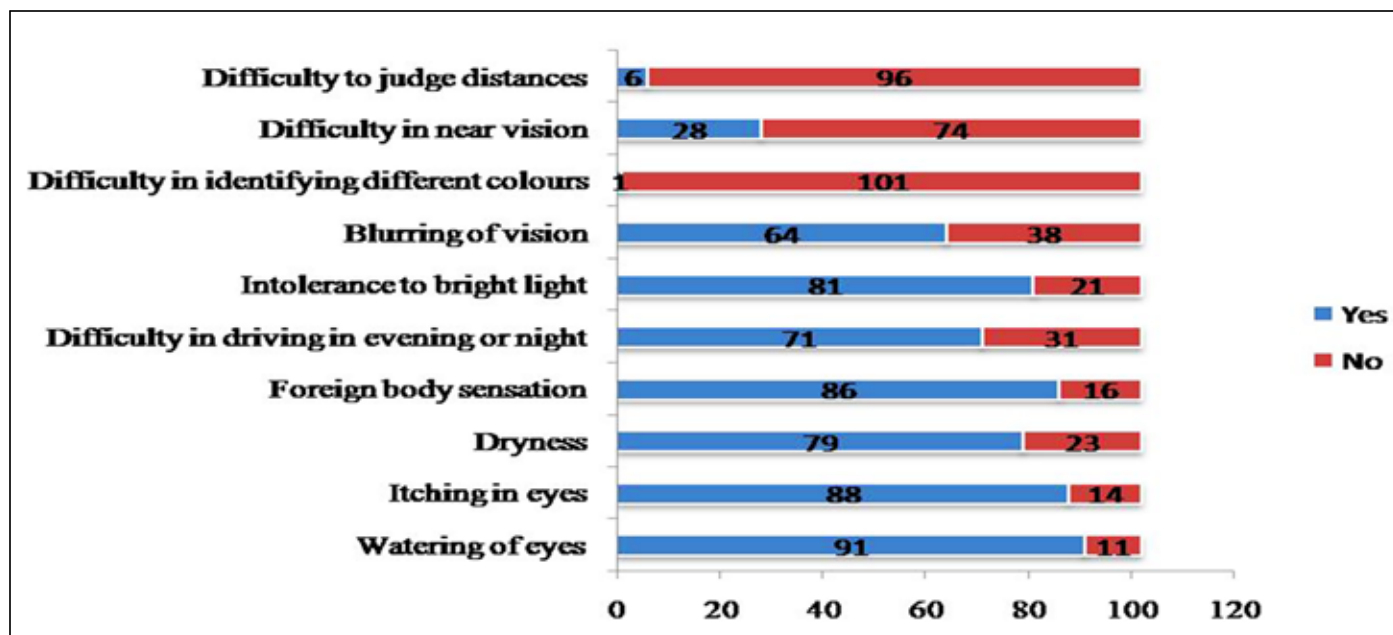


Figure 1: Showing common ocular complaints reported by drivers while driving

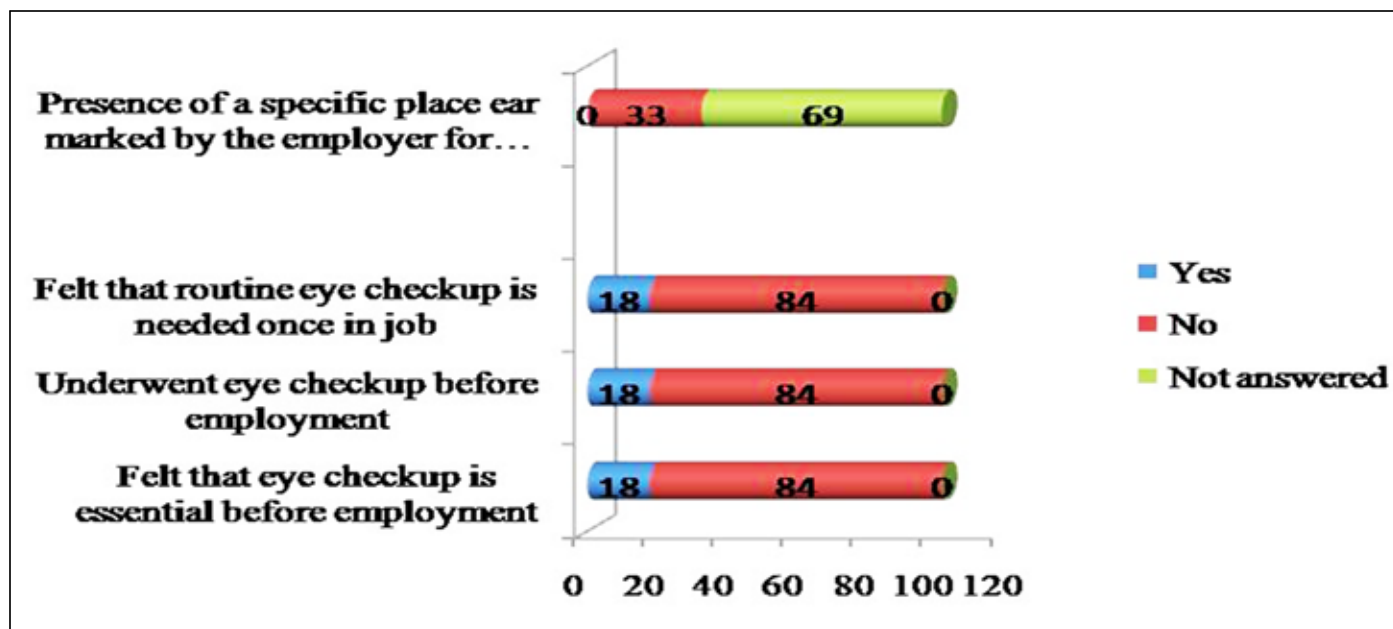


Figure 2: Showing perceptions of drivers regarding the support by employers for eye checkup

responded that financial assistance was given for eye checkup by employers, while seven responded that logistic assistance in form of paid leave was granted for eye checkup. But sixty eight did not respond about the assistance given by employer for eye checkup. Regarding the benefits for undergoing eye surgery, 27 drivers reported partial assistance, 5 as leave without pay, 1 each for leave with pay and full assistance. Seventy one drivers reported no benefits by employer for undergoing surgery. Only one driver reported that he met with road traffic accident that was related to eye problem. Sixty drivers were aware that field of vision can be affected by eye disease. Fifty seven drivers were not aware about cataract and diabetic retinopathy affecting the vision. Thirty two participants had done their blood sugar level estimation.

### Discussion

Successful driving depends on good visual function apart from normal auditory, biomechanical and cognitive skills. The visual function includes vision, field of vision, colour vision and contrast sensitivity, all of which play important role in driving. Visual disorders in drivers pose risk not only to themselves but also to the passengers. Our study found majority of drivers in the age group between 20 and 30 years. A study done on truck drivers in Andhra Pradesh showed 65 out of 140 screened to be in the age group of 21-30 years. Another study done in 520 commercial drivers in central Ghana found the mean age of drivers to be 39.23 years.<sup>10</sup> Majority of drivers in our study had done secondary education and they were from urban area. The common ocular findings observed were refractive errors, allergic

conjunctivitis, pseudophakia and diabetic retinopathy, etc. Our study shows the presence of vision impairment in a small proportion of the participants. Various studies have shown refractive errors as the most common ocular condition in drivers. In a study done in Andhra Pradesh, prevalence of refractive errors among truck drivers was found to be 28%. The most common symptoms experienced by drivers in this study while driving included watering of eyes, itching in the eyes, foreign body sensation and intolerance to bright light. In a study done on commercial drivers in Nigeria, the symptoms reported by drivers included blurring of vision, growth in the eye, itching, redness and foreign body sensation. In India, driving license is issued by the Regional Transport Offices of each state and the procedure is regulated by the Motor Vehicle Act (MVA) 1988, amended in 2017.<sup>11</sup> It does not include any further vision-specific criterion for driving license renewal in India and calls for a self-declaration (Form 1) and a medical certificate (Form 1A) for issuing license. Self-declaration form 1 carries three questions related to visual function. Medical examination form carries the same questions to be answered by a registered medical practitioner but does not mandate any specific test or assessment criteria. Visual function assessment would ascertain the eligibility of the driver for driving during the issue of license. None of the drivers in our study had undergone ocular examination at the time of issue or renewal of license or at the time of employment. In a study done in Nigeria, a large proportion (83.6%) of drivers had not undergone eye testing before the issue of driving license. A study done in Nepal 66.4% out of 250 drivers had not undergone ocular examination before the issue of license.<sup>12</sup> Normal colour vision is very essential for driving. The driver should be able to recognize traffic signal lights and brake lights while driving. Various studies have reported colour vision defects in drivers.<sup>13</sup> None of the participants in our study had colour vision defects. Majority of them had passed contrast sensitivity and stereopsis tests.

The employers have the responsibility to ensure that the employees are fit to drive. Encouraging the drivers to undergo ocular evaluation and providing them monetary benefits for the same can be some of the ways to support the employees. However, in our study the drivers felt that employer policy was not very supportive. It is essential that drivers have the knowledge about eye conditions that can affect their vision. Good awareness about eye health would motivate them to undergo periodic ocular evaluation. Ignorance of visual problem was found as barrier to treatment in a study done on commercial drivers in Cape coast. Even though the drivers in our study were aware of field of vision being affected by ocular conditions, the knowledge about cataract and diabetic retinopathy was poor. A study done on drivers in central region of Ghana found poor knowledge of colour vision defects amongst drivers as compared to stereopsis anomalies. We feel that imparting eye health education to drivers would enable them to undergo regular eye checkups. Conclusion: The study shows good visual function and overall satisfactory knowledge about ocular conditions among drivers.

### Limitations of study

Visual field assessment is very essential test that drivers need to undergo either at the time of issue or renewal of license. Only few study participants underwent visual field assessment by automated perimeter in our study. Also we did not assess glare sensitivity. Our study comprised of only male participants.

### References

1. Chakrabarty N, Riku R. Uniform Driver Evaluation in India: A Mandatory Requirement for Road Safety. *Int J Sci Res Publ* 2013;3(2):1-6
2. Pepple G, Adio A. Visual function of drivers and its relationship to road traffic accidents in Urban Africa. *Springerplus* 2014;3(1):1-7.
3. Honavar S. Driving blind - Should tests of visual function be mandatory for driving license? *Indian J Ophthalmol* 2019;67(2):193-4.
4. Adegbehingbe B, Onakoya A, Oladehinde M, Adeoye A. Visual functions of commercial drivers in relation to road accidents in Nigeria. *Indian J Occup Environ Med* 2007;11(2):71-5.
5. Ovenseri-Ogomo G, Adofo M. Poor vision, refractive errors and barriers to treatment among commercial vehicle drivers in the Cape Coast municipality. *Afr Health Sci* 2011;11(1):97-102.
6. Adekoya BJ, Owwoye JFA, Adepoju FG, Ajaiyeoba AI. Visual function survey of commercial intercity vehicle drivers in Ilorin, Nigeria. *Can J Ophthalmol* 2009;44(3):261-4.
7. Murthy G, Deshmukh A, Mallidi A, Murthy P, Kattige J, Murthy V. Renewal of driving license in India and glaucoma: A study of prevalent practice and its lacunae. *Indian J Ophthalmol* 2019;67(2):240-6.
8. Rajendra P, Murali K, Satyanarayana U. Refractive errors and color blindness among truck drivers: A pilot study. *J Dr NTR Univ Heal Sci* 2013;2(2):89-91.
9. World Health Organisation (WHO). WHO Technical report series No 518 [Internet]. [cited 2020 Aug 14]. Available from: [https://apps.who.int/iris/bitstream/handle/10665/38222/WHO\\_TRS\\_518.pdf](https://apps.who.int/iris/bitstream/handle/10665/38222/WHO_TRS_518.pdf);
10. Boadi-Kusi SB, Kyei S, Asare FA, Owusu-Ansah A, Awuah A, Darko-Takyi C. Visual function among commercial vehicle drivers in the central region of Ghana. *J Optom* 2016;9(1):54-63.
11. India Code: Motor Vehicles Act, 1988 [Internet]. [cited 2020 Aug 14]. Available from: [https://www.indiacode.nic.in/handle/123456789/1798?sam\\_handle=123456789/1362](https://www.indiacode.nic.in/handle/123456789/1798?sam_handle=123456789/1362)
12. Bastola P. Pattern of Ocular Morbidity in Professional Intercity Vehicle Drivers of MidWestTarai Belt of Nepal: A Cross Sectional Descriptive Study. *Journal of Nepalgunj Medical College*. 2014;12(1):14-8.
13. Chidi-Egboka NC, Akeem Bolarinwa O, Awoyemi AO. Visual Function Test among Commercial Drivers in a North Central State of Nigeria. 2015;9(6):1-7

**Cite This Article as:** Vidya Hegde, Rashmi Jain, Rashmi Shambu, Anupama Bappal, Rajarathna Hegde Visual function in professional drivers in a coastal town of South India and their perceptions about ocular health. Delhi J Ophthalmol 2020;31; (4) 67-71.

**Acknowledgments:** None.

**Conflict of interest:** None

**Source of Funding:** None

**Date of Submission :** 24 Jun 2020

**Date of Acceptance :** 10 Sep 2020

### Address for correspondence

**Vidya Hegde** Professor and HODt  
Department of Ophthalmology,  
Yenepoya Medical College,  
Mangalore, India.  
Email : vidyaradhesh@gmail.com



Quick Response Code