



International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

ISSN:2347-6567

IJAMSCR /Volume 7 / Issue 3 / Jul - Sep - 2019
www.ijamscr.com

Research article

Medical research

Assessment of visual acuity and colour blindness among bus drivers in a metro city

Guhan.K.A¹ Dr.C.Xavier Jayaseelan^{2*}

¹Medical Student (Undergraduate),

²Associate Professor, Department of Ophthalmology, Saveetha Medical College and Hospital, Saveetha University, Chennai

Corresponding Author: Dr.Xavier.C.Jayaseelan

Email id: xavjaynir@gmail.com

ABSTRACT

The importance of good visual acuity for safe driving should be emphasized during this modern era. Most of the road traffic accidents are mainly due to poor or low visual acuity, stress and psychological factors affecting the drivers in addition to poor vehicle maintenance. An attempt was made to ascertain the visual status of the bus drivers for visual Acuity by screening them in the Poonamallee Bus Stand located in NH 4 (Chennai-Bangalore highway) frequented by many local and Interstate bus drivers, because of the high concentration of passenger movement connecting the two Metro cities of South India, a highly industrialised zone in addition to the presence of many Educational Institutions and also it is a Green Corridor.

Purpose

The purpose of this study was to determine the prevalence of visual impairment among bus drivers frequenting the national highways. The data from this study will provide necessary information on visual functions among bus drivers, help to make appropriate policy decisions towards drivers obtaining driving licence and regulations, and the importance of periodic vision check up and corrective measures to be undertaken.

Materials and Methods

A cross-sectional study was done on bus drivers passing through Poonamallee bus stand located in the busy NH 4 (Chennai – Bangalore highway). Drivers were examined for visual acuity using Snellen's Chart, Colour Vision by Ishihara's Isochromic Plates and Field of Vision by confrontation method. Those requiring further evaluation were referred to Saveetha Medical College and Hospital which is very close by to undergo further detailed ocular examination including Refraction and Fundus Examination.

Results

Totally 300 drivers were examined, out of which 214(71%) were found fit for driving. The remaining 86(29%) had visual impairment due to various causes.

Conclusion

Prevalence of visual impairment among drivers was about 29% which is quite a large magnitude to be accepted. Driver fault forms a significant share of the causes of road accidents in India. With driving tests in India not emphasising in visual acuity, poor eyesight could be a major culprit in road accidents questioning passenger safety. In India the Ophthalmologist's role in certifying a person applying to get a driver's licence is negligible. The criteria for vision requirement for safe driving is to be revised and regular monitoring and better visual

examination parameters should be given more importance for issuing and renewal of driving licenses to prevent road accidents.

Keywords: Visual Acuity, Colour blindness, Bus drivers, Screening

INTRODUCTION

Travelling by buses is the most common and preferred mode of commuting in India which is a developing country. In comparison to other modes of transport it is very economical and availability of frequency of services is quite high and flexibility of time is the common reasons for this becoming better mode of transportation. Buses ply during day and night and so the driving conditions and attitude of the drivers also vary depending upon their duty hours. Vision plays a very important role not only to concentrate on the road ahead and also the various other reflexes needed to control the buses in different situations depends mainly on a normal visual acuity for the safety of passenger and others on the road. Indian roads and highways and the attitude of other vehicle users pose multiple challenges to the drivers of buses. India has 48.65 lakhs km of road network making it the second largest in the world. [1] Transportation of people in India is mainly dependent on roads, carrying almost 80% of its passengers. And due to the increasing number of road rage incidents and misuse of roads such as for cattle rearing, drying of hay in rural setup and children playing on roads along with the poor design and maintenance of roads and poor signalling system in an urban setup are few of the non driver related factors, wherein adequate visual acuity of drivers help in avoiding the mishap. As a developing nation it has a vast and exhaustive network of national highways (NH) connecting various parts of the country. Road traffic accident is a major cause for health hazard worldwide and is a major cause for mortality and morbidity due to the resulting trauma. [2] The drivers are not only more vulnerable for highway mishaps but within city limits also. Visual disability among drivers is one of the major causes of road accidents in India. Over half of the Indian drivers responsible for road accidents have at least one visual disability, according to a study by the Indian Institute of Sciences (IISc) [3]. This study mainly focuses on the visual functions of drivers as vision is the most important source of information during driving and

many driving related injuries have been associated with visual problems.

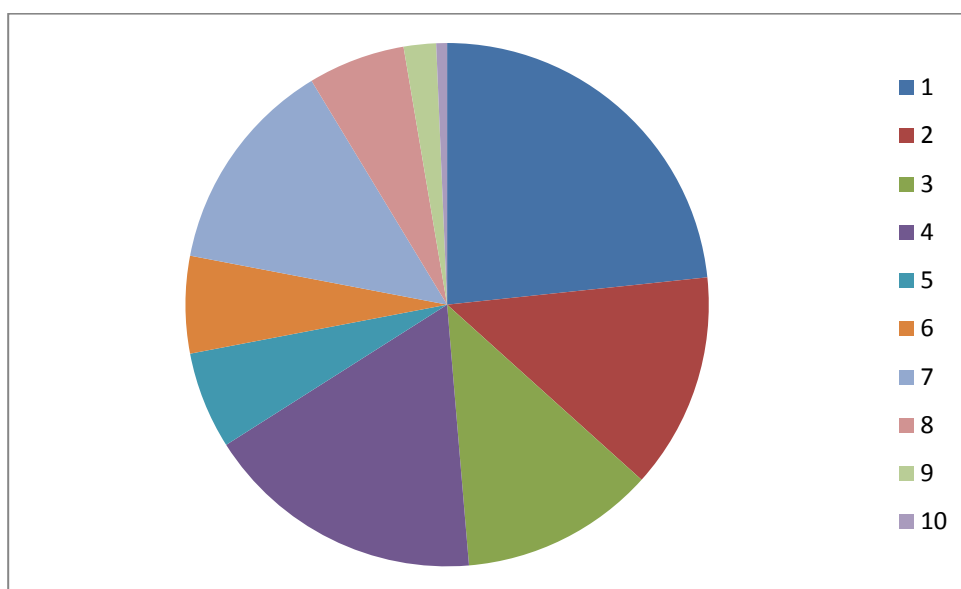
MATERIALS AND METHODS

A screening camp was conducted during the month of April in the year 2019 for a period of 7 days exclusively for bus drivers to check for any visual disorders in the bus stand in Poonamallee located in NH 4 (Chennai - Bangalore highway) frequented by bus drivers from all parts of Tamil Nadu, Karnataka and Andhra Pradesh, as it is a highly traversed route connecting two busy Metropolitan cities of South India; moreover this road connects other important places like Kanchipuram, Tiruvannamalai, Ambur, Vellore etc. for various reasons. This was a cross sectional, non comparative type of study. These drivers were tested for visual acuity and colour vision and visual field by confrontation method at the camp site. Those suspected of having visual problems were sent for detailed check up at Saveetha Medical College and Hospital. Comprehensive eye examination at the base hospital included Visual Acuity using Snellen's chart, Refraction, Direct Ophthalmoscopy, Tonometry, Slit Lamp Biomicroscopy and Automated Perimetry. Detailed examination was done to exclude cataract, glaucoma, ARMD and retinopathy due to different causes. All drivers with uncorrected refractive error were given suitable spectacles. Anti-glaucoma medications were prescribed and advised for a regular follow up for those diagnosed with glaucoma. The results were tabulated and evaluated.

RESULTS

Criteria for visual standard is in accordance to International Council of Ophthalmology (ICO) 30th World Ophthalmology Congress, Brazil, 2006(4). Totally 300 drivers were examined. The mean age of drivers was 44 years (range 18- 70 years).

| Serial Number | Age of Drivers | Number of Drivers |
|---------------|----------------|-------------------|
| 1 | 18-25 | 70 |
| 2 | 26-30 | 40 |
| 3 | 31-35 | 36 |
| 4 | 36-40 | 52 |
| 5 | 41-45 | 18 |
| 6 | 46-50 | 18 |
| 7 | 51-55 | 40 |
| 8 | 56-60 | 18 |
| 9 | 61-65 | 6 |
| 10 | 66-70 | 2 |



Pie Chart 1 shows the age wise distribution of drivers.

| Education Status | Number of Drivers |
|--------------------------|-------------------|
| Primary School and below | 46 |
| Middle School | 118 |
| High School and Above | 136 |

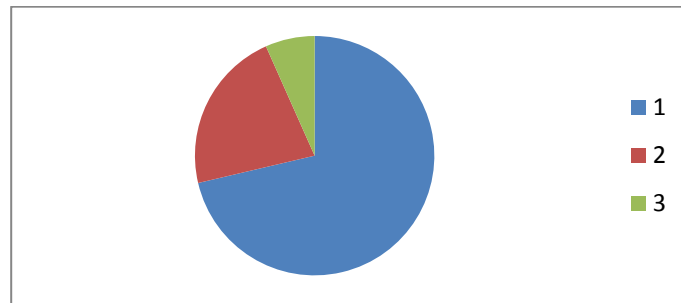
Of the drivers who participated in study 46(15.3%) have studied until primary school, 118(39.3%) Middle School and 136(45.4%)

have completed high school till undergraduate level.

| Serial Number | Visual Acuity | Number of Drivers |
|---------------|---------------|-------------------|
| 1 | 20/20 20/25 | 214 |
| 2 | 20/40 20/50 | 66 |
| 3 | 20/70 20/200 | 20 |

About 214 (71%) drivers were emmetropic and the remaining 66 (22%) drivers had visual acuity less than 20/20. 20 drivers that are nearly 6% had visual acuity less than 20/30 making them unfit for

driving. 71% of drivers were fit for driving and 22% of drivers had mild visual impairment. Severe visual impairment was found in (20) 7% of the drivers.



Alcohol intake among Drivers

| Alcohol intake history | Number of Drivers | More than 10 years of Alcohol Consumption |
|------------------------|-------------------|---|
| Consume Alcohol | 128 | 44 |
| Don't consume alcohol | 172 | - |

Of the drivers who were taken for the study 128(42.6%) of them consumed alcohol and 44(34%) of them consumed alcohol for more 10 years and 172 (57.4%) than did not consume alcohol.

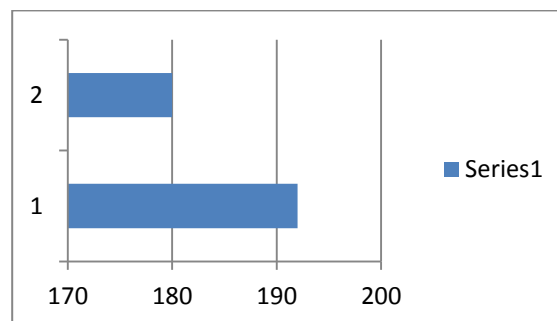
Tobacco Usage among drivers

| Tobacco usage History | Number of Drivers | Consumption of tobacco for more than 10 years |
|-----------------------|-------------------|---|
| Consume Tobacco | 98 | 54 |
| Don't consume Tobacco | 202 | - |

Of the drivers who were taken for the study 98(32.6%) of them consumed tobacco and 54(55%) of them consumed tobacco for more 10 years and 202 (67.4%) than did not consume tobacco.

| Spectacle Usage | Number of Drivers |
|----------------------|-------------------|
| Using spectacles | 108 |
| Don't use Spectacles | 192 |

108(36%) of drivers only use the spectacles and had regular visit to the Ophthalmologist, whereas 192(64%) don't use spectacles .



| Illness | Number of Drivers |
|-------------------|-------------------|
| Diabetes Mellitus | 43 |
| Hypertension | 28 |

Of the drivers who were subjected to the study 43 (14.3%) of them were Diabetic and 28(9.3%) were having hypertension, both under medications.

DISCUSSION

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. [5] In a recent study done at Guwahati, India (Chauhan S). [6] an attempt was made to identify the shortcomings in physical attributes of the drivers that may pose road safety hazards such as visual acuity, field of vision, depth perception, glare recovery, colour vision, contrast sensitivity, phorias, etc.

In our study we found that 214(71%) drivers were emmetropic and were fit for driving. The remaining 86(29%) had visual impairment of some sort or the other. This is quite a large magnitude to be accepted. A similar study conducted by Verma R et al [7] showed the prevalence of refractive error to be 18.82%. Another study conducted by Dr. Vikas Mahatme et al(8) in Nagpur had similar result as ours with 33% refractive error. Commercial vehicle drivers in the Central Region of Ghana had 20.4% refractive error.(9)in our study 108(36%) of drivers were wearing spectacles while 192(64%) were neither wearing spectacles nor did they visit the Ophthalmologist in the past.

Cataracts, diabetic retinopathy, glaucoma, and macular degeneration may weaken colour perception, contrast sensitivity, depth perception, glare recovery, or peripheral vision components. Ultimately, these vision impairments elevate the risks of traffic collisions and violations. [16]

Surprisingly all were unaware of such defect existing in them and had never faced any problem due to that. A direct link between increased risk of road traffic accident and colour vision defect has not been established. [17] In some circumstances it may impact performance of interpreting traffic control devices and other colour coded signals if other cues (luminance, position, pattern) are not sufficiently informative. [18]

This highlights the lack of concern and insensitivity of drivers towards visual health and at the same time points out the fault in our licence issuing system. Driver education is not mandatory and physical fitness of candidates with respect to visual abilities is not evaluated before issuing driver licence. Only the manoeuvring abilities of drivers during day time are considered sufficient for issuing the licence. These defects should be rectified for safety on the roads. Driving is a privilege and not a right and that the primary responsibility of those who assess potential drivers is to the public and not to the applicant.

CONCLUSION

Vision is the most important source of information during driving and many driving related injuries have been associated with visual problems. Prevalence of visual impairment among drivers is very high and poses serious health and social issues. As majority of the drivers did not have ocular examination at the time they were issued driving licence, ocular examination by an Ophthalmologist should be introduced as part of the compulsory test process for issuing and renewing drivers' license. This could ascertain minimum visual requirement for driving and will help to reduce the incidence of road traffic accidents.

REFERENCES

- [1]. "An overview: Road Network of India". Ministry of Road Transport, Government of India.2010.
- [2]. Omolase CO, Afolabi OT, Omolase BO, Ihemedu CO Ocular Status of Commercial Drivers in a Nigerian Community. J Community Med Health Educ 2, 2012, 138. doi:10.4172/2161-0711.1000138.
- [3]. Verma, Ashish and Chakrabarty, Neelima and Velmurugan S and Bhat, Prithvi B and Kumar, Dinesh HD and Nishanthi, B *Assessment of driver vision functions in relation to their crash involvement in India*. In: CURRENT SCIENCE, 110 (6), 2016, 1063-1072.
- [4]. Available from: <http://www.icoph.org/dynamic/attachments/resources/visionfordriving.pdf>.
- [5]. Bener A., Ahmad M.D., El-Tawil M.S. Visual impairment and motor vehicle accidents. Mid East J Emerg Med. 4, 2004, 1–9.

- [6]. Chauhan, S., Influencing traffic problem parameters through improved driver education and licensing, B Tech Thesis, IIT, Guwahati, 2009.
- [7]. Assessment of Visual Function of Truck Drivers Travelling on National Highway of Central India: A Prospective Study Rahul Verma¹, Puneet Bharadwaj, International Journal of Scientific Study 3(4), 2015.
- [8]. Dr. Vikas Mahatme et al JMSCR 2, 2014.
- [9]. 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. *Journal of Optometry*. 9(1), 2016, 54-63. doi:10.1016/j.optom.2015.06.004.
- [10]. Visual functions of commercial drivers in relation to road accidents in Nigeria M. K. Oladehinde, A. O. Adeoye, B. O. Adegbehingbe, A. O. Onakoya Indian J Occup Environ Med. 11(2), 2007, 71–75. doi: 10.4103/0019-5278.34532).
- [11]. Adamsons I, Rubin GS, Vitale S, Taylor HR, Stark WJ The effect of early cataracts on glare and contrast sensitivity. A pilot study. *Arch Ophthalmol* 110, 1992, 1081-1086.
- [12]. Rubin GS, Adamsons IA, Stark WJ Comparison of acuity, contrast sensitivity and disability glare before and after cataract surgery. *Arch Ophthalmol* 111, 1993, 56-61.
- [13]. Mangione CM, Phillips RS, Lawrence MG, Seddon JM, Orav EJ, et al. Improved visual function and attenuation of declines in health-related quality of life after cataract extraction. *Arch Ophthalmol* 112, 1994, 1419-1425.
- [14]. Owsley C, McGwin G Jr, Sloane M, Wells J, Stalvey BT et al. Impact of cataract surgery on motor vehicle crash involvement by older adults. *JAMA* 288, 2002, 841-849.
- [15]. Wood JM, Carberry TP Bilateral cataract surgery and driving performance. *Br J Ophthalmol* 90, 2006, 1277-1280.
- [16]. International Journal of Innovative Research in Science, Engineering and Technology 2(7), 2013. Copyright to IJRSET www.ijrset.com 3074 Visual Challenges among Drivers: A Case Study in Delhi, India Dr. Neelima Chakrabarty, Arun Lakshman, Kamini Gupta, Ankit Bhatnagar.
- [17]. Omolase CO, Afolabi OT, Omolase BO, Ihemedu CO Ocular Status of Commercial Drivers in a Nigerian Community. *J Community Med Health Educ* 2, 2012, 138. doi: 10.4172/jcmhe.1000138.
- [18]. Owsley C, McGwin G. Vision and Driving. *Vision research*. 50(23), 2010, 2348-2361. doi:10.1016/j.visres.2010.05.021.
- [19]. Available from: <http://www.icoph.org/downloads/visionfordriving.pdf>.
- [20]. Analysis of vision screening of truck drivers in a truck parking campus located in a busy national highway. Dr.Xavier.C.Jayaseelan and Dr.V.Panimalar DOI: 10.18231/2395-1451.2017.0073

How to cite this article: Guhan.K.A, Dr.C.Xavier Jayaseelan. Assessment of visual acuity and colour blindness among bus drivers in a metro city. *Int J of Allied Med Sci and Clin Res* 2019; 7(3): 977-982.

Source of Support: Nil. **Conflict of Interest:** None declared.