

**BJHS**

Birat Journal of Health Sciences

ISSN:

2542-2758 (Print) 2542-2804 (Online)

ARTICAE INFO:

Received Date: 15 November, 2024

Accepted Date: 28 March, 2025

Published Date: 30 April, 2025

KEYWORDS:

Drivers, ear morbidity, Nepal, ocular morbidity, rickshaw.

CORRESPONDING AUTHOR:**Pankaj Ray Adhikari**

Consultant Optometrist

Department of Optometry and Vision Science

Biratnagar Eye Hospital, Biratnagar, Nepal

Email: pankajaiims@gmail.com

ORCID: 0000-0002-4246-2153

Access the article online



DOI: 10.62065/bjhs628

CITATION:

Adhikari PR, Aara T, Karn RR. Title Of Manuscript: Pattern Of Ocular And Ear Morbidity Among Electric Rickshaw Drivers Of Biratnagar Metropolitan City, Nepal. 2025; 9 (2): 10-13.

COPYRIGHT:

© Authors retain copyright and grant the journal right of first publication with the work simultaneously licensed under Creative Commons Attribution License CC - BY 4.0 which allows others to share the work with an acknowledgment of the work's authorship and initial publication in this journal.



Pattern of Ocular and Ear Morbidity Among Electric Rickshaw Drivers of Biratnagar Metropolitan City, Nepal

Pankaj Ray Adhikari^{1,2*}, Tabassum Aara³, Rajiv Ranjan Karn⁴¹ Consultant Optometrist, Department of Optometry and Vision Science, Biratnagar Eye Hospital, Biratnagar, Nepal² Associate Professor, Department of Optometry and Vision Science, National Academy of Medical Sciences (NAMS), Bir Hospital, Kathmandu, Nepal³ Optometrist, Department of Optometry and Vision Science, Biratnagar Eye Hospital, Biratnagar, Nepal⁴ Research Officer, Research Department, Eastern Regional Eye Care Program, Biratnagar, Nepal**ABSTRACT**

Introduction: Vision is a fundamental component of safe driving. Any significant loss of visual function such as vision, field of vision, color vision, or contrast sensitivity/ability to see light and traffic signals in bad weather and night will diminish a person's ability to operate a motor vehicle safely on today's congested high-speed roadways.

Objectives: To find out the pattern of ocular and ear morbidity of electric rickshaw driver of Biratnagar metropolitan city.

Methodology: The descriptive cross-sectional study was conducted at Biratnagar Eye Hospital (BEH), Biratnagar. The socio-demographic variables, assessment of uncorrected and corrected visual acuity for distance and near, color vision, stereopsis/depth perception, anterior and posterior segment ocular examination was done. Ear examination was performed by using otoscope and torch light.

Results: Among 154 participants, mean age (\pm SD) was 38.09(\pm 9.66) and all of them were male 154(100%). Nearly half 74(48%) of the participants were in the age group 26-40 years among them majority had completed secondary level education 94(61%) and 121(78.6%) had no driving license. More than half of the participants 79 (51.3%) reported previous history of eye examination. Normal color vision and stereopsis was found in 142(92.2%) and 89(57.8%) participants respectively. Majority of eye 306(99.35%) had normal best corrected visual acuity. Only 2 of them had history of Road Traffic Accident (RTA). More than two-thirds of the participants had no ear morbidity.

Conclusion: Distance visual acuity was also found with in normal limit but presbyopia was emerged as the most common ocular morbidity and stereopsis was also found abnormal among electric rickshaw driver. Majority of them had no ear morbidity.

INTRODUCTION

Driving is the common approach for mobility in many countries¹ and this aids in the performance of daily routine activities.² In the Terai region of Nepal, an Electric rickshaw (E- rickshaw) is the most commonly available public transport to travel local places. In Biratnagar metropolitan city, it is one of the popular intra-city modes of public transport. While traveling, Road Traffic Accident (RTA) is a major concern worldwide leading to death.^{3,4} Each year an estimated 1.2 million people

are killed in road traffic crashes and up to 50 million injured worldwide.⁵ Driving is a visually intensive task that requires several sets of abilities which include sensory ability (mainly visual), mental ability, motor ability and compensatory abilities.⁶ As vision is one of the fundamental components of safe driving,¹ one needs different kinds of vision to be able to drive safely.

About 95% of the sensory ability needed for driving has been visual so any significant loss of visual⁷ function such as visual acuity,⁷ visual field, depth of perception, color vision, or contrast sensitivity will diminish a person's ability to operate a motor vehicle safely. If the distance vision is poor the driver may not see the hazards present in the driving environment until it is too late while poor accommodation prevents the proper use of the vehicle's dashboard. Compromised depth of perception/stereopsis and peripheral visual field intercept with the ability to judge distance well, overtake other vehicles lanes and limit the use of side and rear mirrors respectively. To identify traffic signs and signals along with various vehicle lamps and signals color vision plays a crucial role. People with reduced contrast sensitivity due to increasing age and ocular disorders may experience difficulty in driving despite having adequate visual acuity.⁸ Thus disturbance in these visual functions may prohibit safe driving.

In developed and developing countries, noise pollution is one of the major environmental threat for hearing loss.⁹ The professional drivers who drive buses or any public transport in busy traffic lanes are always at risk of exposure to high levels of noise due to traffic congestion along the roadside.^{10,11} In major cities, noise pollution studies have shown that long-term exposure to these noise affects the hearing ability of drivers eventually resulting in a decrease in their work performance.^{12,13,14}

Biratnagar is the largest city of southern Nepal where E-rickshaw has been very popular recently due to growing population and industrialization. There is a very limited study done in E-rickshaw drivers in Nepal hence we aimed to find out the pattern of ocular and ear morbidity of these E-rickshaw drivers of Biratnagar metropolitan city.

METHODOLOGY

A descriptive cross-sectional study was conducted at Biratnagar Eye Hospital (BEH), Biratnagar. The data was collected from one of the eye and ear screening program organized by BEH at the base hospital separately for E-rickshaw driver working in southern part of Biratnagar metropolitan city in 2019. All the data were retrieved from hospital records. Ethical clearance was taken from the Institutional Review Committee of BEH (BEH-IRC-168/A) and informed consent was taken before data collection. Demographic data included age, gender, education, history of RTA. The uncorrected distance visual acuity (UCDVA) and best-corrected distance visual acuity (BCDVA) was done by using wall mounted Snellen's vision chart, best-corrected near visual acuity (BCNVA), objective refraction was done by using Heine retinoscope and subjective refraction was performed by using trial set, anterior segment examination was conducted by using torch light and hand held portable slit lamp (Keeler), undilated

fundus examination was done by using Heine ophthalmoscope, color vision test was done by using Ishihara Pseudo- isochromatic color vision test chart. Stereopsis was tested using the Titmus fly test under room illumination, other data were taken by face-to-face interview. All eye examinations were performed by an experienced optometrist. The ear examination was also performed by a trained ear care professional by using a torch light and an otoscope. After eye and ear screening, proper management of refractive error and other ocular and ear morbidities was done and referral was done for those who needed secondary consultation and further management. All the data were entered in an Excel sheet and statistical analysis was done by using SPSS version 20 (SPSS, Inc., Chicago, IL). All categorical variables were reported using frequencies and percentages and continuous variables were expressed in terms of mean (SD).

Refractive errors were classified according to the following criteria.¹⁵

A) Hyperopia: Refractive error at least +0.5 D which was further classified as Low (+0.50D to +3.0D), Medium (+3.0D to <+6.0D) and High (more than +6.0D)

B) Myopia: Refractive error at least -0.5 D which was further classified as Low (-0.50D to -3.0D), Medium (-3.0D to <-6.0D) and High (more than -6.0D)

C) Astigmatism: Astigmatism was classified as simple hyperopic astigmatism (SHA), simple myopic astigmatism (SMA), compound hyperopic astigmatism (CHA), compound myopic astigmatism (CMA), mixed astigmatism (MA).

The Visual Acuity (VA) was categorized as per WHO guidelines, VA in log MAR Normal 0.0 to 0.5, Visual Impairment 0.6 to 1.0, Severe Visual Impairment 1.0 to 1.3 and Blind <1.3 to NPL.¹⁶

RESULTS

A total 308 eyes of 154 E-rickshaw drivers were included in the study. The mean age of the participant was 38.09(±9.66) with a minimum of 18 and a maximum of 68 years of age. All of them were male 154(100%) and nearly half 74(48%) of them were in the 26-40 years of age group. The majority of them, 94(61%) had completed secondary-level education. More than half, 79 (51.3%) participants had a previous history of eye examination. Normal color vision and stereopsis was found in 142(92.2%) and 89(57.8%) participants respectively. About 121(78.6%) participants had not taken a driving license and only 2(1.3%) had reported history of RTA on the day of examination (Table 1). Among all examined eyes, more than half had presbyopia as the major ocular morbidity (Table 2). Only 31(20%) of the participants had ear morbidity (Table 3). Visual acuity was found to be normal in 291(94.5%) eyes whereas visual acuity after correction was found to be normal in 306(99.4%) eye (Figure 1)

DISCUSSION

While distance visual acuity was generally good, presbyopia emerged as the most common ocular morbidity, and a significant proportion of participants exhibited abnormal stereopsis. In this

study, all the participants were male and belonged to the active age group. This finding almost coincides with the findings of a study done in Nepal for professional bus drivers.¹⁷ In this study, all the participants were literate which was dissimilar with the study done in Nepal and Nigeria.^{18,9} The high literacy rate may explain why only 1.29% of participants reported a history of road traffic accidents (RTA), a stark contrast to the 18% reported in a Nigerian study.⁹ Only 21.8% of the participants in this study had driving license which differed from the study done at Nigeria.⁹ This study reported that only 51.3% participants had a prior history of eye checkup. Among all participants, 7.85% had color vision deficiency and 42.2% had abnormal stereopsis. This finding was in contrast with other study in which all drivers had normal color vision but they did not mention about stereopsis.⁸ As normal color vision and stereopsis is very very essential to see the traffic signals and road condition for safe driving. This study also showed 94.4% of participant had uncorrected visual acuity while 99.3% had best corrected visual acuity in the range of 0.00 to 0.50 log MAR which is also the essential component for safe driving. This finding almost coincides with the finding of study done at Nigeria.⁹ Presbyopia was the major ocular morbidity found which was similar to the study done in Nigeria⁹ but differ from the study done in Nepal.¹⁸ Presbycusis is an age related hearing loss and it was found in 9(5.8%) participants of age more than 40 years which was lower than the study conducted in Iran.¹⁴ This might be due to short distance driving. CSOMT TT was found in 11(7.1%) participants which was also less than the hospital-based study done eastern Nepal,¹⁸ this might be due to the set up as in hospital, mostly patients came with any type of symptoms related to ear.

This study was the first of its kind which included both eye and ear morbidity among E-rikshaw driver of Koshi Province.

LIMITATION OF THE STUDY

A limitation of this study was the use of Ishihara pseudo isochromatic plate for color vision assessment which could only detect congenital color defect as other tests such as Farnsworth Munsell 100 Hue test and D-15 test which could detect acquired color vision defect were not available at the time of this study. Also, contrast sensitivity and visual field were not assessed in this study due to the difficulty in performing these tests at camp site. Contrast sensitivity helps to see pedestrians, lights and road signs in bad weather and at night while visual field test is helpful in detecting the side objects through side mirrors while fixing the central point which is also crucial for turning the vehicle on either side. Similarly, we could not perform Pure Tone Audiometry (PTA) to find out the reason for hearing loss. So, there is future scope of study to conduct comprehensive color vision tests, contrast sensitivity assessments, visual field test and Pure Tone Audiometry to provide a more detailed evaluation of ocular and auditory health among drivers.

CONCLUSION

Presbyopia was the most common ocular morbidity but stereopsis was abnormal. Although presbyopia occurs due to age related changes in the eye but its impact on near vision is very

significant. Uncorrected presbyopia among the drivers resulting in difficulty in seeing dashboard and navigation properly has a crucial impact in safe motor driving. Poor Stereopsis also has significant impact in judging the road conditions as well as distance between the front vehicles which is crucial for safe driving and helpful to avoid RTA. Only half of the participants had history of previous eye examination and less than quarter of them had license. This highlights the need for unceasing efforts to educate vulnerable groups on these visual impairments and implement rules to compulsorily have driving license for every driver. It should be ensured that every potential driver at licensing test and at renewals gets the basic vision test done. Color vision test should be made compulsory for all the drivers. Those found to have visual impairment should be referred to Ophthalmologists/ Optometrist for detailed ocular examination.

ACKNOWLEDGEMENT

We would like to sincerely thank all the study participants for being part of the study. We would like to also acknowledge Biratnagar Eye Hospital for providing technical support, organizing screening camp, including examination of the participants and further treatment. We would also like to acknowledge all my team members.

CONFLICT OF INTEREST: None

FINANCIAL DISCLOSURE: None

REFERENCES

1. Bener A, Ahmad MD MF, El-Tawil MS, Al-Bakr S. Visual impairment and motor vehicle accidents. The Middle East Journal of Emergency Medicine.2004;4(1): 39-43.
2. Owsley C, McGwin G Jr. Vision impairment and driving. Surv Ophthalmol.1999; 43(6): 535-550.
DOI: [10.1016/S0039-6257\(99\)00035-1](https://doi.org/10.1016/S0039-6257(99)00035-1)
PMID: 10416796
3. Museru LM, Macharo CN, Leshabari MT (2002) Road traffic accidents in Tanzania: A ten-year epidemiological appraisal. East and Central African Journal of Surgery.1999; 7: 23-26.
4. Solagberu BA, Adekanye AO, Ofoegbu CP, Udoffa US, Abdul-Rahman LO. Epidemiology of trauma deaths. West Afr J Med .2003;22: 177-181.
DOI: [10.4314/wajm.v22i2.27944](https://doi.org/10.4314/wajm.v22i2.27944)
PMID: 14529233
5. Krug EG, Sharma GK, Lozano R. The global burden of injuries. Am J Public Health.2000; 90(4): 523-526.
DOI: [10.2105/AJPH.90.4.523](https://doi.org/10.2105/AJPH.90.4.523)
PMID: 10754963 PMCID: PMC1446200
6. Oladehinde MK, Adeoye AO, Adegbehingbe BO, Onakoya OA . Visual functions of commercial drivers in relation to road accidents in Nigeria. Indian J Occup Environ Med. 2007; 11(2):71-75.
DOI: [10.4103/0019-5278.34532](https://doi.org/10.4103/0019-5278.34532)
PMID: 21938219 PMCID: PMC3168100

7. Taylor JF. Vision and driving. *The Practitioner*. 1982;226:885-9.
PMID: 7100078
8. Omolase CO, Afolabi OT, Omolase BO, Ihemedu CO .Ocular Status of Commercial Drivers in a Nigerian Community. *J Community Med Health Educ* .2012; 2:138.
DOI: [10.4172/2161-0711.1000138](https://doi.org/10.4172/2161-0711.1000138)
9. Rajeshwar Balaji . Hearing Impairment and High Blood Pressure Among Bus Drivers in Puducherry. *Journal of Clinical and Diagnostic Research*. 2016; 10(2): CC08-CC10.
DOI: [10.7860%2FJCDR%2F2016%2F17361.7199](https://doi.org/10.7860%2FJCDR%2F2016%2F17361.7199)
10. Bluhm G, Nordling E, Berglind N. Road traffic noise and annoyance--an increasing environmental health problem. *Noise Health*. 2004;6(24):43-49
11. Karimi A, Nasiri S, Kazerooni FK, Oliaei M. Noise induced hearing loss risk assessment in truck drivers. *Noise Health*. 2010;12(46):49-55.
DOI: [10.4103/1463-1741.59999](https://doi.org/10.4103/1463-1741.59999)
PMID: 20160390
12. Pushpa K, Girija B, Veeraiah S. Effect of Traffic Noise on Hearing in City Bus Drivers of Bangalore. *Indian J Public Health Res Dev*. 2013;4(3):227-30.
DOI: [10.5958/j.0976-5506.4.3.114](https://doi.org/10.5958/j.0976-5506.4.3.114)
13. Janghorbani M, Sheikhi A, Pourabdian S. The prevalence and correlates of hearing loss in drivers in isfahan, iran. *Arch Iran Med*. 2009;12(2):128-34
14. Corrêa Filho HR, Costa LS, Hoehne EL, Pérez MAG, Nascimento LCR, de Moura EC. Noise-induced hearing loss and high blood pressure among city bus drivers. *Rev Saúde Pública*. 2002;36(6):693-701.
DOI: [10.1590/S0034-89102002000700006](https://doi.org/10.1590/S0034-89102002000700006)
PMID: 12488935
15. Althomali TA. Relative Proportion of Different Types of Refractive Errors In Subjects Seeking Laser Vision Correction. *Open Ophthalmol J*. 2018 ;30(12):53-62.
DOI: [10.2174/1874364101812010053](https://doi.org/10.2174/1874364101812010053)
PMID: 29872484 PMCID: PMC5958297
16. Khawaja AP, Chan MPY, Hayat S, Broadway DC, Luben R, Garway-Heath DF, et al. The EPIC-Norfolk Eye Study: rationale, methods and a cross-sectional analysis of visual impairment in a population-based cohort. *BMJ Open*. 2013; 19:3(3).
DOI: [10.1136/bmjopen-2013-002684](https://doi.org/10.1136/bmjopen-2013-002684)
PMID: 23516272 PMCID: PMC3612817
17. Bastola P. Pattern of Ocular Morbidity in Professional Intercity Vehicle Drivers of Mid West Tarai Belt of Nepal: A Cross Sectional Descriptive Study. *Journal of Nepalgunj medical college*. 2014; 12 (1):14-18.
DOI: [10.3126/jngmc.v12i1.13399](https://doi.org/10.3126/jngmc.v12i1.13399)
18. Thakur SK, Singh SK, Mahato B, Singh A. Ear diseases pattern and hearing impairment in the Eastern Nepal- A study in a combined eye and ear set up. *Asian Journal of Medical Sciences*. 2015; 6(5):51-55.
DOI: [10.3126/ajms.v6i5.11621](https://doi.org/10.3126/ajms.v6i5.11621)