

## A Retrospective Observational Assessment of the Prevalence of Refractive Errors and Spectacle Uptake in Truck Drivers

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### Abstract

**Aim:** To study the prevalence and types of refractive errors among truck drivers, as well as their uptake of glasses.

**Material & Methods:** This is a retrospective observational study. Data were collected through routine eye camps held for drivers over a period of one year in the Department of Ophthalmology, Anugrah Narayan Magadh Medical College Hospital, Gaya, Bihar, India.

**Results:** A total of 1625 truck drivers were examined in the camps, with the help of a mobile van, during the study. Most of the from utilizing offered services. No association between myopia and uptake of glasses. The results of the logistic regression indicate that the uptake of spectacles was positively associated with age-classes, and negatively associated with number of affected eyes, presence of astigmatism, and presence of hyperopia. The results of the multiple logistic regression analysis conform to the findings of the univariate analysis.

**Conclusions:** Our study highlights the importance of eye examination among truckers. There is a need to increase the uptake of spectacles by increasing awareness and developing better models of spectacle delivery.

**Key words:** Refractive error, regular eye examinations, spectacles, truck drivers.

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### Introduction

The recent data on the global burden of vision impairment (VI) has suggested a reduction in the age-adjusted prevalence of blindness; however, these gains made over the past few decades are at risk due to population growth and the many inadequacies in keeping up with the need. [1] However, estimates on the burden of VI among certain segments of populations such as commercial taxi drivers (CTDs)

are scanty, specifically from India. As the majority of people in India rely greatly on commercial modes of transport for commuting between and within cities and towns, [2] understanding the ocular and vision impairment burden among CTDs is crucial and significant from a public health perspective. Many recent studies, emanating predominantly from the African countries, have established a link between

poor vision of commercial drivers and road traffic injuries and fatalities. [3-6] However, similar evidence from India is largely absent.

As per a 2018 report, 53% of the 1031 truck drivers surveyed during the independent Kantar study reported suffering from health problems, 8% of those citing eyesight issues. [7] These drivers also report long hours on the road without breaks, [8] resulting in body-clock reversal from late-night driving. Driving performance has been shown to be significantly associated with refractive blur and the time of day, suggesting that accurate correction of even low refractive error can help prevent adverse events, especially under night-time driving conditions. [9]

Thus, we aim to the prevalence and types of refractive errors among truck drivers, as well as their uptake of glasses.

#### **Material & Methods:**

This is a retrospective cross-sectional study. Data were collected through routine eye camps held for drivers over a period of one year in the Department of Ophthalmology, Anugrah Narayan Magadh Medical College Hospital, Gaya, Bihar, India. The study was approved by the Institutional Review Board (IRB/2019/OCT/08) and adheres to the tenets in the Declaration of Helsinki.

Prior to each camp, awareness activities were held to encourage drivers into up taking the services. These predesignated camps were conducted as per scheduled rosters and were attended by truck drivers, mechanics, and other Drivers requiring glasses for reading at a normal distance of 35–40 cm were categorized as those with near vision problems. Drivers affected by distance vision problems were categorized as suffering from either myopia or

hyperopia with or without astigmatism. Those needing both distance and near vision correction were analyzed as a separate category.

The cut-offs used for myopia and hyperopia were more than, or equal to, 0.5 D and more than, or equal to, 0.75 D for astigmatism. Myopia of <3 D was labeled as mild, from 3 D up to 6 D as moderate, and more than 6 D as high myopia. [11] Hyperopia of <2 D was labeled as mild, from 2 D up to 5 D as moderate, and more than 5 D as high. [12]

The proportion of drivers suffering from the refractive errors and their appropriate classifications was analyzed, as was the proportion of drivers who decided to uptake glasses by purchasing. Logistic regression was applied to check the association between the uptake of glasses with an optimum combination of covariates, including age categories, number of affected eyes, presence of astigmatism, and presence of hyperopia. Statistical analysis was carried out using R software version 3.1.1 and Excel 2013 (Vienna, Austria).

#### **Results:**

A total of 1625 truck drivers were examined in the camps, with the help of a mobile van, during the study. Most of the from utilizing offered services.

Post 40 years, 3.14% of the truck drivers had myopia (95% CI: 20.73 - 1.38%); 20.8% had hyperopia (95% CI: 3.62 - 4.64%); 2.3% had astigmatism (95% CI: 0.81 - 1.70%); and 42.5% of the truck drivers had at least one refractive error (25.19 - 27.82%). Chi-square tests confirm that the prevalence of refractive error significantly varied over different age-classes of the truck drivers ( $P < 0.001$  for each type of refractive error). [Table 1]

**Table 1: The prevalence of different combinations of distance and near vision problems in truck drivers**

	Number of truck drivers	%	95 % CI
Myopia with or without astigmatism + presbyopia	51	3.14	0.73 - 1.38
Hyperopia with or without astigmatism + presbyopia	339	20.8	3.62 - 4.64
Myopia with or without astigmatism (no presbyopia)	37	2.34	0.81 - 1.70
Hyperopia with or without astigmatism (no presbyopia)	12	0.77	0.05- 0.42
Presbyopia with or without distance vision	496	30.5	22.93 - 25.48
Any refractive error at least in one eye	690	42.5	25.19 - 27.82

The procurement of glasses by the truck drivers belonging to different refractive error categories is given in Table 2. 592 drivers with Presbyopia with or without distance vision bought spectacles followed by drivers with Astigmatism only (no presbyopia) (46.8%). [Table 2]

**Table 2: Uptake of spectacles advised in truck drivers with different combinations of distance and near vision problems**

	Number of truck drivers advised spectacles	Spectacle uptake numbers				Uptake of spectacles Advised (%)
		Distance	Near	Bifocal	Total	
Myopia with or without astigmatism + presbyopia	51	1	2	8	11	38.3
Hyperopia with or without astigmatism + presbyopia	339	0	30	46	76	41.7
Myopia with or without astigmatism (no presbyopia)	37	22	0	0	22	0.00
Hyperopia with or without astigmatism (no presbyopia)	12	0	0	0	0	40.2
Astigmatism only (no presbyopia)	22	18	0	0	18	46.8
Presbyopia with or without distance vision	496	1	531	61	592	48.9
Any refractive error at least in one eye	690	45	551	60	656	38.3

No association between myopia and uptake of glasses. The results of the logistic regression indicate that the uptake of spectacles was positively associated with age-classes, and

negatively associated with number of affected eyes, presence of astigmatism, and presence of hyperopia. The results of the multiple logistic regression analysis conform to the findings of the univariate analysis [Table 3].

**Table 3: Results of the logistic model**

Covariates	Coefficients (B)	Level of significance	OR (Exp B)	Base category
Age 30-39 years	0.782	0.01	2.072	Age below 30 years
Age 40-49 years	1.201	0.01	3.066	
Age 50 years and above	1.039	0.01	2.428	
Number of affected eyes	-1.571	0.02	0.171	
Presence of astigmatism	-0.772	0.052	0.683	Absence of astigmatism
Presence of hyperopia	-0.681	0.038	0.891	Absence of hyperopia
Constant	2.384	0.01		

### Discussion

Among 1.35 million people killed annually by road traffic crashes, 93% of deaths occur in LMICs. [13] The importance of traffic regulations is illustrated by the reduction of traffic deaths and injuries by 13% in the WHO European Region between 2010 and 2016 through enactment and enforcement of road safety legislations by political and technical commitment. [14] The Global Burden of Diseases, Injuries, and Risk Factors Study 2017 showed that, although mortality from road traffic injuries decreased globally over time, it did not in south Asia and southern Latin America. [13] The economic burden of road traffic crashes is increasing in LMICs [14] and exceeds that in HICs due to increases in urbanization, [15] road infrastructure, and access to private vehicles. [16] Sustainable Development Goal 3.6 aims to “halve the number of global deaths and injuries from road traffic accidents” by 2020, echoing the Stockholm Declaration target of reducing road deaths by 50% by 2030. [17] These goals will not be achievable in LMICs without concerted effort.

Compared to studies among public institution drivers in Nigeria [18], 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.

Long-term spectacle compliance was relatively low among CTDs, and the trends indicate that compliance improved with age. Spectacle coverage is one of the important impact indicators for primary eye care services. There is, however, a severe dearth of information on spectacle compliance among CTDs. A study done among multiple locations of the national capital region of India revealed low spectacle usage among heavy vehicle truck drivers. [19] A descriptive qualitative study among commercial drivers from the Indian state of Odisha reports that 92.3% of the respondents replied in the negative about their usage of recommended glasses. [20]

Yet, a seminal strength of our study, making it unique, is its screening of one of the largest series of long-distance Indian truck drivers for refractive error and spectacle uptake. This is especially so when compared to numbers reported in

earlier studies of truck drivers in India. [21-27]

### Conclusion:

Providing health-care facilities to a mobile population of truck drivers is a trial for most health service providers.<sup>[18]</sup> On the basis of our study, we would like to recommend interventions targeted at generating awareness regarding the need of regular eye examinations and the importance of uptake of glasses. Better models for spectacle dispensing, along with provisions for more readymade spectacles on-site to increase uptake are recommended, especially for distance vision spectacles and bifocals.

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