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STUDY OF VISUAL STATUS IN DRIVERS OF MOTOR VEHICLES INVOLVED IN ROAD TRAFFIC ACCIDENTS

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ABSTRACT

Background*: In low and middle-income countries 50-85% of trauma cases are RTA, posing a significant and unnecessary burden on the healthcare system and drain of medical resources.*

Aim: *To assess the visual status in drivers of motor vehicles involved in RTAs.*

Setting & design: *A prospective cross-sectional study with 100 subjects was done, from all drivers of RTA, at our hospital, between February 2023 to February 2024.*

A pre-tested structured questionnaire was administered to the patients, which included driver's demographic data, duration of driving, previous history of RTA, previous ophthalmic history.

Material and Methods: *A Comprehensive ophthalmological examination was done -*

Visual acuity test, Refraction, Anterior Segment examination, EOM, Colour vision, Visual field assessment, IOP & Fundoscopy.

Statistical analysis & Results: *A total of 100 drivers with RTA were evaluated.*

- *Age-range was 16 to 72 years with mean of 42.1 ± 6.7 years.*
- *6 drivers lacked a driving license and 8 hadn't renewed their DL.*
- *None of the drivers had an eye examination by an ophthalmologist prior to obtaining DL.*
- *37 had refractive errors (31 were newly detected). Only 6 had corrective glasses.*
- *Visual impairment in 21 patients.*
- *Simple Myopia in 18 patients.*
- *7 had unilateral cataract.*
- *3 had monocular blindness –*
- *2 had HMC*
- *1 had near mature cataract*
- *Colour Deficiency in 4 patients.*
- *2 patients had tubular field of vision, were diagnosed with POAG.*

Conclusion: *There was a significant relationship between Visual impairment and RTAs, which calls for more stringent screening of drivers at the licencing level.*

KEYWORDS:

VA	*Visual Acuity*
IOP	*Intra Ocular Pressure*
RTA	*Road Traffic Accident*
DL	*Driving license*
EOM	*Extra Ocular Movements*
HMC	*Hyper Mature Cataract*
OPD	*Out-Patient Department*
VFA	*Visual Field Analysis*
GCS	*Glasgow Coma Scale*

Article History

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INTRODUCTION

In the 1990's, the 'Global Burden of Disease Study' predicted that traffic- related injuries would become the third largest contributor to global death and disability by the year 2020.[1]

In low and middle-income countries 50-85% [2] of trauma cases are RTA victims who pose a significant burden on the healthcare system and represent significant and unnecessary drain of medical resources.

- Vision is the most important sensory factor in driving which accounts for about 95% of all sensory requirements.[3]
- Therefore, visual assessment for driving is of prime importance to ensure the reduction of crash-related injuries.
- Visual acuity is by and large the most widely used criterion for determining eligibility for driving worldwide.
- Visual acuity alone is not an appropriate method for assessing full visual function, which includes other vision components such as visual field and colour vision to name a few.

NEED FOR STUDY

- There is a need to develop a valid and reliable tool of vision screening that can predict driving performance.

MATERIALS AND METHODS

Source of Data

Sample Size: 100 Cases.

Recruitment of subjects: All drivers who were victims of RTA, which fulfilled the inclusion criteria, admitted at our hospital, was considered for the study.

The Study Period was between February 2023 to February 2024.

Inclusion Criteria

- Drivers of Motor Vehicles involved in an RTA
- RTA victims with limb trauma / body trauma
- Drivers of all types of motor vehicles – 2W, 3W, 4W & HTV.
- GCS of > 13/15

Exclusion Criteria

- Pillion or passenger victims of RTA
- RTA victims with head trauma / ocular trauma.
- Known CNS disorders / diseases.
- Drivers driving under the influence of alcohol or with h/o substance abuse
- GCS of < 13/15

Study Design

Prospective cross-sectional

Consent

Informed written consent from the patient was obtained prior to administering the questionnaire and eye exam.

METHODOLOGY

- A pre-tested structured questionnaire was administered to the patient by face-to-face interview.
- The documented information included driver's demographic data, duration of driving, history of involvement in RTA, history of previous ophthalmic diseases and past ophthalmic examination and treatment.

  A Comprehensive ophthalmological examination was performed on all subjects.
- Visual acuity test by Snellen's.
- Refraction.
- Anterior Segment by slit lamp biomicroscopy.
- EOM Movement.
- Colour vision was tested using the Ishihara pseudo-isochromatic plates.
- Visual field assessment was done on the OPD basis using the confrontation method. Suspected cases were be subjected to automated perimetry.
- Dilated Fundoscopy.
- IOP by Goldmann Applanation Tonometry.

RESULTS

- A total of 100 drivers with RTA were evaluated.
- The age range was 16 to 72 years with mean of 42.1 ± 6.7 years.
- Of the drivers in the study 72 were males and 28 were females.
- 6 drivers did not possess a driving license and 8 patients had not renewed their driving license (14%)

RESULTS

- None of the drivers (100%) had an eye test done by an ophthalmologist prior to obtaining DL.
- A significant number (23%) did not have any eye test done on the day of their driving license exam.
- 37 patients had refractive errors of which 31 had newly detected refractive errors. Only 6 were wearing corrective glasses.
- Visual impairment was noted in 21 patients (21%) (p=0.043)
- Simple Myopia was the most common refractive error detected in 18 patients (18%).
- A total of 7 patients had unilateral cataract.
- 3 patients had monocular blindness –
    - 2 had HMC (2%)
    - 1 had near mature cataract (1%)
- Color Deficiency was noted in 4 patients (4%) (p=1.51)
- 2 patients had tubular field of vision and were diagnosed as having POAG (2%) (p=0.93).

Table 1: Presenting Visual Acuity in the Better Eye of Drivers with RTA

Visual Acuity	Frequency	Percentages
6/6-6/12 normal	79	79%
6/18-6/60 visual impairment	21	21%
<6/60-3/60 severe visual impairment	0	0
<3/60 blindness	0	0
Total	100	100

Table 2: Ocular Morbidity in 100 Patients with RTA

Morbidity	Frequency	Percentage
Anterior Segment		
Cataract	7	7%
Presbyopia	11	11%
Other Refractory errors	26	26%
Corneal Opacity	1	1%
Ectropion	1	1%
Posterior Segment		
Glaucoma	3	3%
Mild NPDR	2	2%
Macular Hole	1	1%

DISCUSSION

- In our study none had their eyes evaluated by an ophthalmologist prior to obtaining DL in comparison to Erkishera et al [4] where over 62% did not have their eyes evaluated.
- The prevalence of visual impairment of 21% found in this study was statistically significant and was found similar to other studies by Norman et al [5], Falola et al [6].
- Our Study prevalence of patients with monocular blindness was 3 % . A study by Abraham et al [7] found that one-eyed drivers cause dangerous accidents at intersections three times higher than normal drivers.
- Visual field is another visual parameter that has been recommended to be tested along with Visual Acuity but has yet to be incorporated.

  In this study, the prevalence of significant visual field defects was 2%.
- Colour vision defect too 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. In our Study 4 % had colour vision defects.
- This Study also pointed out several lacunae in our licensing system. In India the only parameter tested is visual acuity in accordance to the motor vehicles act 1989.
- In contrast, in countries such as in USA, Sweden, Australia not only visual acuity but colour vision, depth perception, field of vision and contrast sensitivity is mandatory to be tested for driving license.

CONCLUSION

- There was a significant relationship between Visual impairment and road accidents.
- 3% of the patients had monocular blindness,4% had colour deficiency and 2% patients had field defects.
- None (100%) had any eye exam done by an ophthalmologist.
- This calls for more stringent screening of drivers at the licensing level.
- What is considered normal vision for driving?

- What is the Field of vision required for driving?
- Is colour vision important for driving?
- Can a monocular blind person drive?
- How often should a driver get an eye test done especially during renewal of licenses?

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