African Vision and Eye Health
ISSN: (Online) 2410-1516, (Print) 2413-3183

Knowledge and practices of vision screening standards for driving among optometrists in Gauteng province, South Africa

Authors:
Gloria T. Tamenti[1]
Tuwani A. Rasengane[2]
Khathutshelo P. Mashige[3]

Affiliations:
[1]Discipline of Optometry, School of Health Sciences, University of KwaZulu-Natal, Durban, South Africa

[2]Department of Optometry, School of Health and Rehabilitation Sciences, Faculty of Health Sciences, University of the Free State, Bloemfontein, South Africa

[3]African Vision Research Institute, Discipline of Optometry, School of Health Sciences, University of KwaZulu-Natal, Durban, South Africa

Corresponding author:
Gloria Tamenti,
tsholo@tamenti.co.za

Dates:
Received: 16 July 2024
Accepted: 12 Jan. 2025
Published: 28 Feb. 2025

How to cite this article:
Tamenti GT, Rasengane TA, Mashige KP. Knowledge and practices of vision screening standards for driving among optometrists in Gauteng province, South Africa. Afr Vision Eye Health. 2025; 84(1), a974. https://doi.org/10.4102/aveh.v84i1.974

Background: Despite the existence of vision screening standards, inconsistent implementation of these standards among optometrists persists.

Aim: To evaluate the knowledge and practices of optometrists regarding vision screening standards specific to driver fitness assessments.

Setting: Gauteng province, South Africa.

Methods: A descriptive cross-sectional study employing a quantitative approach was conducted among optometrists via an online survey.

Results: A total of 156 optometrists with a mean professional experience of 18.6 years ± 10 years participated in the study. The majority of optometrists (73%) demonstrated knowledge of the minimum vision screening standards required for driving. Male optometrists had higher odds of good knowledge compared to females (OR: 1.84 CI: 1.01 – 3.37, $p = 0.048$). Most optometrists (89%) adhered to these standards in their clinical practice. There was a significant association between knowledge level and the practice of measuring both visual acuity (VA) and visual fields (VF) ($\chi^2 = 9.358$, $p = 0.025$).

Conclusion: While the majority of optometrists (73%) demonstrated knowledge of the minimum vision screening standard required for driving, 89% reported adherence to these standards in practice; it is concerning that 27% lacked sufficient knowledge, and 11% did not adhere to these screening standards.

Contribution: The study highlights gaps in the knowledge and practice of vision screening standards among optometrists.

Keywords: Vision screening standards; visual acuity; visual field; knowledge; practice.

Introduction

The *National Road Traffic Act* (Act 93 of 1996) establishes the vision screening standards for driving licence applicants in South Africa, specifically under Regulation 102.[1] These regulations outline the minimum visual acuity and field requirements necessary for obtaining or holding a learner's or driving licence. For light motor vehicles (LMV), a minimum visual acuity of at least 6/12 for each eye, or where the visual acuity of one eye is less than 6/12 (20/40) or one eye is blind, a minimum visual acuity for the other eye of 6/9 (20/30). For heavy motor vehicles (HMV), the minimum visual acuity, with or without refractive correction, is 6/9 (20/30) for each eye. For LMV, a minimum visual field of 70 degrees temporal in each eye, with or without refractive correction, is required. If one eye has less than 70 degrees temporal in each eye, with or without refractive correction, a minimum total horizontal visual field of at least 115 degrees with or without refractive correction is necessary. HMV requires a minimum visual field of 70 degrees temporal in each eye, with or without refractive correction.

The South African Optometric Association (SAOA) collaborates with the Department of Transport to provide vision screening guidelines and standardised certificates for optometrists conducting vision screenings for driver's licence applicants.[2] Evaluating optometrist's knowledge and practices regarding vision screening standards for driving is important to ensuring road safety.[3,4] Given that optometrists are often the primary practitioners conducting these screenings, any variation in adherence to these standards may lead to an inconsistent screening of drivers vision, posing risks to drivers and pedestrians alike.[5] In addition, these vision screening standards lack specific recommendations for tools that would ensure consistency and efficiency in vision screening practices.[6] Current literature lacks sufficient data on whether Gauteng optometrists uniformly apply these standards, highlighting a gap that could affect the reliability of vision screening outcomes for driving. Addressing this gap is essential to identify areas for improvement in practitioner training and compliance, thereby enhancing the effectiveness of visual screening related to driving licensure.

Research methods and design

Study design

This study employed a cross-sectional, descriptive design utilising quantitative research methods. Conducted from April to October 2023, the investigation focused on the knowledge and practices of optometrists in South Africa concerning vision assessment for driving. The questionnaire was designed based on a review of related studies.[3,4] online questionnaire was distributed to 1062 Gauteng-based private optometric practitioners who were in active practice in 2023.[7,8]

Data collection

The questionnaire was developed and disseminated online via Google Forms through various social media channels, including an electronic publication by the SAOA. The pertinent information, detailed in Appendix A, was distributed to all optometrists in Gauteng who owned private practices in 2023. The Health Professions Council of South Africa (HPCSA) register was utilised to obtain the identifying details of these practitioners. As the register is a publicly accessible document available on the HPCSA website, accessing and researching the data within did not constitute any breach of ethics or confidentiality.

The questionnaire was structured into three distinct sections:

1. Section A: This section was designed to collect demographic information, including the practice location of the respondents.
2. Section B: This section investigated practitioners' knowledge regarding vision and driving.
3. Section C: This section gathered data on the current practices employed by optometrists when assessing vision for driving.
4. Section D: This section explored the opinions of optometrists regarding vision and driving.

The questionnaire was piloted among a sample of 10 optometrists to support its critical evaluation and finalisation. Internal consistency reliability was assessed using Cronbach's alpha, which yielded a score of 0.74, indicating good internal consistency and reliability across the set of items. All concerns and queries raised during the pilot phase were systematically addressed. The questionnaire was subsequently refined based on this feedback before its deployment in the full-scale study.

Data analysis

The optometrists' knowledge of minimum visual acuity (VA) and visual fields (VF) standards for light and heavy motor vehicle drivers was assessed by generating variables for VA, temporal VF, and total horizontal VF. These variables were binary, coded as 0 for incorrect responses and 1 for correct responses, to indicate the accuracy of optometrists' answers regarding the established standards for VA and VF.

Outcome variable: Knowledge level

Following the creation of binary variables, a composite knowledge level variable was developed by summing the correct responses across the four aforementioned variables for each optometrist. This composite variable was then categorised into four levels: low (score of 1), medium (score of 2), good (score of 3), and high (score of 4). Higher scores indicated a better knowledge of vision screening guidelines for driving.

Exposure variables and confounders

The exposure variables assessed in this study were the use of visual acuity exclusively for vision testing, the use of visual fields exclusively for vision testing, and the combined use of both visual acuity and visual fields for vision testing. Each of these exposure variables was treated as binary. The analysis controlled for confounding variables, which included age category (< 35, 35–44, 45+), sex (male/female), and job experience category (0–5 years, 6–10 years, 10+ years).

Statistical analysis

The Statistical Package for Social Sciences (SPSS, version 23) was utilised to analyse data. Normality testing was determined using the Shapiro-Wilk test. Descriptive statistics, including means, standard deviations, or ranges, were reported to provide a comprehensive view of the data. Reliability was assessed through Cronbach's alpha for internal consistency. Chi-square tests were employed to evaluate the relationships between outcome and exposure variables, specifically examining the associations between optometrists' vision screening practices and their knowledge levels. Ordinal logistic regression analysis was performed to control for potential confounders and ascertain adjusted associations. Statistical significance was set at $p < 0.05$. This study presents two exposure and outcome variables sets, as indicated in Table 1 below.

TABLE 1: Exposure and outcome variables.

Set	Exposure variable	Outcome variable
1	VA Temporal VF Horizontal VF	Composite knowledge level, which is the Sum of all correct responses
2	Knowledge level	Vision screening practice

VA, visual acuity; VF, visual fields.

Ethical considerations

This study complied with established ethical guidelines and principles. Informed consent was obtained from all participating optometrists, ensuring their voluntary participation and confidentiality. The relevant protocol was reviewed and approved by the relevant ethical review board to ensure participant protection and adherence to ethical standards. Ethics approval was granted by the University of KwaZulu-Natal Biomedical Research Ethics Committee (BREC/00000664/2019).

Results

Demographic profile

A total of 156 responses were received, yielding a response rate of 15%. The study population consisted of 62% females (*n* = 97) and 38 % males (*n* = 59).

The median age of the optometrists in this study was 43 years, with an interquartile range of 36 to 49 years. There was no statistically significant association between age and responses for visual acuity regarding the minimum thresholds among LMV drivers (χ^2 = 0.846, p = 0.655) and HMV drivers (χ^2 = 1.14, p = 0.494). Table 1 below represents the chi-square test results on outcomes, exposure, and confounding variables.

The average number of years in practice among participants was 18.6 years (± 10 years), with a range from newly qualified to 45 years of experience. No statistically significant relationship was observed between job experience and the minimum visual acuity requirements for LMV drivers (χ^2 = 0.146, p = 0.930) and HMV drivers (χ^2 = 0.136, p = 0.934). Table 2 presents the demographic data, levels of knowledge, and practices related to vision screening standards, along with the associations between demographic variables and both knowledge and practice of these standards.

Knowledge level among optometrists

As shown in Figure 1 below, a high proportion (93% and 92 %) were knowledgeable about the minimum VA requirements for LMV (6/12) and HMV (6/9), respectively. Among the respondents, 72% and 88% knew the minimum requirements for total horizontal (115 degrees) and temporal visual field (70 degrees), respectively. Overall, a substantial proportion of participants (73%) demonstrated knowledge of the minimum vision screening standard for visual acuity and visual field requirements. However, 27% did not know the minimum visual screening requirement for LMV and HMV.

The ordinal logistic regression analysis results indicated that age was not significantly associated with the level of knowledge among optometrists and did not independently predict it (OR: 1.02 CI: 0.99 – 1.04 p = –0.27). A statistically significant association was found between gender and the responses provided by optometrists regarding the minimum visual acuity requirements for LMV drivers (χ^2 = 6.018, p = 0.014). However, there was no significant association between gender and minimum visual acuity requirements HMV drivers (χ^2 = 0.002, p = 0.965).

Male optometrists demonstrated higher odds of possessing a good knowledge level than female respondents (OR: 1.84 CI: 1.01 – 3.37, p = 0.048). There was no significant association between categories of job experience (0–5 years, 6–10 years, more than 10 years) and the level of knowledge (Table 3).

Practices of the minimum vision screening standard for driving

All the respondents (*n* = 156, 100%) reported their participation in driver licensing and the issuance of eye screening certificates as proof of vision evaluation to be submitted to the licensing department. Most respondents *(89%, n = 139)* indicated that they measured both VA and VF for LMV and HMV. Conversely, 11% (*n* = 17) of respondents measured only VA without measuring the VF. The odds of measuring VA and VF were higher in optometrists with good knowledge of visual requirements for driver's licence for LMV and HMV. There was no statistically significant association between the level of knowledge and optometrists who exclusively measured visual acuity for driver's licence screening (p = 0.314), as presented in Table 3 above. The analysis of the current utilisation of visual field tests revealed that the confrontation test was the most commonly employed method (*n* = 85, 52%). This was followed by the ARC Visual Field Screener (*n* = 40, 25%) and Novissphere (*n* = 35, 22%). The least reported methods were Opti-scan, Bernell vision disk and automated perimetry, each accounting for 0.6% of the responses.

Opinions of practitioners regarding vision and driving

The majority of respondents (62%, *n* = 96) indicated that the current vision standard for driving in South Africa was insufficient and required improvement. These respondents further recommended implementing additional vision tests, as illustrated in Figure 2 below.

The majority of participants (70%, *n* = 109) indicated that individuals with visual impairment that cannot be corrected with conventional contact lenses, spectacles, or surgery should be prohibited from driving, even with the use of specialised devices such as bioptic telescopes. Conversely, 30% of participants (*n* = 47) supported the notion that individuals with visual impairment could drive with the bioptic telescopes, provided they achieved minimum visual standards for driving.

Additionally, 58% of participants (*n* = 90) reported that the current vision screening performed every five years for driver's licence renewal was not ideal, and 42 % gave variable responses. Among the 90 respondents, 56% (*n* = 50) recommended that an eye test for the renewal of a driver's licence should be conducted every two years, while 22%

TABLE 2: Demographic characteristics, knowledge and practices related to vision screening standards.

Variables	Visual acuity for light motor vehicles						Visual acuity for heavy motor vehicle						Temporal visual fields				Total horizontal visual fields						Knowledge level									
	No		Yes		Chi-Square	*P*-value	No		Yes		Chi-Square	*P*-value	No		Yes		No		Yes		Chi-Square	*P*-value	Low		Medium		Good		High		Chi-Square	*P*-value
	n	%	*n*	%			*n*	%	*n*	%			*n*	%	*n*	%	*n*	%	*n*	%			*n*	%	*n*	%	*n*	%	*n*	%		
Sex	-	-	-	-	6.018	0.014	-	-	-	-	0.002	0.965	0	-	-	-	-	-	-	-	2.243	0.134	-	-	-	-	-	-	-	-	5.338	0.149
Female	43	75.4	54	55.7	-	-	32	62.7	68	62.4	-	-	0	0.0	100	62.5	23	74.2	77	59.7	-	-	7	77.8	21	65.6	38	70.4	34	52.3	-	-
Male	15	24.6	44	44.3	-	-	19	37.3	41	31.6	-	-	0	0.0	60	37.5	8	25.8	52	40.3	-	-	2	22.2	11	34.4	16	29.6	31	47.7	-	-
Age category	-	-	-	-	0.846	0.655	-	-	-	-	1.14	0.494	-	-	-	-	-	-	-	-	2.278	0.32	-	-	-	-	-	-	-	-	6.008	0.422
< 35	9	15.8	21	21.6	-	-	11	21.6	21	19.2	-	-	0	0.0	32	20.0	9	29.0	23	17.8	-	-	3	33.3	6	18.7	10	18.5	13	20.0	-	-
35–44	20	35.1	30	30.9	-	-	13	25.5	38	34.9	-	-	0	0.0	51	31.9	10	32.3	41	21.8	-	-	1	11.1	9	28.1	23	42.6	18	27.7	-	-
45+	28	49.1	46	47.4	-	-	27	52.9	50	45.9	-	-	0	0.0	77	48.1	12	38.7	65	50.4	-	-	5	55.6	17	53.1	21	38.9	34	52.3	-	-
Job experience group	-	-	-	-	0.146	0.93	-	-	-	-	0.136	0.934	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.157	0.905
0–5 years	7	12.3	10	10.3	-	-	6	11.8	12	11.0	-	-	0	0.0	18	11.3	6	19.3	12	9.3	3.618	0.164	1	11.1	5	15.6	7	13.0	5	7.7	-	-
6–10 years	5	8.8	9	9.3	-	-	5	9.8	9	8.3	-	-	0	0.0	14	8.7	1	3.2	13	10.1	-	-	1	11.1	2	6.2	4	7.4	7	10.8	-	-
10+ years	45	78.9	78	80.4	-	-	40	78.4	88	80.7	-	-	0	0.0	128	80.0	24	77.5	104	80.6	-	-	7	77.8	25	78.1	43	79.6	53	81.5	-	-
Use only visual acuity	-	-	-	-	3.331	0.068	-	-	-	-	0.335	0.563	-	-	-	-	-	-	-	-	0.47	0.493	-	-	-	-	-	-	-	-	2.0744	0.557
No	2	3.6	0	0.0	-	-	1	2.1	1	0.9	-	-	0	0.0	2	1.3	0	0.0	2	1.6	-	-	0	0.0	1	3.3	1	1.9	0	0.0	-	-
Yes	54	96.4	92	100.0	-	-	47	97.9	105	99.1	-	-	0	0.0	152	98.7	29	100.0	123	98.4	-	-	9	100.0	29	96.7	51	98.1	63	100.0	-	-
Use only visual fields	-	-	-	-	0.587	0.444	-	-	-	-	3.886	0.049	-	-	-	-	-	-	-	-	0.691	0.406	-	-	-	-	-	-	-	-	9.188	0.027
No	7	12.5	8	8.6	-	-	8	16.7	7	6.5	-	-	0	0.0	15	9.7	4	13.8	11	8.7	-	-	0	0.0	7	23.3	5	9.6	3	4.7	-	-
Yes	49	87.5	85	91.4	-	-	40	83.3	100	93.5	-	-	0	0.0	140	90.3	25	86.2	115	91.3	-	-	9	100.0	23	76.7	47	90.4	61	95.3	-	-
Combined (use both visual acuity and visual fields	-	-	-	-	0.012	0.912	-	-	-	-	4.681	0.031	-	-	-	-	-	-	-	-	1.309	0.253	-	-	-	-	-	-	-	-	9.358	0.025
No	8	14.0	13	13.4	-	-	11	21.6	10	9.2	-	-	0	0.0	21	13.1	6	19.3	15	11.6	-	-	0	0.0	9	28.1	7	13.0	5	7.7	-	-
Yes	49	86.0	84	86.6	-	-	40	78.4	99	90.8	-	-	0	0.0	139	86.9	25	80.7	114	88.4	-	-	9	100.0	23	71.9	47	87.0	60	92.3	-	-

(*n* = 20) suggested yearly vision screening, and 16% (*n* = 14) advocated for vision screening every three years. Further responses indicated the need for more frequent vision screening for drivers with progressive eye disease and age-based vision screening for drivers experiencing age-related visual changes and co-morbidities (6%, *n* = 6).

Discussion

The study aimed to assess the knowledge and practices of optometrists in the Gauteng province of South Africa regarding current vision screening standards for driving LMV and HMV. Overall, the results of this study showed that 73% of the optometrists demonstrated knowledge of the minimum vision screening (VA and VF) standards necessary for driving eligibility.

A significant proportion of optometrists demonstrated knowledge of the minimum visual acuity standards for LMV and HMV, with 93% and 92% correctly identifying these standards, respectively (Figure 1). However, 7% and 8% of optometrists lacked knowledge regarding the minimum visual acuity requirements for LMV and HMV. Similarly, 28% did not know the total horizontal visual field requirements, and 12% lacked knowledge of the temporal visual field requirements. Given the essential role of VA and VF screening in ensuring safe driving, it is notable that 15% of optometrists (7% VA for LMV and 8% VA for HMV) and 40% (28% for total horizontal VF and 12% temporal VF) were unfamiliar with these critical standards. This is of concern because VA and VF minimum standards for driving are accessible online, underscoring the importance of ensuring that optometrists stay informed on such readily available resources.[2]

Regarding the practice of minimum vision screening tests for driving, all participants reported involvement in issuing eye screening certificates. Of these participants, 89% indicated they assessed both visual acuity and visual field for drivers, while 11% did not conduct the combined screening. Analysis revealed that, within this 11% who did not perform the combined tests, the visual field screening was the component omitted. Failure to assess visual fields in drivers while still granting certification has significant implications for road safety. Drivers with restricted peripheral vision are at an elevated risk of failing to detect hazards, including pedestrians or vehicles approaching laterally, thereby increasing collision risk.[9,10] Furthermore, a reduced visual field may impair a driver's response time to abrupt changes in the driving

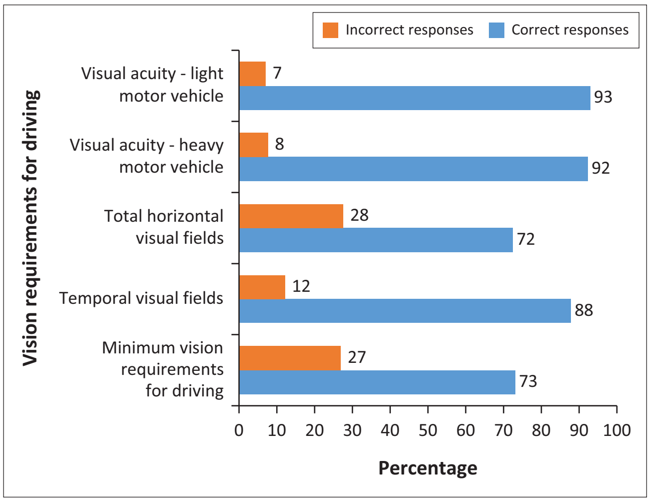

FIGURE 1: Knowledge of the minimum vision screening requirements for driving.

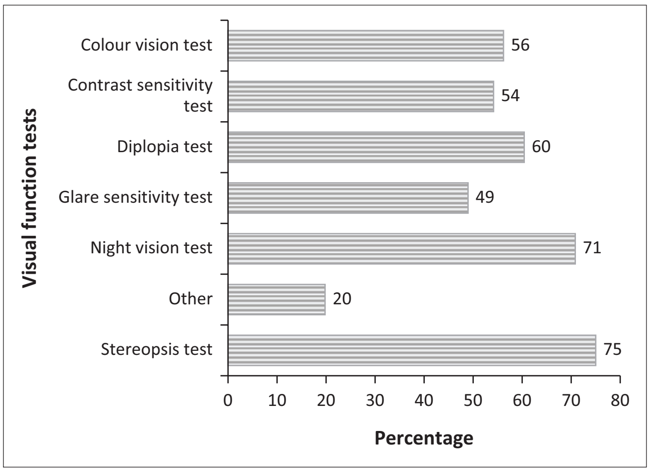

FIGURE 2: Additional vision screening tests suggested for driving.

TABLE 3: Ordinal logistic regression.

Variables	Univariable model			Multivariable model		
	OR	95% CI	*p*-value	OR	95% CI	*P*-value
Age (years)	1.02	0.99 – 1.04	0.27	1.01	0.97 – 1.05	0.483
Sex						
Female	1.00	Reference	-	1.00	Reference	-
Male	1.84	1.01 – 3.37	0.048	1.98	1.04 – 3.77	0.037
Job experience (years)						
0–5	1.00	Reference	-	1.00	Reference	-
6–10	2.13	0.58 – 7.81	0.253	2.06	0.53 – 8.05	0.298
More than 10	1.60	0.66 – 3.87	0.295	1.23	0.38 – 4.03	0.729
Use visual acuity only						
No	1.00	Reference	-	1.00	Reference	-
Yes	3.16	0.34 – 29.68	0.314	1.48	0.12 – 18.29	0.761
Use visual fields only						
No	-	-	-	1.00	-	-
Yes	2.45	0.97 – 6.24	0.059	2.07	0.73 – 5.85	0.169

OR, odd ratio; CI, confidence interval.

environment, such as merging vehicles or crossing pedestrians, potentially compromising both the driver's and public safety.[10]

The majority of participants indicated a preference for manual visual field screening tests, likely attributable to their lower cost relative to automated perimetry. However, manual visual field tests have been reported to be subjective, less reliable, and less sensitive to visual field loss than automated visual field screening.[11,12,13] We advocate for the standardisation of the visual field evaluations for driving to eliminate ambiguity. To facilitate implementation and standardisation and to mitigate the high costs associated with automated perimetry, we suggest adopting a standardised manual perimetry method capable of quantifying visual field extents, such as Arc perimetry or Vision Disc, rather than relying on the degree estimations provided by confrontation tests.

A significant proportion of participants (62%) reported that current vision screening standards for driving are inadequate. They recommended the inclusion of additional visual function screening assessments, such as stereopsis, glare sensitivity, diplopia, colour vision, and contrast sensitivity, in the screening protocol. These perceptions may be influenced by the critical role these visual functions play in safe driving. For instance, stereopsis makes depth perception critical for distance estimation, while contrast sensitivity facilitates detecting and recognising moving or stationary objects at intermediate distances.[14] Glare sensitivity, particularly relevant for night driving, affects one's capacity to quickly recover from intense light exposure, where delayed recovery can impair visual clarity and driving performance in low-light conditions.[15] A vision screening tool incorporating the recommended visual function assessments can be implemented at the driver licensing testing centres to facilitate comprehensive vision screening.

Standardising the red light at the top and green at the bottom of traffic signals enhances rapid and safe signal recognition, particularly aiding individuals with colour vision deficiencies. This orientation allows drivers to rely on positional cues, reducing confusion and potentially lowering accident risks. Maintaining this configuration aligns with international road safety practices.[16] Comprehensive vision screening is essential for safe driving, evaluating acuity, peripheral vision, depth perception, and contrast sensitivity to identify impairments. Evidence-based protocols to support these evaluations are necessary for identifying vision deficiencies that may compromise safety.[9] Certain groups, such as heavy-duty vehicle drivers, first-time drivers, and older adults, may benefit from more stringent or frequent vision screening due to higher risk profiles.[17] Enhanced screening for these groups aligns with findings that rigorous vision screening correlates with reduced accident rates, as demonstrated in studies from the UK, Australia, and Europe.[17,18] Implementing similar standards and collecting local data in South Africa could inform policy adjustments to improve road safety.

Optometrists were less receptive to using the bioptic telescope for driving among individuals with vision impairment. These findings may be influenced by the current absence of bioptic driving licensing safety, which is compounded by the lack of scientific evidence supporting its safety.[19,20,21] Further research is required in the field of bioptic driving safety, including the development of specialised training programmes to evaluate safety and performance among drivers with low vision.

In this study, optometrists recommend that vision screening be conducted every two years instead of the current five years, which may facilitate earlier detection of conditions that could lead to vision impairment. It is recommended that a vision screening policy in South Africa strikes a balance between public health benefits and financial sustainability, ensuring broad accessibility without imposing excessive costs or logistical burdens on the population. While international data suggests a correlation between visual impairment and road accidents, locally sourced evidence is required to substantiate this measure within the South African context. Providing complimentary screenings through public health clinics would enhance accessibility, particularly benefiting low-income populations by alleviating affordability concerns. The results of this study should be interpreted in light of certain limitations, such as the relatively small sample size, which may limit the generalizability of the findings.

Conclusion

The study highlights considerable gaps in understanding of vision screening guidelines for driving among optometrists. While 73% of respondents demonstrated knowledge of the minimum vision screening standards, it is concerning that 27% lacked knowledge of these standards. A substantial proportion did not perform both VA and VF testing as part of the standard vision screening for driving, which poses a significant risk to road safety. This indicates a pressing need to reinforce adherence to minimum vision screening standards for driving and to standardise visual field-testing equipment. The study also emphasises the importance of incorporating vision and driving education into optometrists' continuing professional development (CPD) programmes and the development of practical clinical guidelines for vision screening standards.

Acknowledgements

We extend our sincerest appreciation to the Statistician who helped with data analysis.

Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

G.T.T., T.A.R., and K.P.M. were responsible for the conception or design of the work, the drafting of the article as well as the

data collection. G.T.T., T.A.R., and K.P.M. contributed to the critical revision of the article, as well as the final approval of the version.

Funding information

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Data availability

The data that support the findings of this study are available from the corresponding author, G.T.T, upon reasonable request.

Disclaimer

The views and opinions expressed in this article are those of the authors and are the product of professional research. It does not necessarily reflect the official policy or position of any affiliated institution, funder, agency, or that of the publisher. The authors are responsible for this article's results, findings, and content.

References

1. South African Government. Road Traffic Act 93 of 1996: Regulation 102, GoN 1892, G. 17603 [homepage on the Internet]. [cited 2024 May 10]. Available from: http://www.oasa.org.za/Regulation102.php
2. South African Optometric Association. Drivers' certificates [homepage on the Internet]. SAOA; 2012 [cited 2024 May 20]. Available from: https://saoa.co.za/pdfs/Eye-Sense-Regulations.pdf
3. Piano ME, Veerhuis N, Edwards J, Traynor V, Carey N. Having the conversation about vision for safe driving with older adults: an exploratory study of eyecare professional experiences in England and Australia. Clin Exp Optom. 2023;106(6):666–674.
4. Oberstein SL, Boon MY, Chu BS, et al. Views and practices of Australian optometrists regarding driving for patients with central visual impairment. Clin Exp Optom. 2016;99:476–483.
5. Sithole HL. Ethical issues in optometric practice. African Vision and Eye Health. 2010;69(2):93–99.
6. Straus SH. New, improved, comprehensive, and automated driver's license test and vision screening system. Arizona: Dept. of Transportation; 2005.
7. Rosen H. Health market inquiry oral presentation: Public hearing [homepage on the Internet]. South African Optometric Association [cited 2023 Oct 10]. Available from: https://www.compcom.co.za/wp-content/uploads/2020/03/Presentation-by-SA-OPTOMETRIC-ASSOCIATION-SAOA.pdf
8. Parkins D. The optical workforce survey full report [homepage on the Internet]. College of Optometrists; 2015 [cited 2024 Jun 05]. Available from: https://www.college-optometrists.org/the-college/research/research-projects/optical-workforce-survey2.html
9. Owsley C, McGwin G Jr. Vision and driving. Vision Research. 2010;50(23):2348–2361.
10. Patterson G, Howard C, Hepworth L, Rowe F. The impact of visual field loss on driving skills: A systematic narrative review. The British and Irish Orthoptic Journal. 2019;15(1):53.
11. Johnson CA. Visual fields: Visual field test strategies. In: Giaconi JA, Law SK, Nouri-Mahdavi K, Coleman AL, Caprioli J, editors. Pearls of Glaucoma Management. New York: Springer, 2016; p. 145–151.
12. Pandit RJ, Gales K, Griffiths PG. Effectiveness of testing visual fields by confrontation. Lancet. 2001;358:1339–1340.
13. Mendieta N, Suárez J, Barriga N, et al. How Do Patients Feel About Visual Field Testing? Analysis of Subjective Perception of Standard Automated Perimetry. Seminar Ophthalmology. 2021;36:35–40.
14. Pepple G, Adio A. Visual function of drivers and its relationship to road traffic accidents in Urban Africa. Springerplus 2014;3:1–7.
15. Boadi-Kusi SB, Austin E, Abu SL, Holdbrook S, Morny EKA. Disability glare and nighttime driving performance among commercial drivers in Ghana. J Occup Health. 2021;63(1):e12279. https://doi.org/10.1002/1348-9585.12279
16. De Micheli E, Prevete R, Piccioli G, Campani M. Color cues for traffic scene analysis. In Proceedings of the Intelligent Vehicles' 95. IEEE Symposium 1995, pp. 466–471.
17. Yan MK, Kumar H, Kerr N, et al. Transnational review of visual standards for driving: How Australia compares with the rest of the world. Clin Exp Ophthalmol. 2019;47(7):847–863.
18. Colenbrander A, DeLaey J. Visual standards: Vision requirements for driving safety with emphasis on individual assessment. Sao Paulo: International Council of Ophthalmology (ICOPH); 2006.
19. Peli E. Low vision driving in the USA: Who, where, when and why. CE Optometry. 2002;5(2):54–58.
20. Vincent C, Lachance JP, Deaudelin I. Driving performance among bioptic telescope users with low vision two years after obtaining their driver's license: A quasi-experimental study. Assistive Technology. 2012;24:184–195.
21. Moharrer M, Wang S, Dougherty BE, et al. Evaluation of the Driving Safety of Visually Impaired Bioptic Drivers Based on Critical Events in Naturalistic Driving. Transl Vis Sci Technol. 2020;9:1–10.

Appendix

Appendix A: Interview Schedule for Optometrists

Section A: Demographic Profile

1. Gender: Male ☐ Female ☐
2. Age________________________years
3. How many years have you been practicing? ____
4. Where is your practice located____?
5. Do you conduct vision screening for driving? Yes ☐ No ☐

If No, to question 5 above, go to question 10

Section B: Knowledge vision screening standards

6. What are the minimum VA requirements for private drivers (code A1, A, B and EB) for each eye with and without refractive correction?
   6/60 ☐
   6/36 ☐
   6/24 ☐
   6/18 ☐
   6/12 ☐
   6/9 ☐
   6/7.5 ☐
   6/6 ☐
7. What are the minimum VA requirements for commercial drivers (C1 C, EC1 and EC)?
   6/60 ☐
   6/36 ☐
   6/24 ☐
   6/18 ☐
   6/12 ☐
   6/9 ☐
   6/7.5 ☐
   6/6 ☐
8. What are the minimum temporal VF requirements for both LMV and HMV driving in South Africa?
   50 ☐
   60 ☐
   70 ☐
   Other____________________________________
9. What are the minimum total horizontal VF requirements for LMV driving in South Africa?
   90 ☐
   100 ☐
   110 ☐
   115 ☐
   Other____________________________________

Section C: Practices vision screening standards

10. Do you issue a vision screening certificate for driving? Yes ☐ No ☐
11. Do you measure visual acuity as part of the vision screening protocol for driving? Yes ☐ No ☐
12. Do you measure visual fields as part of the vision screening protocol? Yes ☐ No ☐

    If No, to the above question, please go to question 14

13. Which visual field-screening procedure do you use for driver's vision screening?
    Confrontation ☐ Arc Visual field Screener ☐ Novissphere ☐
    Automated Perimetry ☐ Other (specify) ☐ ____

Section D: Opinions of practitioners regarding vision and driving

14. In your opinion, are the current vision tests used for driving adequate?
    Yes ☐ No ☐
    If your response to question 14 above is Yes, please proceed to question 16
15. If your response to question 14 above is NO, which visual function test do you think should be the requirement for driving?
    (Tick all that you think applies)

Visual Acuity	Yes ☐	No ☐
Visual Field	Yes ☐	No ☐
Stereopsis	Yes ☐	No ☐
Colour vision	Yes ☐	No ☐
Contrast sensitivity	Yes ☐	No ☐
Diplopia	Yes ☐	No ☐
Glare sensitivity	Yes ☐	No ☐
Night vision	Yes ☐	No ☐
Other (specify)	Yes ☐	No ☐

If you answered other, please specify
____
____
____

16. Should drivers with visual impairment (those who cannot be corrected with conventional contact lenses, spectacles, or surgery) be allowed to drive with the aid of specialised assistive devices such as bioptic telescopes?
    Yes ☐ No ☐
17. Is the frequency of vision screening every 5 years appropriate for the renewal of a driver's license?
    Yes ☐ No ☐
18. If the answer to question 17 is no, what should the frequency of vision screening be for the renewal of a driver's licence ___
    ____
    ____
    ____

Thank you for your participation.