

Visual Requirements and its Relation with Road Traffic Accident in Saudi Arabia

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ABSTRACT

Introduction: Driving is the act of operating and moving vehicles for which it is critical for drivers to recognize road signs, pedestrians, and animals when on the road. In Saudi Arabia it is estimated that there are over 1 million car accidents per year in which almost 80% are due to vision issues. The aim of the study is to assess the need of visual test and its relation with RTA.

Material and methods: This study has followed cross sectional study design conducted among driving license holders aged (17-60) who could be both the resident and non-resident of Saudi Arabia. A structured questionnaire was used to collect data for 550 calculated samples using the online platform. The data was analyzed using excel-13 and SPSS-21. T-test was used to compare vision with correction and number of accidents; vision without correction and number of accidents whereas ANOVA and Post-Hoc test was used to compare the number of accidents among different age groups.

Results: This study involves the information collection among 550 respondents who had received the driving license under the Government of Saudi Arabia. Among the respondents, majority (33%) of them were from the age group 17 to 27. The prevalence of vision problem among respondents was 45% in which 72% had their visual correction. All the respondents who did not had visual correction has faced any sort of road traffic accident as the reverberation of denial towards need of visual correction. The study also performed comparative analysis to see the various relations among the driver's visual status and the road traffic accidents, were more number of accidents were recorded among respondents around 17-27 years of age. The study also reflected that there was no statistically significant difference in mean number of accidents between any other age group.

Conclusion: Saudi Arabia has one of the highest accidents rate in the world by over 1 million accidents in 2016. This study has significantly highlighted the risk age group and people's denial towards visual correction leading to increase in rate of road traffic accident. So there is need of strictly implementing compulsory vision checkup with medical professional and revised standard visual requirement for obtaining driving license.

Keywords: Vision, Visual standards, Road Traffic Accidents, Driving license

INTRODUCTION

Driving is the act of operating and moving vehicles such as cars, buses, Lorries, and other similar vehicles. When driving any vehicle, the ability to evaluate space and objects, as well as the relative distance between things and cars, is critical which is because good telescopic vision is required for depth perception. It is vital to determine whether the car can be crossed safely while facing incoming traffic and changing from one lane to another between moving vehicles. It is critical for drivers to recognize road signs, bicycles, pedestrians, and animals when on the road.(1,2) While driving, sight is the most essential source of information, and many driving-related injuries are caused by visual issues. The proportion of persons who do not fulfill the visual standards is increasing as the population ages, and eye care practitioners must be able to counsel patients during their eye exams.(3) As traffic accident, also known as a motor vehicle collision (MVC) among others occurs when a vehicle collides with another vehicle, pedestrian, animal, road debris, or other stationary obstruction, such as a tree or pole. Accidents in traffic can result in injuries, deaths, and property damage. Speed, road design, road environment, and driver skills, driver weakness, and behavior are all elements that contribute to accident risk.

Every year, around 1.25 million people's lives are projected to be cut short as a result of a road traffic accident around the world. Between 20 and 50 million people suffer from non-fatal injuries, with many of them becoming disabled as a result of their injuries which are also shown by various studies. (4) According to a study, driver factors account for 57% of all accidents, with the main causes being driver inattention and visual impairments.(5) Attention issues include dialing a phone considering as the most dangerous distraction, which increased the risk by 10 times. (6) Similarly study conducted in Europe also states that risk of car crash has increases by 9% with visual impairment and 59% of accidents could be linked to causes associated with poor sight – such as failure to use corrective lenses or glare-related reasons (7)

The International Council of Ophthalmology has lists several categories of visual disability. Low vision is defined as visual acuity between 20/60 and 20/200 or corresponding visual field loss to less than 20 degrees in the better eye with best possible correction. Blindness is defined as visual acuity of less than 20/400 or corresponding visual field loss to less than 10 degrees in the better eye with the best possible correction. (8)

In Saudi Arabia it's estimated that there are over 1 million car accidents in 2016 in which 80% turned out to be disable and visual; disability can be considered to be leading factor yet many drivers state deniable towards the issue of visual difficulties as drivers.(9) The aim of the study is to compare and evaluate the visual requirements and standards for obtaining a driving license in Saudi Arabia. This study has also assessed the need of visual test with RTA.

MATERIALS AND METHODS

This study has followed cross sectional study design conducted among driving license holders aged (17-60) who could be both the resident and non-resident of Saudi Arabia. There are very few studies which interlink road traffic accident with visual issue but there is no such study done in Saudi Arabia. There is a survey done in India on 2019 which indicates that the rate of road traffic accident is around 70%. So taking the 70% as the prevalence for the sample calculation and 4% as the standards error applying the formula $4PQ/L2$, $n=4 \times 0.7 \times 0.7 / 4\%$, $n=525$ Adding 5% as the non-response rate, the sample for this study turn out to be 551 in which 550 were actually reached. A structured questionnaire was used to collect data using the online platform. The collected data were cleaned and analyzed using excel 2013 and SPSS version 21 where both descriptive and inferential analysis was performed. T-test was used to compare vision with correction and number of accidents; vision without correction and number of accidents whereas ANOVA and Post-Hoc test was used to compare the number of accidents among different age groups. The collected information was presented and interpreted using required tables and charts

RESULTS

This study involves the information collection among 550 respondents who had received the driving license under the Government of Saudi Arabia. Among the respondents 33% were from the age group 17 to 27 Years followed by 50 to 60 years(18.7%), 39 to 40(18.2 %), 28 to 38 (18%) and more than 60 years (12.2%). Among those respondents the study has identified the mean age of respondents who had undergone care accident in a year.

Table 1 Prevalence of vision problem

Vision Status	Frequency (n=550)	Percentage
Poor vision	247	45%
Good Vision	303	55%

The above table shows 45% of the respondents had the vision problem whereas 55% have no such issues.

Table 2 Prevalence of Road Traffic Accident

Car Accident in their life span	Frequency(n=550)	Percentage
Yes	470	85%
No	80	15%

Referring to table 2, among the respondents 85% of them have met with any sort of road traffic accidents in their lifespan whereas only 15% have not faced such situation.

Table 3: The mean number of Road Traffic Accidents among various age group

Age group (years)	Mean age	Mean number of Road Traffic Accident	Total number of Road Traffic Accident	SD of number of Road Traffic Accident
17 – 27	21.83	2.53	457	2.48
28 – 38	33.76	2.53	253	2.18
39 - 49	43.78	2.09	209	2.09
50 – 60	55.553	2.485	256	2.89
above 60	66.86	3.5	235	3.18

Further, comparing the rate of road traffic accident with their mean age and age group the above table 3 shows that mean number of Road Traffic Accident among age group 17-27 is 2.53 per year. Similarly, among age group 28-38 in 2.53, age group 39-49 in 2.09, age 50-60 in 2.485 and above 60 in 3.5. The study also performed comparative analysis to see the various relations among the driver's visual status and the road traffic accidents. For which it was seen that more accidents are recorded among respondents around 17-27 years of age.

Table 4 Vision problem and car accident

		Road Traffic Accident		Total
		Yes	No	
Vision problem	yes	218(88.25%)	29(11.74%)	247
	No	252(83.16%)	51(16.83%)	303
Total		470	80	550

Similarly the above table 4 compares car accident with vision problem in which, among 247 respondents who have vision problem 88% reported having Road Traffic Accident whereas among 303 who did not have vision problem 83% reported having any sort of Road Traffic Accident

Table 5 Vision correction Status

Vision correction	Frequency (n=247)	
Yes	179	72%
No	68	28%

The above table5 give the detail of rate of corrected vision among those who have eye problem in which 72% had corrected their vision where 28% are still denial about their visual problem and has not seek any medical care for visual correction.

According to above table 6 , comparing corrected vision with accident it was seen that among people who have corrected their vision 84% still had met with Road Traffic Accident where as those 16% were saved from the kind of accidents post their vision

correction. Here the comparison also indicates that all the respondents who had the issue of eye problem but did not correct their vision has met with any sort of Road Traffic Accident

Similarly, One-way ANOVA was also performed to compares the means of two or more independent groups in order to determine whether there is statistical evidence that associate the population means to be significantly different.

Table 6 Vision with correction and its relation with car accident

		Car accident		Total
		Yes	No	
Vision with correction	Yes	150 (84%)	29(16%)	179
	No	68 (100%)	0	68
Total		218	29	247

Table 7 ANOVA test: The significant of accidents number

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	82.980	4	20.745	3.206	.013
Within Groups	3526.293	545	6.470		
Total	3609.273	549			

As refer to table 7 this study revealed that there was a statistically significant difference between number accidents between at least two age groups ((between groups df=4, within groups df=545), [F-value=3.206], p = [0.013]) and further post hoc test was applied to see the multiple comparisons.

Table 8 Post Hoc Test (Multiple Comparisons)

(I) age group	(J) age group	Mean Difference (I-J)	Std. Error	Sig.
17 to 27 years	28 to 38 years	-.01507	.31797	1.000
	39 to 49 years	.44039	.31694	1.000
	50 to 60 years	.04495	.31395	1.000
	more than 60 years	-.97708	.36376	.075
	17 to 27 years	.01507	.31797	1.000
28 to 38 years	39 to 49 years	.45545	.36064	1.000
	50 to 60 years	.06002	.35801	1.000
	more than 60 years	-.96201	.40240	.172
	17 to 27 years	-.44039	.31694	1.000
39 to 49 years	28 to 38 years	-.45545	.36064	1.000
	50 to 60 years	-.39544	.35710	1.000
	more than 60 years	-1.41746 [*]	.40159	.005
	17 to 27 years	-.04495	.31395	1.000
50 to 60 years	28 to 38 years	-.06002	.35801	1.000
	39 to 49 years	.39544	.35710	1.000
	more than 60 years	-1.02203	.39924	.107
	17 to 27 years	.97708	.36376	.075
more than 60 years	28 to 38 years	.96201	.40240	.172
	39 to 49 years	1.41746 [*]	.40159	.005
	50 to 60 years	1.02203	.39924	.107
	17 to 27 years	-.97708	.36376	.075

According to Table 8 ,multiple comparisons found that the mean value was significantly different between age group 39 to 49 years and age group more than 60 (p = 0.005).There was no statistically significant difference in mean number accidents between any other age group.

DISCUSSION

Saudi Arabia visual standards differ from others countries standards and the requirements is not full distributed among eye care practitioners. In 1971, the law in Saudi Arabia was only a medical report of the driver general physical health, which was undetailed for vision. In 2007, the law was change to restricted and unrestricted (visual acuity and color vision) for new and renew licenses also undetailed for regular vehicles licenses but 6/6 (corrected or uncorrected) only for heavy vehicles licenses and in 2016 shifted to minster of health for examination before it was in the minster of internal traffic department.(10) Different countries have different policy regarding visually for driving license as shown by study done in different countries.(11) Respondent who apply for license the visual function assessment was good among all as shown in our study.

In this study Numbers of accidents per year was 2.53 which in both in age group of (17-27) and (28-38), whereas USA shows high in age group of (25-34).(12) The number of car accidents is higher in increasing age whereas other data shows there is high accident in mid age compared to others.(12) Majority of respondent 88% who have car accidents indicates that vision problem is also one of cause which is also shown in different studies.(13,14) Apart from vision disorder there is high rate car accident 87% by people who have correct vision. There is no significant different between any other age group as shown in our study.

In our survey, we found that while the majority of respondents (84%) have proper vision, they have nonetheless experienced road traffic accidents, which has been documented in other studies. In this case, the comparison also shows that all respondents who had an eye condition but did not correct it have been involved in a road traffic accident. Though both people with good and bad vision can be involved in road traffic accidents, most studies show that people with poor vision have a higher risk of being involved in an accident than people with normal vision. (15,16)

In this study shows no significant difference between any age group relating to accident where as other study shows that young and mid age group drivers have high trend of accidents compare to old age group.(17,18)

CONCLUSION

Saudi Arabia has one of the highest car accidents rate in the world by over 1 million accidents in 2016, so it is mandatory to review and specify standards for the visual capacity of drivers in Saudi Arabia since the population is almost 31 million in 2016.

This study has significantly highlighted the risk age group and people's denial towards visual correction leading to increase in rate of road traffic accident. So there is need of strictly implementing compulsory vision checkup with medical professional and revised standard visual requirement for getting license as, currently in Saudi Arabia visual acuity is not specific and detailed for regular drivers (except heavy license which 6/6 is the only accepted vision) and color vision discrimination which almost no examiner points out.

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