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Vision Assessment of Drivers of Passenger Service Vehicles Operating across Bushenyi-Ishaka Municipality

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Abstract

The main purpose of the study is to establish the vision of the drivers of Passenger Service Vehicles operating across Bushenyi – Ishaka municipality in Uganda. A cross-sectional descriptive study with both quantitative and qualitative techniques was used. Semi structured questionnaires were administered to 392 participants and the data was analysed at three (3) different levels; Univariate, to find out the proportion of respondents with reduced vision for driving, Bivariate, to assess the effect of individual factors on accident involvement & Multivariate, to assess for the effect of the potential confounding variables. Participants underwent eye examinations comprising visual acuity, colour vision test using Ishihara Pseudo-Isochromatic plates, confrontational visual fields, external and internal Ocular eye health examinations. 87% of the drivers of Passenger Service Vehicles met the visual requirement for driving (visual acuity greater than 6/9 in both eyes) while 13% had inadequate vision for driving (visual acuity less than 6/9 in both eyes). The commonest cause of reduced vision was refractive error (71%) and the factors associated with it according to the respondents were the family history of blindness, old age and accidents (trauma). Poor visual acuity was significantly associated with road traffic accidents (P-0.004). This study implies that the number of operators of passenger service vehicles in Bushenyi District with visual acuity less than 6/9 for driving is high and the level of awareness and utilization of eye care services by the drivers of Passenger Service Vehicles in Bushenyi is low.

Keywords: *Drivers, Driving, Eyes, Vision, Passenger Service Vehicles (PSVs), Visual Acuity.*

Introduction

The Ophthalmological Society of East Africa (OSEA) recommended that all driving license application forms must be filled by a qualified eye health worker, but despite this recommendation, most of the motorists including drivers of Passenger Service Vehicles do not visit the eye clinics to have their sight tested before obtaining a driving license [15].

Vision/Eyes-sight is your ability to see, which could be clear or unclear as defined in the Long Dictionary of Contemporary English. Sight is therefore one of the human senses that is absolutely essential for safe driving and to determine whether your sight is up to standard with driving, it is most paramount that one's visual acuity is ascertained [4].

According to WHO and the world report on road trafic injury prevention, [9]. A visual acuity of 6/9 in both eyes is taken as the yardstick for a normal or clear vision. Therefore, normal vision plays a major role in safe driving.

95% of sensory input to the brain required for driving comes from good vision [5]. However, the majority of drivers in Uganda are not assessed for this before they acquire driving licenses.

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In Uganda as it is elsewhere, it is a mandatory requirement to have one's eye sight tested before obtaining a driving permit/license, however, the application form for a driving permit is surface level in that it does not require for a detailed eye examination by an eye specialist but a mere physical examination of applicant (to be completed by medical practitioner) [13, 14].

In Uganda, like other parts of the world, most health workers have poor knowledge on the guidelines in the area of fitness to drive and eye check up before obtaining a driving licence is not always taken seriously by the doctors [10].

The challenge of road traffic accidents involving drivers of Passenger Service Vehicles is worldwide. A study conducted in Ghana revealed that, 80% of the accidents which took place in Ghana involved commercial vehicles and the causes were linked to vision of the drivers. In another study conducted in Kampala-Uganda by Dr Grace Sali, it indicated that out of every 8 commercial vehicle drivers, 1 did not meet the required visual standard for driving [12].

Researchers and organizations seem to have become interested in the implications of vision on driving. Debates abound over the factors associated with road traffic accidents and its relationship to Vision, both theoretically and empirically.

According to Uganda Traffic Police report on accidents, vision has continually been cited as one of the salient features in causing accidents every year thus this henceforth sets the stage for this investigation [6].

Problem Statement

Road traffic accidents are a significant public health concern in Uganda, resulting in injuries, fatalities and economic losses. Visual impairment and poor eyesight are potential contributing factors to these accidents, as they can affect a driver's ability to react to hazards, navigate roads, and respond to traffic signals. Despite the importance of good eyesight for safe driving, there is limited awareness and inadequate regulation regarding vision testing and correction for drivers in Uganda.

In Bushenyi, between January to June 2012, 87 passengers were seriously injured due to road traffic accidents and out of these, 17 were confirmed dead [1]. Visual issues surrounded the cause of these accidents.

This study aims to investigate the effect of eyesight on traffic accidents in Bushenyi district with the focus on establishing the proportion of drivers with reduced visual acuity, identify factors leading to reduced vision acuity and examine factors associated with road accidents.

Purpose of the Study:

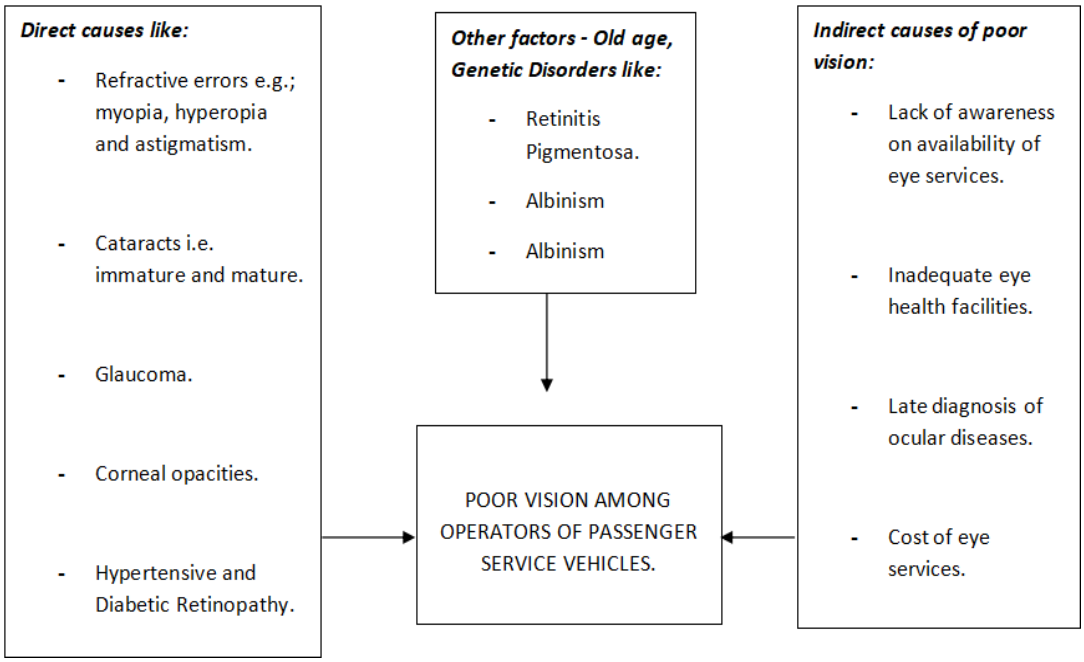
General Objective

To assess the vision of drivers of Passenger Service Vehicles operating across Bushenyi – Ishaka Municipality, Bushenyi District-Uganda.

Specific Objectives

1. To determine the proportion of drivers of Passenger Service Vehicles with reduced visual acuity for driving, across Bushenyi-Ishaka Municipality.
2. To examine the factors contributing to reduced vision among drivers of Passenger Service Vehicles with visual acuity less than 6/9, across Bushenyi-Ishaka Municipality.
3. To investigate the factors associated with road traffic accidents among drivers of Passenger Service Vehicles operating across Bushenyi-Ishaka Municipality.
4. To establish the level of awareness and utilization of eye services among operators of Passenger Service Vehicles operating across Bushenyi-Ishaka Municipality.

Conceptual Framework



(Source: Eye Diseases in Hot climates, John Sandford Smith, 1993).

Limitations and Strength of the Study

1. There was the respondent's fear to cooperate with the view that their licences may be revoked on account of their level of visual acuity. The respondents were assured of confidentiality and informed it was purely for study purposes.
2. The strength of this study was as a result of my own skills and the appropriate equipment which made the evaluation of the study possible.

Materials and Methods

Study Area

The study was conducted in Bushenyi District which is located in Southwestern Uganda. The road network in Bushenyi District comprises of mostly feeder roads which are poorly maintained and tend to become very impassable especially in the rainy season. The roads are narrow and are shared between pedestrians, motorcycle riders, motor drivers, cyclists and animals. This makes the roads very congested hence increasing the risk of accidents.

With an estimated population of 251,000 people, [1] an aggregated 75% of its population use motorcycle (Boda Bodas) and taxis as a means of transport. The motorcycles (Boda Bodas) are predominantly used than any other means though the taxis and bicycles and are spread all over the district [1].

The district has two main taxi parks referred to as Ishaka and Bushenyi parks respectively. The Ishaka Park is much bigger and busier.

The offices of Ishaka Bushenyi Taxi Owners & Drivers' association (IBUTODA) are located in Ishaka town. The IBUTODA offices were used for examining the drivers of the PSV's during the Traffic police road stop and check exercise.

Study Population

The target population of 392 drivers of Passenger Service Vehicles who plied the Ishaka -Bushenyi road during the road stop and check exercise, and drivers of PSV are registered under IBUTODA.

Sampling Method

The two-stage cluster sampling was used because it is useful in studying sparsely distributed populations. Two clusters used were:

1. The first cluster comprised of the 242 drivers of PSV's who are registered under the Ishaka- Bushenyi Taxi Owners & Drivers' Association (IBUTODA). The list of these operators was obtained from the management of IBUTODA.
2. The second cluster targeted 150 random PSV drivers who plied the Ishaka-Bushenyi road in June 2013 at the time of data collection. A total of 392 operators of passenger service vehicles were interviewed and examined.

Data Collection Tools

1. **Questionnaire:** This tool was used since the study was concerned with variables that could not be directly observed for example, views and feelings of the respondents. The sample size was also quite large (392) and given the time constraints, questionnaire was the ideal tool for collecting this data. Questionnaire is ideal because the information needed can easily be described in writing and it was used to collect quantitative data
2. **Data sheet**: This tool was used because it allowed the researcher to easily obtain qualitative data on Clinical findings during ophthalmic examination of the respondents.
3. **Focus group discussion guide:** This tool was also used to collect qualitative data.

It consisted of 242 PSV drivers registered with IBUTODA, some random PSV drivers at the Police Traffic checks and five key informants.

Data Analysis and Presentation

Both Qualitative and Quantitative data was collected because both methods supplemented each other. The qualitative methods provided in-depth explanations while quantitative methods provided the numerical data needed to meet required objectives.

1. **Qualitative data:** Qualitative data collected was coded, decoded and tabulated so as to generate patterns of resemblance and divergences. This helped to generate categories of data so as to deduce conclusions.
2. **Quantitative data:** Quantitative Data collected was entered using EPI INFO and exported to SPSS computer program for analysis.

The statistical significance in the quantitative data analysed was tested using Spearman's rho correlation coefficient at bivariate analysis to sort out the independent variables which were significant and in order to control the co funders; these variables were later combined together and tested at multivariate analysis level so as to come up with the significant ones. The data was analysed at three levels as seen below;

1. **Univariate analysis:** The data was summarized in to numerical data and categorical data. Numerical data was summarized using measures of central tendency (mean, mode and median) and measures of dispersion (standard deviation, variance, quartiles and range). Categorical data was summarized in percentages and proportions.
2. **Bivariate analysis:** This level of data analysis helped to identify the relationship between two variables i.e. the dependent variable and independent variable. There are usually many independent variables and one or two dependent variables, but we dealt with one by one. It helped to

generate the variables which are more significant in the study.

3. **Multivariate analysis:** This is the last level of data analysis which helped to identify the most significant variables in the study and it helped in adjusting for co-founding variables.

Recommended Data Collection Instruments / Equipment

The following instruments were used during data collection:

1. Snellens chart, for testing the distance vision of the respondents.
2. Direct ophthalmoscope, for assessing the retina of the respondent.
3. Ishihara colour plates, for testing the colour vision of the respondents.
4. Pin hole, this helped to rule out any refractive error of the respondent.
5. Trial set, this is a box of lenses used to correct refractive errors.
6. Mydriatic eye drop, this was used in some cases to dilate the pupil during retinal examination.
7. Blood pressure machine, this was used to measure the blood pressure of respondents especially suspected to be having hypertensive retinopathy.
8. A portable Slit lamp machine, this is a machine which magnifies the eye structures, hence making examination much simpler.
9. Torch, for examination of the anterior segment of the eye.
10. Tonopen, for measuring the intraocular pressure of the eye especially for motorists suspected to be having glaucoma.
11. Retinoscope, for diagnosing refractive errors.

The instruments which were used routinely on every participant are;

1. Visual acuity chart.
2. Torch.
3. Ophthalmoscope.

The rest of the instruments were used depending on the clinical findings.

Ethical Consideration

Institutional Consent

Ethical approval for the study was obtained from the research and ethics committee of Kampala International University (KIU). Permission was obtained from the management of IBUTODA to use their premises during the study. Permission was also obtained from the Uganda Police Traffic Department, Bushenyi branch to allow their staff to work with the research team.

Informed Consent

After explaining the details and the purpose of the study to the respondents, written consent for the participation was obtained. Confidentiality was observed during data collection, entry, storage, analysis and presentation of results. Respondents were assured of maximum protection during the study and they were at liberty to withdraw from the study whenever they wished.

IBUTODA staff were identified and briefed on the exercise and were requested to assist in the following ways;

1. Identifying the selected respondents with valid driving licences.
2. Directing the respondents to the examination premises.
3. Explaining and reassuring the selected respondents that their licenses will not be withdrawn even if they are diagnosed with eye problems.

Results

From May 2013 to August 2013, a total of 392 operators of passenger service vehicles were examined to determine their visual status. All the 392 operators of passenger service vehicles examined were male and they had valid driving licenses.

Table 1. Summary of Respondent Bio-data

		Count	**Percentage**
Age of the Respondents	20 – 30yrs	86	22%
	30 - 40yrs	192	49%
	40yrs - Above	114	29%
Total		392	100%
Religion of Respondent	Catholic	118	30%
	Protestant	198	51%
	Moslem	65	17%
	Others	11	3%
Total		392	100%
Highest level of Education Attained	None	35	9%
	Primary	183	47%
	Secondary	140	36%
	Tertiary	34	9%
Total		392	100%
Marital Status of Respondent	Married	340	87%
	Single	52	13%
Total		392	100%

Summary of Respondent Bio-data

The Table 1 above, Shows a summary of the respondent's bio- data (Age, Religion, highest level of education and marital status) with their percentages. The table shows that the biggest percentages of the respondents were those above 30 years of age (78%) and the remaining percentage were those below 30 years of age (22%). Most of the respondents were Protestants. The highest level of education attained by most of the respondents is primary level (47%) and majority of the respondents were married (87%) while the remaining numbers were single (13%).

Table 2. Summary of Respondent Data

		Count	**Percentage**
Eye check-up before obtaining driving license	Yes	200	51%
	No	192	49%
Total		392	100%
Place where eye checkup was done	Eye Clinic	73	19%
	General Clinic	127	32%
	No Check Up	192	49%
Total		392	100%
Involvement in accident	Yes	75	19%
	No	317	81%
Total		392	100%
Number of accident times	1 - 5times	74	19%
	No Accident	317	81%
Total		391	100%
Cause of the accident involved	Reckless Driving	38	10%

	Over Speeding	27	7%
	Others	8	2%
	No Accident	318	81%
Total		391	100%
How long has the respondent been driving?	0 - 5 yrs	138	35%
	5 - 10yrs	98	25%
	10yrs - Above	156	40%
Total		392	100%
Does the respondent wear glasses?	Yes	42	11%
	No	350	89%
Total		392	100%
How long has the respondent worn glasses?	0 - 2yrs	34	9%
	2yrs - Above	9	2%
	Not Worn Glasses	349	89%
Total		392	100%
Are the glassess for distance or near vision?	Distance	37	9%
	Near	4	1%
	Not Worn Glasses	351	90%
Total		392	100%
Visual acuity of the respondent	Greater than 6/9	343	88%
	Less than 6/9	49	13%
Total		392	100%
Respondent's eye diagnosis	Normal Eyes	137	35%
	Allergic Reactions	170	43%
	Refractive Errors	36	9%
	Other	49	13%
Total		392	100%

Source: Primary Data

Summary of Respondent Data

Table. 2 above summarizes the data which was obtained from the respondents according to the questionnaire and it shows the different percentages. The table shows the different factors which were considered during the study for example, Eye check-up before obtaining driving license whereby, 200 (51%) of the respondents had eye check-up and 192 (49%) did not have eye check-up before obtaining a driving license, Place where eye check-up was done, whereby some respondents went to the eye clinic while some went to the general clinic for eye check-up, involvement in accidents, use of glasses, Visual acuity of the respondents whereby 343 respondents had visual acuity greater than 6/9 and 49 respondents had visual acuity less than 6/9.

Objective 1. Proportion of Operators of Passenger service Vehicles with Reduced Visual Acuity for Driving, across Bushenyi- Ishaka Municipality

In order to achieve this objective, the following data was necessary.

Visual Acuity

Visual acuity was tested in both eyes (one eye at a time) using Snellen's chart at a distance of 6 meters. Those drivers with visual acuity less than 6/9 in both eyes were further examined to find out the cause.

Measurement of Visual Acuity (VA)

Visual acuity, which is the sharpness or clarity of vision, is commonly measured using a Snellen chart. This chart displays rows of letters or symbols in decreasing sizes. The patient reads the chart from a set distance, typically 20 feet or 6 meters, and the smallest line they can clearly identify determines their visual acuity.

Here's a more detailed explanation:

1. The Snellen Chart:
   - The Snellen chart is a standardized eye chart with rows of letters or symbols that decrease in size as you move down the chart.
   - Each row corresponds to the distance at which a person with normal vision can read that line.
   - For example, a line labeled "20/20" means that a person with normal vision can read that line at 20 feet.
2. Testing Procedure:
   - The patient sits or stands 20 feet (or 6 meters) away from the chart.
   - The examiner covers one of the patient's eyes with a paddle or piece of paper or asks the patient to cover their own eye with one hand.
   - The patient reads the letters aloud, starting from the top of the chart and progressing to smaller lines.
   - The examiner notes the smallest line of letters the patient can read accurately.
   - The same procedure is repeated for the other eye.
3. Recording Results:
   - Visual acuity is recorded as a fraction, such as 20/20 or 6/6.
   - The top number of the fraction represents the distance at which the patient was tested (20 feet or 6 meters).
   - The bottom number represents the distance at which a person with normal vision can read the same line.
   - For example, 20/40 vision means the patient sees at 20 feet what a person with normal vision sees at 40 feet.

Percentage of Respondents on Visual Acuity

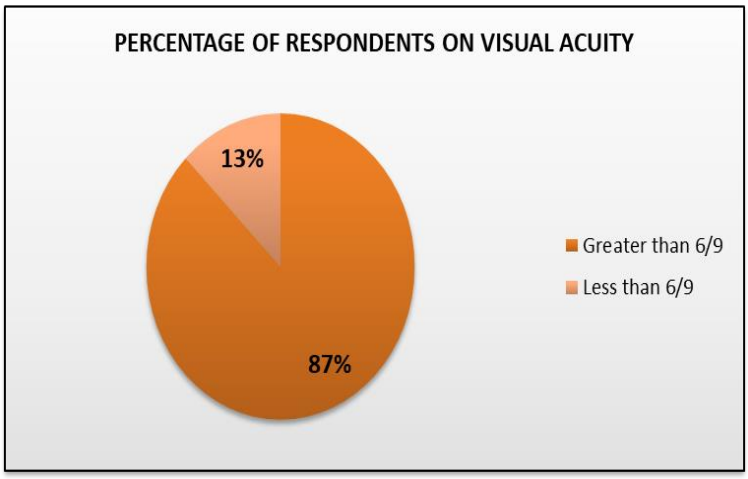


Figure 1. Showing Respondents Visual Acuity

Source: Primary Data

According to figure 1 above, 343 (87%) of the operators of passenger service vehicles had visual acuity greater than 6/9 in both eyes. while 49 (13%) of them had visual acuity less than 6/9 in both eyes. These findings probably could be due to the fact that most of the respondents visited a health worker for eye check-up before obtaining a driving license.

Objective.2 Factors Contributing to Reduced vision Among Operators of Passenger Service Vehicles with Visual Acuity less than 6/9, across Bushenyi - Ishaka Municipality

To achieve our objective, the following data was necessary for achieving this objective.

Table 3. A Cross Tabulation of Eye Diagnosis and Visual Acuity of the Respondent

		Visual Acuity of the Respondent				Total	
		Greater than 6/9		Less than 6/9		Count	%
		Count	%	Count	%		
Respondent's Eye Diagnosis	Normal Eyes	137	40%	0	0%	137	35%
	Allergic Reactions	170	50%	0	0%	170	43%
	Refractive Errors	1	0%	35	71%	36	9%
	Other	35	10%	14	29%	49	13%
Total		343	100%	49	100%	392	100%

Source: Primary Data

According to table 3 above, Of the 49 operators of passenger service vehicles with visual acuity less than 6/9, (poor vision), 35 (71%) had refractive errors, while 14 (29%) respondents had other ocular conditions like cataracts, uveitis corneal scars and glaucoma. And all the respondents with normal eyes and allergic conjunctivitis had normal vision. Here, refractive error was found to be the leading cause of poor vision among the respondents.

Table 4. Factors Contributing to Reduced Vision

		Respondent's Eye Diagnosis			
		Refractive Errors		Other	
		Count	%	Count	%
Factors for Reduced Vision	Old Age	17	65%	9	35%
	Family History	6	86%	1	14%
	Accident	12	75%	4	25%

Source: Primary Data

Table 4 above shows the factors contributing to reduced vision among respondents with visual acuity less than 6/9 due to refractive errors and other conditions like; cataracts, uveitis, glaucoma and corneal scars. Here, reduced vision was mostly associated with family history of poor vision (86%), followed by trauma or home accidents (75%) and finally old age (65%).

Objective 3. Factors Associated with Road Traffic Accidents among Operators of Passenger Service Vehicles Operating across Bushenyi-Ishaka Municipality

In order to achieve this objective, the following data was obtained.

Table 5. Visual Acuity and Road Traffic Accident Involvement

		Involvement in Accident				Total	
		Yes		No		Count	%
		Count	%	Count	%		
Visual acuity of the Respondent	Greater than 6/9	60	17%	283	83%	343	100%
	Less than 6/9	15	31%	34	69%	49	100%
Total		75	19%	317	81%	392	100%

Source: Primary Data

Table 5 above, shows the relationship between visual acuity and the risk of getting involved in an accident. It was observed that operators of passenger service vehicles with visual acuity less than 6/9 in both eyes were more likely to get involved in accidents (31%) as opposed to those with visual acuity greater than 6/9 in both eyes (17%). This is because, poor vision makes it difficult to judge the distance of objects while driving hence causing an accident. This was statistically significant with a p value of 0.004.

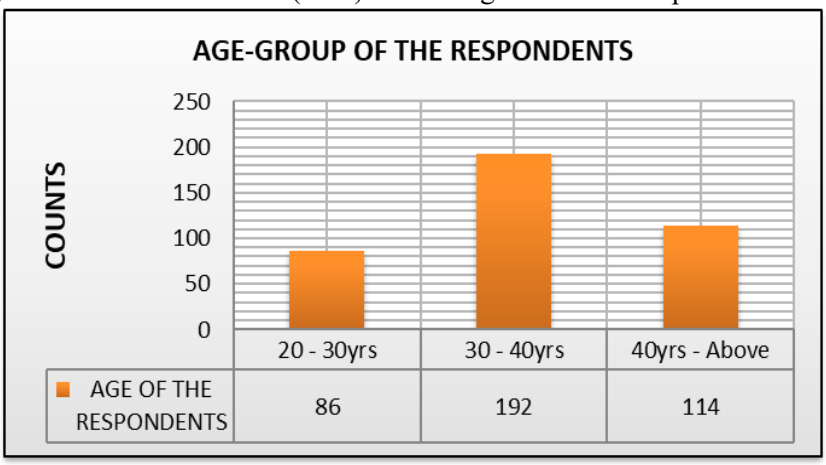


Figure 2. Age distribution of operators of Passenger Service Vehicles operating across Bushenyi –Ishaka Municipality (n = 392)

Source: Primary Data

As shown in figure 2 above, most of the drivers were in the age range of 30-40 year followed by drivers above 40 years of age. The age group with the lowest number of drivers was in the range of 20-30 years.

Table 6. Age Group of the Respondents and History of Road Traffic Accident Involvement

		Involvement in Accident				Total	
		Yes		No		Count	%
		Count	%	Count	%		
Age of the Respondents	20 - 30yrs	20	23%	66	77%	86	100%
	30 - 40yrs	43	22%	149	78%	192	100%
	40yrs - Above	12	11%	102	89%	114	100%
Total		75	19%	317	81%	392	100%

Source: Primary Data

As shown table 6 above, the respondents in the age range of 20-30 yrs were more likely to get involved in accidents (23%), as compared to those respondents in the higher age range (11%). This could be because; the young drivers had less driving experience as compared to the older drivers. This was found not to be statistically significant with a p value of 0.666.

Eye Check-up before Obtaining a Driving License and Road Traffic Accident Involvement

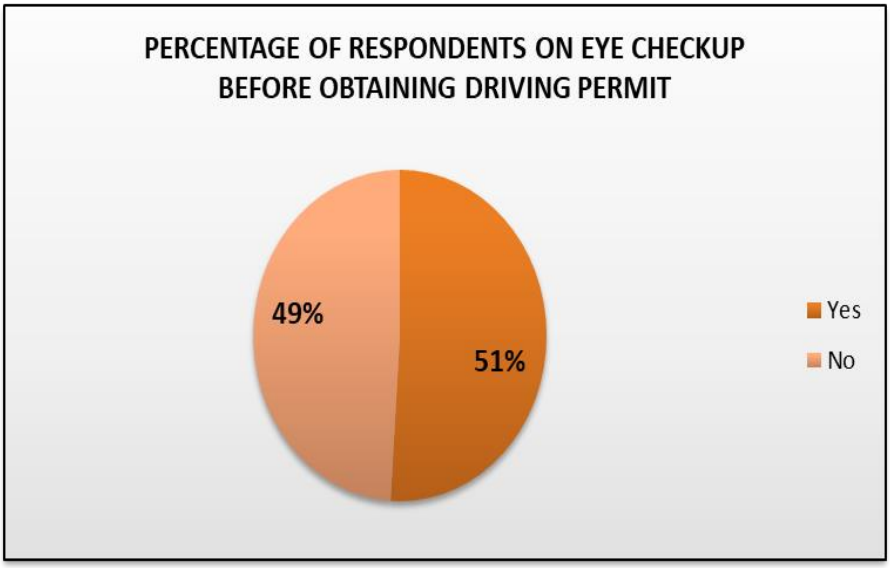


Figure 3. Percentage of Respondents whose Eyes were Checked before Obtaining Driving License

Source: Primary Data

According to figure 3 above, (49%) of the respondents did not have eye check-up before obtaining driving license. Probably because they did not know where to go for eye check-up while obtaining a driving license.

The Place where Eye Check-up was Done

Table 7. Showing the Place where Eye Check-up was done

		Frequency	Percent
Valid	Eye Clinic	72	36.2
	General Clinic	127	63.8
	Total	199	100.0

Source: Primary Data

According to table 7 above, 72 (36.2%) of the respondents had their eyes checked at the eye clinic while 127 (63.8%) of the respondents had their eyes checked at the general clinic, the remaining respondents did not have their eyes checked at all before obtaining driving license. The number of respondents who did not have eye check-up before obtaining driving license was high, this could be because, they did not know where to go for eye check-up.

Table 8. Eye check-up before Obtaining Driving License and Road Traffic Accident Involvement

		Involvement in Accident				Total	
		Yes		No		Count	%
		Count	%	Count	%		
Eye check-up before Obtaining Driving license	Yes	17	9%	183	92%	200	100%
	No	58	30%	134	70%	192	100%
Total		75	19%	317	81%	392	100%

Source: Primary Data

Table 8 above, shows the relationship between Eye check-up before obtaining a driving license and the likelihood of getting involved in Road traffic Accident. The risk of getting involved in road traffic accident is high when the drivers' eyes are not checked at all (30%) while the risk of getting involved in road traffic accident after eye check-up is smaller (9%). Probably this is because, when drivers go for eye check-up while obtaining a driving license, poor vision can be detected early hence reducing the risk of getting involved in an accident. This was found not to be statistically significant with a p value of 1.000.

Table 9. Place where Eye Check-up was Done and Road Traffic Accident Involvement

		Involvement in Accident				Total	
		Yes		No		Count	%
		Count	%	Count	%		
Place where Eye Checkup was Done	Eye Clinic	7	10%	66	90%	73	100%
	General Clinic	10	8%	117	92%	127	100%
Total		17	9%	183	92%	200	100%

Source: Primary Data

Table 9 above shows the relationship between the place where eye check-up was done and the likelihood of getting involved in road traffic accident. Respondents whose eyes were checked at the eye clinic were more likely to get involved in road traffic accidents (10%) as compared to those whose eyes were checked at the general clinic (8%). This means that, the place of eye check-up does not matter, but the most important thing is to have the eyes checked before one gets a diving license. This was found not to be statistically significant with a p value of 0.321.

Table 10. Duration of Driving and Road Traffic Accident Involvement

		Involvement in Accident				Total	
		Yes		No		Count	%
		Count	%	Count	%		
How long has the Respondent been Driving?	0 - 5 yrs	34	25%	104	75%	138	100%
	5 - 10yrs	27	28%	71	72%	98	100%
	10yrs - Above	14	9%	142	91%	156	100%
Total		75	19%	317	81%	392	100%

Source: Primary Data

Table 11. Multivariate Analysis

Variables in the Equation							
		B	**S.E.**	**Wald**	**df**	**Sig.**	**Exp(B)**
Step 1[a]	VA	-2.117	.738	8.242	1	.004	.120
	AGE	.215	.498	.186	1	.666	1.240
	Eye check-Upbe4dl	17.495	4.019E4	.000	1	1.000	3.961E7
	Driving period	.580	.386	2.262	1	.133	1.786
	Eye check-up place	.556	.561	.984	1	.321	1.744
	Constant	-15.165	4.019E4	.000	1	1.000	.000
a. Variable(s) entered on step 1: VA, AGE, DRIVINGPERIOD, and EYECHECK-UPPLACE. EYECHECK-UPBE4DL- (Eye check up before obtaining driving licence).							

Source: Primary Data

From table 11 above, it shows that out of the five factors tested; only visual acuity was found to be significantly associated with road traffic accident involvement (p=0.004).

Objective 4. Level of Awareness and Utilization of Eye services by Operators of passenger Service Vehicles Operating across Bushenyi- Ishaka Municipality

To achieve this objective, the following data was obtained from the FGD and key informants.

The study investigated respondent's knowledge about the causes of poor vision, where to access eye care services and the challenges in accessing eye services**.**

Several issues emerged from both the FGD and in-depth interview. These causes of poor vision, where level of access to eye health services and the challenges faced in accessing eye health services.

Knowledge on the Causes of Poor Vision and the Categories of People who usually Suffer from Poor Vision

A number of responses emerged from the FGDS and KI interviews regarding the causes of poor vision and the categories of people who suffer from poor vision. Most respondents were of the view that poor vision is caused by old age. Some respondents said that, poor vision is caused by dust. While some discussants thought that poor vision is caused by smoke from the kitchen, drinking waragi, (local gin) smoking tobacco and eating "mirunji'-which are scientifically not known causes of poor vision. However, it emerged from in depth interview that old people and children are the ones at risk of getting poor vision.

Knowledge on Availability of Eye Care Services

A majority of the respondents had full knowledge of the tertiary eye care service availability mainly at Ruharo eye centre in Mbarara (60km away) and few knew about other tertiary eye care centres like Mengo hospital and Mulago Hospital. Other respondents knew that people can access eye care services from drug shops and traditional healers. However, they suggested that eye services should be introduced in all the hospitals in Bushenyi district like Ishaka Adventist Hospital, Kampala International University Teaching Hospital (KIUTH) and Comboni Hospital so as to reduce the burden of going up to Ruharo in Mbarara.

Challenges Faced by People with Poor Vision Especially in Accessing Eye Care Services

Most respondents echoed lack of money for buying eye medicines, transport to the hospital and for buying glasses as the main challenge in accessing eye care services. Some

respondents cited availability of few eye care centres in the district as one of the challenges in accessing eye care services by people with poor vision. Inadequate social support was cited by some respondents as a challenge in accessing eye care services by people with poor vision especially among the elderly whose children no longer stay with them. Failure to get a helper to escort one to the eye care centre makes some patients fail to access the services.

Inadequate community sensitization by health workers and politicians about the location, availability and cost of eye care services was also cited as one of the challenges in accessing eye care services.

How to Overcome the above Challenges

A number of suggestions were raised in the FGD on how to overcome the challenges faced by people with poor vision.

Most of the respondents were of the view that, in order to overcome the above challenges, the government should build enough eye units in the district and the eye medicines and glasses should be provided to the communities for free of charge. Some respondents suggested that, people should be taught on the kind of diet to eat so as to prevent blindness and some respondents suggested that people should be sensitized on where to access the eye services.

Discussion

Discussion of findings According to the Objectives

Proportion of operators of passenger service vehicles with reduced visual acuity for driving, across Bushenyi –Ishaka Municipality

Forty-nine (13%) of the respondents had visual acuity less than 6/9 in both eyes. These drivers failed to meet the visual requirement for driving, which is a visual acuity of at least 6/9 in both eyes (WHO definition of visual acuity for driving). The findings are similar to a Kenyan study by Mwangi, [7], a study by Davison in UK, a study by Mantyjarv in Finland and a study by Harms e tal in Germany whereby, a number of the drivers examined failed to meet the visual requirement for driving [8].

The finding of 13% of the drivers who did not meet the visual requirement for driving in this study is very high when compared to other countries, almost 4 times that in UK and only comparable to Kenya. This could be due to the fact that, unlike in UK, a majority of drivers in Uganda do not have their eyes checked before obtaining a driving license. According to this study, it was found that 192 (49%) of the respondents did not have their eyes checked at all before obtaining a driving license. And those who had eye check-up, a majority of them (32%) had their eyes checked at the general clinic by non- eye care workers.

This contradicts the Ophthalmological society of east Africa (OSEA) recommendation of 2005 that all driving license application forms must be filled by a qualified eye health worker [15]

Factors contributing to reduced vision among operators of passenger service vehicles with visual acuity less than 6/9, across Bushenyi- Ishaka Municipality

In this study, out of the 49 drivers who had visual acuity less than 6/9 in both eyes, 35 (71%) had simple refractive errors, 14 (29%) had other ocular conditions like cataracts, uveitis, glaucoma and corneal scars. The factors which were identified by the drivers to be associated with poor vision were; old age (49%), accidents (34%) and family history of poor vision (17%). Drivers with refractive errors without correction are likely to be involved in road traffic accidents because uncorrected refractive errors lead to difficulty in reading traffic road signs and interpreting the distances of objects including vehicles. A driver with poor visual acuity requires an obstacle to be near before its significance can

be appreciated leaving less time to react. The findings in this study are consistent with similar studies done in other countries. Mwangi in her study in Kenya, Guest and Jennings in Australia, Davson and Harms in Germany, G Ovenseri and M Adofo in Cape Town [17]. and RSA insurance company in UK also found refractive errors as the most common cause of visual impairment among PSV drivers.

However, the above findings differ from those in a study by Grace Sali in Kampala Uganda who found that 18.4% of the PSV drivers had cataracts, whereby 8 drivers had incipient cataracts, and 1 driver had traumatic cataract in the right eye following trauma one year prior to examination and the visual acuity in that eye was 6/36 [12].This could be because, during the time of her study, there were many patients with cataracts as Vision 2020 program of elimination of avoidable blindness had not rolled throughout the whole country.

In this study, four drivers were found with glaucoma, only one had colour deficiency (red-green). This driver also had allergic conjunctivitis. This is almost similar to the Kenyan study by Mwangi, where only 1.7% of PSV drivers in Nairobi had colour deficiency [7].

Factors associated with road traffic accidents among operators of passenger service vehicle operating across Bushenyi-Ishaka Municipality

Visual acuity and road traffic accident involvement

This study revealed that, the operators of passenger service vehicles with visual acuity less than 6/9 were more likely to get involved in accidents (31%) while those drivers with visual acuity greater than 6/9 were less likely to get involved in accidents (17%). This means that poor vision predisposes to road traffic accidents [2, 3]. The findings in this study are consistent with those of other studies by Ovenseri et al in Ghana and Kulmala e tal on association between poor vision and road traffic accidents [20] whereby, During the 10-year follow-up of the participants, 239 (58%) participants suffered at least one injurious accident. The risk for injurious accidents in a multivariate model adjusted for age, gender, eye-related diseases, diabetes and cardiovascular diseases among participants with lowered vision was 1.45 (95%) compared with that for people with normal visual acuity. Participants with visual impairment had an increased risk for injurious accidents whereby, commercial vehicle drivers with visual acuity less than 6/9 were more involved in accidents compared to those with visual acuity greater than 6/9.

Visual acuity and road traffic accident involvement were found to be statistically significant. ($p=0.004$). A driver with poor vision is at risk of causing accident because poor vision makes the drivers fail to judge the distance of an object from them hence affecting the reaction time.

Drivers with poor vision cannot interpret colours for example of the traffic lights; hence this puts them at risk of getting involved in accidents. However, a study which was conducted in Ghana by Ocansley Stephen in 2010 [11], found that there are a number of other physical conditions a part from poor vision which can affect safe driving and physical abilities which are necessary for avoiding accidents. Physical conditions which can lead to accidents include poor hearing, illness, and fatigue. Good vision is important for safe driving and avoiding accidents. You need to have good visual acuity, peripheral vision, depth perception, and glare resistance and recovery. Good vision allows you to identify potential hazards and react more quickly. You also need to keep your view unobstructed by not hanging things from your mirrors or otherwise blocking your windows, and keeping your windows and mirrors clean.

A number of accidents are caused by not checking blind spots.

Age group of Respondent and History of Road Traffic Accident Involvement

This study found that, operators of passenger service vehicles in the age range of 20 -30 years were more likely to get involved in accidents (23%) compared to those in the higher range (11%). This means that the young drivers with less driving experience were more likely to get involved in accidents due to their less experience in driving compared to older drivers with much experience in driving. Although age was found to be insignificantly associated with road traffic accident involvement (p=0.666), the findings are similar to the study which was conducted by Vingrys et al, on 17,500 Californian drivers, whereby, there was a weak association between road traffic accident involvement and advancing age or much experience in driving this was because, the older drivers were more careful while driving as compared to the younger drivers [16]. the relationship between age group of respondents and accident involvement was found to be statistically significant in this study. However, a study by Cynthia Owsley et al, in UK, found that older drivers were more likely to get involved in road traffic accidents compared to the young drivers and this was because the older drivers were more nervous while driving compared to younger drivers [18].

Relationship between Duration of driving and Road Traffic Accident Involvement

This study also found that the duration of driving was important in road traffic accident involvement, whereby, those drivers who had driven for less than 10 years were more likely to get involved in road traffic accidents (28%) as compared to those drivers who had driven for more than 10 years (9%). Although duration of driving was found to be insignificantly associated with road traffic accidents (p=0.133), these findings are consistent with a study by Eunice Kennedy on Effect of Experience on Driving Performance in New Teenage Drivers whereby, Motor vehicle crash rates were highest among teen drivers, especially during the first six months and 1000 miles of independent licensed driving. Crash rates decline with driving experience; however, no research has demonstrated learning effects on performance due to independent driving experience and the extent and variability in driving performance among young drivers.

You should have your vision checked and wear prescription lenses as necessary to compensate for a visual deficiency.

Eye Check-up before Obtaining Driving License and Road Traffic Accident Involvement

This study revealed that the risk of getting involved in road traffic accident when the eyes are not checked before obtaining a driving license was high (30%), while the risk of getting involved in road traffic accident after eye check-up before obtaining a driving license was smaller (9%) therefore, this suggested that there was need for all operators of passenger service vehicles to undergo eye check-up before obtaining a driving license so as to reduce the risk of getting involved in accidents. Eye check-up before obtaining a driving license is important because it helps in early diagnosis of conditions like; Refractive error**,** Amblyopia, Strabismus, Eye teaming problems, Focusing problems, glaucoma and diabetic retinopathy among others, once these conditions are diagnosed and managed early, then the risk of accidents will be reduced.

Although the relationship between eye check-up before obtaining driving license and road traffic accident involvement was found to be statistically insignificant (p=1.000), these findings are similar to those in a study by Eby GW in America [19]. The eye test that you

take when you get your driver's license renewed is an example of a vision screening.

Depending on who is performing the test and where the test is given, vision screenings may include tests for blur, muscle coordination and/or common eye diseases. Keep in mind that a vision screening can indicate that you need to get your eyes checked, but it does not serve as a substitute for a comprehensive eye exam.

Eye Check-up Place and Road Traffic Accident Involvement

This study also revealed that the respondents whose eyes were checked at the eye clinic were more at risk of getting involved in road traffic accidents as compared to those whose eyes were checked at the general clinic. Therefore, the place where respondents go for eye check-up does not matter but what is more important is to have eye check-up before obtaining a driving license. Although the relationship between place of eye check-up and road traffic accident involvement was found to be statistically insignificant (p=0.321), these findings are similar to those in a study by Kulmala e tal in Australia whereby majority of commercial drivers went to the general practitioners to have their eyes checked when getting driving licenses [20].

Level of Awareness and Utilization of eye services by operators of Passenger Service Vehicles operating across Bushenyi-Ishaka Municipality

The study investigated participant's knowledge about the causes of poor vision, where to access eye care services and the challenges in accessing eye services**.**

Several issues emerged from both the FGD and in-depth interview. These included causes of poor vision, where to access eye health services and the challenges faced in accessing eye health services.

Knowledge on the Causes of Poor Vision and the Categories of People who usually suffer from Poor vision

A number of responses emerged from the FGDS and KI interviews regarding the causes of poor vision and the categories of people who suffer from poor vision. Most respondents were of the view that poor vision is caused by old age. Some respondents said that, poor vision is caused by dust. While some discussants thought that poor vision is caused by smoke from the kitchen, drinking waragi, smoking tobacco and eating "mirunji'-which are scientifically not known causes of poor vision. However, it emerged from in depth interview that old people and children are the ones at risk of getting poor vision, this is because they are the group with low immunity and they are always neglected. The discussants also cited poor feeding as one of the causes to poor vision.

Awareness on Availability of Eye Care Services

A majority of the respondents had full knowledge of the tertiary eye care service availability mainly at Ruharo eye centre in Mbarara (60km away) and few knew about other tertiary eye care centres like Mengo hospital and Mulago Hospital. Other respondents knew that people can access eye care services from drug shops and traditional healers. However, they suggested that eye services should be introduced in all the hospitals in Bushenyi district like Ishaka Adventist Hospital, KIUTH and Comboni Hospital so as to reduce the burden of going up to Ruharo in Mbarara. Some discussants suggested that there is need for community sensitization about the availability of these services in the district. However, a study by Eby GW in America found that, the most reported barrier to treatment was ignorance. The majority of respondents 67 (32.5%) indicated that they were not aware of their visual problem while 24 (11.7%) could not

make out time to go for an eye examination. Another 23 (11.2%) reported cost as the reason for not having an eye examination.

Challenges faced by Respondents with Poor Vision especially in accessing Eye Care Services

Most respondents pointed out lack of money for buying eye medicines, transport to the hospital and for buying glasses as the main challenge in accessing eye care services. Some respondents cited availability of few eye care centres in the district as one of the challenges in accessing eye care services by people with poor vision. Inadequate social support was cited by some respondents as a challenge in accessing eye care services by people with poor vision especially among the elderly whose children no longer stay with them. Failure to get a helper to escort one to the eye care centre makes some patients fail to access the services.

Inadequate community sensitization by health workers and politicians about the location, availability and cost of eye care services was also cited as one of the challenges in accessing eye care services.

How to Overcome the above Challenges

A number of suggestions were raised in the FGD on how to overcome the challenges faced by people with poor vision. Most of the respondents were of the view that, in order to overcome the above challenges, the government should build enough eye units in the district and the eye medicines and glasses should be provided to the communities for free of charge. Some respondents suggested that, people should be taught on the kind of diet to eat so as to prevent blindness. Some respondents suggested that there is need to sensitize people about eye services through their local leaders, and religious institutions. This could be an area for further research.

Conclusions

Forty-nine (13%) of the respondents had visual acuity less than 6/9, this means that, they did not meet the WHO visual requirement for driving.

The commonest cause of reduced vision among the operators of passenger service vehicles with visual acuity less than 6/9 was simple correctable refractive error (71%) and the factors which contributed to reduced vision were; old age (49%), accidents (34%) and family history of poor vision (17%).

Poor vision is associated with increased risk of road traffic accidents. ($p=0.004$).

There is generally a low awareness about eye check-up before obtaining a driving license and the barriers to obtaining these services are; inadequate numbers of eye specialists to carry out eye check-ups, lack of sensitization to the drivers and other stake holders about the importance of eye screening before obtaining a driving license and the cost of the eye services.

Conflict of Interest

I Okaali Simon Daniel hereby declare that, there is no conflict of interest in this work and I certify that, the submission is original work and it is not under review at any other publication.

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