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Factors Associated with Loss of Central Vision Among Elderly Patients Attending Eye Care Services at Jinja Regional Referral Hospital. A cross-sectional study.

Samuel Biringiro*, Violet Alimwenda.
Ophthalmic Clinical Officers Training School, Jinja.

Abstract.

Background:

Loss of central vision is a major cause of visual impairment among the elderly and significantly affects quality of life and independence. This study aimed to determine the factors associated with loss of central vision, its prevalence, and preventive practices among elderly patients attending eye care services at Jinja Regional Referral Hospital (JRRH).

Methodology:

A descriptive cross-sectional study design was employed involving 40 elderly patients diagnosed with central vision loss at JRRH. Data were collected using structured questionnaires and clinical records to obtain socio-demographic characteristics, causes of central vision loss, and preventive practices. Data were analyzed using descriptive statistics and presented in tables and figures.

Results:

The majority of participants were female (62.5%) and aged between 70 and 80 years (32.5%). Most were Basoga (52.5%) and illiterate (32.5%). Cataract was the leading cause of central vision loss (30%), followed by age-related macular degeneration (25%), glaucoma (20%), diabetic retinopathy (15%), and uncorrected refractive errors (10%). The prevalence of central vision loss was most common among patients aged 70–80 years (32.5%). Preventive practices included awareness of risk factor prevention (25%), urban residence (17.5%), regular eye checkups (15%), good sanitation and hygiene (12.5%), income stability (12.5%), and wearing protective glasses (10%).

Conclusion:

Central vision loss among the elderly at JRRH was strongly associated with increasing age and was mainly caused by cataract, age-related macular degeneration, and glaucoma. The condition was more prevalent among illiterate individuals and those aged 70–80 years. Although awareness of preventive measures was relatively high, utilization of protective practices such as regular eye checkups and protective eyewear remained low.

Recommendations:

The government should strengthen eye care services by recruiting and training more eye care professionals, expanding community awareness programs, and improving access to early screening and treatment services.

Keywords: Central vision loss, elderly patients, visual impairment, Jinja Regional Referral Hospital, Uganda.
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Corresponding author: *Samuel Biringiro.*
Email: Samubiringiro020@gmail.com
Ophthalmic Clinical Officers Training School, Jinja.

Background to the study.

Loss of central vision refers to a condition where an individual experiences a loss of detailed, sharp vision in the centre of their visual field. This can make it difficult to see objects clearly, especially those directly in front of the person. Some of the causes of central vision loss may include: Age-related macular degeneration (AMD), diabetic retinopathy, macular hole, macular oedema, retinal detachment, glaucoma, and inherited retinal disorders. Complications of central vision loss included decreased independence, difficulty with daily tasks, high risks of falls, emotional impact, and impact on work, education, and relationships. Treatment options for central vision loss depend on the underlying cause and may include medications, laser therapy, surgery, or vision rehabilitation. Regular eye examinations are essential for early detection and management of conditions that can lead to central vision loss.

Globally, it was estimated that 43million people had lost central vision and became blind. In 2010, 65% of 32.4million blind people and 76% of 191million people with Moderate and Severe Visual Impairment (MSVI) worldwide had a preventable or treatable cause, compared with 68% of 31.8 million and 80% of 172million in 1990. The World Health Organization (WHO 2020) reported that anyone can be affected by loss of central vision, as it results from a variety of conditions. In many developing countries, the causes of blindness and visual impairment vary according to socio-economic conditions and the availability of health and eye care services (Lindfield, Griffiths & Bozzani, 2014).

In Africa, approximately 26.3 million people in the African region have suffered from loss of central vision. Of these, 20.4 million have low vision and 5.9 million are estimated to be blind. It is estimated that 15.3% of the world's blind population resides in Africa. Evidence indicates that the magnitude of avoidable blindness caused by communicable diseases like Trachoma and onchocerciasis (river blindness) and ophthalmological complications in measles is decreasing, whereas non-communicable age-related eye conditions such as cataract, glaucoma, and diabetic retinopathy are increasing (WHO,2023). Approximately 80% of blind people live in African countries, mostly in rural areas with few or underutilized eye-care facilities (Lewallen &Courtright, 2014**).** In East Africa, the identified leading causes of central vision loss were cataracts, followed by glaucoma (Xulu Kasaba et al, 2021). Similarly, the main causes of vision loss included cataract, undercorrected refractive errors, glaucoma, age-related macular degeneration, and diabetic retinopathy (Kovin Naidoo et al, 2015). In Uganda, it was estimated that 1.5 million people suffer from avoidable vision loss, a problem attributed to a lack of accessible eye care services (New Vision, 8th Aug, 2016).

In particular, cataract patients, especially those in remote areas, face challenges regarding the high cost. Cost of surgery (Lillain, Magezi, 15th May, 2017, New Vision). The study was therefore conducted to determine the risk factors of central vision loss, its prevalence, and its preventive measures. This study aimed to determine the factors associated with loss of central vision, its prevalence, and preventive practices among elderly patients attending eye care services at Jinja Regional Referral Hospital (JRRH).

Methodology.

Study design.

A descriptive cross-sectional study design was employed, as well as both qualitative and quantitative methods to determine the factors associated with loss of central vision among elderly patients attending eye care services at Jinja Regional Referral Hospital.

Study area.

The study was conducted at Jinja regional referral hospital. The hospital was located in the city of Jinja, in the Eastern Region of Uganda. The facility offered services like laboratory services, maternity services, ART clinic services, and many others. The hospital was: 00025152.011N, 33012118.011E (Latitude: 0.431111; Longitude: 33.205000).

It was the Regional Referral Hospital for the districts of Bugiri, Iganga, Jinja, Kaliro, Kamuli, Luuka, Mayuge, Namayingo, Kayunga, and parts of Buikwe. The hospital was located approximately 84km (52 miles) east of Mulago National Referral Hospital. It has a bed capacity of 600, although many more patients are admitted, with many sleeping on the floor.

Study Population.

The study was to be carried out among elderly patients who have lost central vision attending the Eye clinic at Jinja Regional Referral Hospital.

Sample size determination.

The sample size determination was calculated using **Leslie Kish's formula**, $N = \frac{Z^2 P Q}{d^2}$

Where;
N=Sample Sizes
Z = Standard deviation, usually 1.65
P = Prevalence of central vision loss in the area, assumption of 50%
d = Accepted error margin to be 13%, when using 90% confidence interval
Q=1-P, which is (1-0.13) = 0.87
Therefore, $N = \frac{1.65^2 \text{ x}0.50\ (1-0.50)}{0.13^2}$
N = **40 Participants**
The study used 40 patients for the study.

Sampling technique.

A simple random sampling technique was used to select respondents.

Sampling procedure.

The study did a simple random sampling of all the adults affected by visual impairment who came to attend eye care services at JRRH, and any other person who had relevant information and was in JRRH. The researcher and his assistants assigned all the patients a unique number. The numbers were written on small pieces of paper, then folded and put in a basin and thoroughly mixed. After being blind folded, they picked the papers and opened them. Those who picked the papers with numbers participated in the study.

Data collection methods

The study used the questionnaire method of data collection.

Data collection tool

Pre-tested structured questionnaires were formulated and used to collect data.

These involved materials used for collecting data from the participants, they included: Pens, Pencils, Papers, Rubbers, and a Questionnaire.

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Data collection procedure.
Permission from the school principal, school administration, hospital director, and the in-charge eye clinic was sought; the researcher had a face-to-face interaction with the participants. Before giving out the questionnaires, the researcher fully explained the questions to the participants. Interpretation was done for participants who were not able to read or write. Each filled-in questionnaire was checked for accuracy and completeness.

Study variable.
Dependent variable
The dependent variable was loss of central vision. Visual impairment was further graded as mild, moderate, severe, and blindness according to the extent of the visual acuity.

Independent variables.
The independent factors were age, gender, presence of systemic diseases, eye conditions like cataracts and glaucoma, nutritional status, drugs like steroids, family history of eye diseases, and access to eye care services.

Data quality control.
This was done through pre-visiting, training of research assistants, and pre-testing of data by the supervisor for approval. Field editing was done on the spot, and data was kept safely in a file.

Pre-testing of the research tool.
The questionnaire was tested on a few patients attending the eye clinic in JRRH and necessary adjustments were made to ensure validity and reliability.

Training of a research assistant;
Before data collection started, training was given to the research assistant on study materials and instructions on the study tools and how they were to be used for one day to minimize errors during the study and ensure accuracy of data collected.

Inclusion criteria
Only the elderly patients who had lost central vision attending the eye clinic at Jinja hospital who consented to the study were included in the study.

Data Analysis and presentation.
After collecting the data, it was presented using tables, figures, and graphs, followed by narratives.
Descriptive statistics and manual analysis were employed as methods of data analysis.

Ethical Consideration.
On approval of the research proposal by the school, a letter of introduction was provided by the Principal Ophthalmic training school, Jinja, and then it was delivered to the hospital director. Jinja Hospital. The participants were assured of absolute confidentiality.
The candidate visited the eye clinic of Jinja Regional Referral Hospital and made arrangements with the hospital administration and the in-charge eye clinic, sought permission using the letter of introduction from the principal OCO training school to confirm permission to carry out the study. One research assistant was utilized who was trained by the principal researcher on data collection procedures and how he/she was to conduct him/herself during the process. Before data was collected. Code numbers were used instead of the patients' names as an assurance that no one knew from whom the information was obtained to ensure privacy and confidentiality.

Results.
Socio-demographic data.

Table 1: Showing socio-demographic data

Variables	Categories	Frequency (n=40)	Percentage (%)
Sex	Male	15	37.5
	Female	25	62.5
Age	50-60	5	12.5
	60-70	12	30
	70-80	13	32.5
	Above 80	10	25
Tribe	Basoga	21	52.5
	Baganda	10	25
	Bagwere	4	10

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	Bagisu	3	7.5
	Others	2	5
Education level	Preprimary/illiterate	13	32.5
	Primary	10	25
	Secondary	8	20
	Tertiary	5	12.5
	Others	4	10
Occupation	Civil servant	8	20
	Business personnel	10	25
	House wife	15	37.5
	Peasants	4	10
	Others	3	7.5
Marital status	Single	1	2.5
	Married	26	65
	Divorced	8	20
	Widow/widower	5	12.5

From the results of Table 1, the sample space included more females, 25(62.5%), than males, 15(37.5%). Of the sample space, the majority of the elderly patients were in the age range of 70 years to 80 years, accounting for 13(32.5%), while the minority were in the age range of 50 years to 60 years, 5(12.5%) of those participants were diagnosed with central vision loss.

By tribe, the participants diagnosed with central vision loss were the Basoga, who were the most affected tribe, accounting for 21 (52.5%), followed by the Baganda, 10 (25%), and other tribes were least affected by central vision loss, 2 (5%).

By educational level, central vision loss mostly affected house wives 13 (32.5%) of the participants with central vision loss were illiterate, 10(25%) of the participants attained primary education, 8 (20%) of the participants with central vision loss attained secondary education, 5(12.5%) of the participants with central vision loss had reached tertiary level of education while 4(10%) of the participants with central vision loss had achieved other higher levels of education.

Of those participants with central vision loss, 8(20%) were civil servants, 10 (25%) were business personnel, 15 (37.5%) were housewives, another 4 (10%) were peasants, and 3(7.5%) were affiliated with other professions.

Lastly, by marital status, 1 (2.5%) of the participants with central vision loss were single, 26 (65%) were married, 8 (20%) were divorced, 5 (12.5%) were widows or widowers, while none of the participants with loss of central vision belonged to any other status of marriage.

Prevalence of central vision loss with age among elderly patients

Figure 1: Showing the prevalence of central vision loss with age among elderly patients.

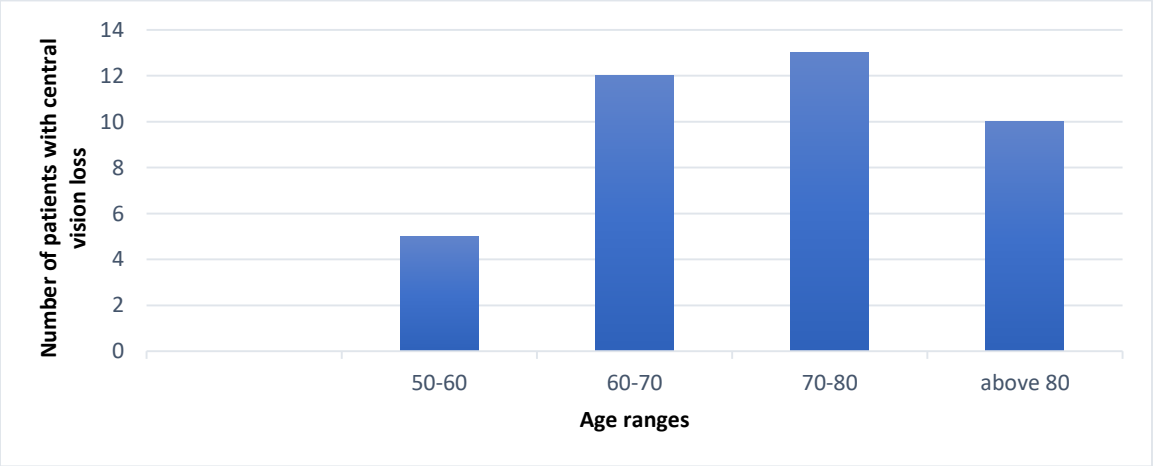

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Figure 1, 5 patients in the age range of 50 and 60 years had lost their central vision, 12 patients in the age range of 60 and 70 years had lost their central vision, 13 patients in the age range of 70 and 80 years had lost their central vision, and finally, 10 patients above 60 years old had lost their central vision.

Figure 2: Showing the prevalence of central vision loss among elderly patients, N=40

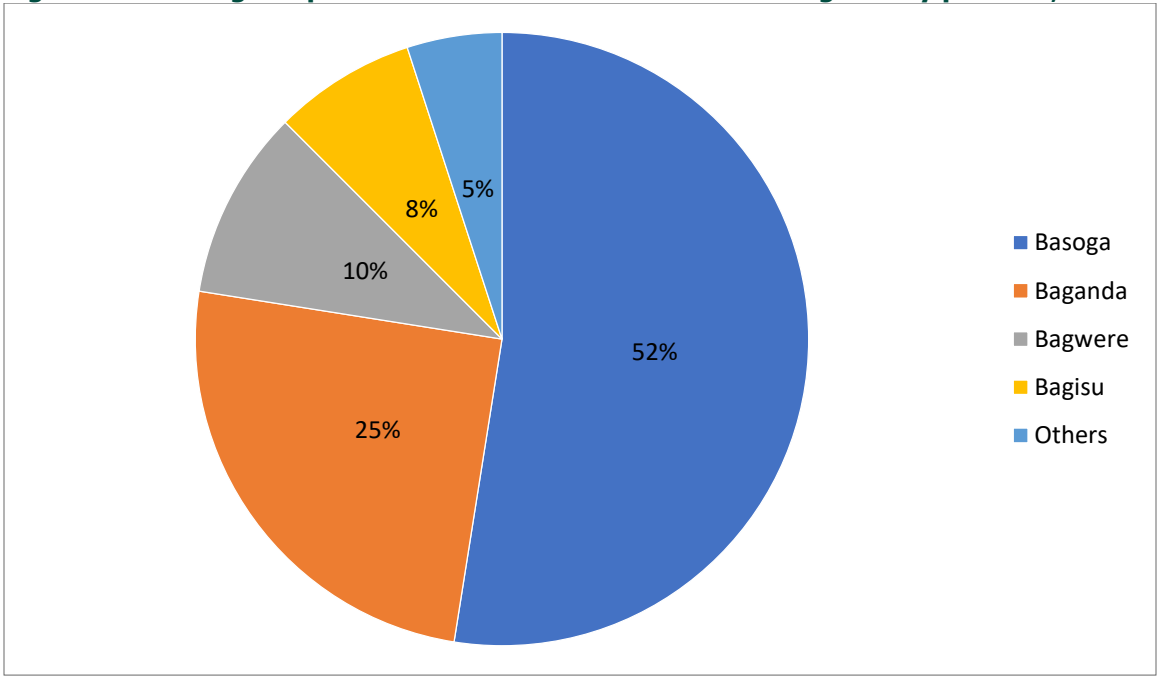

Figure 2, 52% of the patients with central vision loss were Basoga by tribe, followed by Baganda, who accounted for 25%, Bagwere patients with central vision loss contributed 10%, the least were the Bagisu with 8%, and other tribes accounted for 5% of the central vision loss.

Factors for central vision loss among the elderly.

Table 2: Factors for central vision loss among the elderly

Causes	Frequency(n=40)	Percentage (%)
Cataract	12	30
Age-related macular degeneration	10	25
Glaucoma	8	20
Uncorrected refractive errors	4	10
Diabetic retinopathy	6	15

From the table 2, among the 40 participants with central vision loss, 12 (30%) of the cases of central vision loss were caused by cataract, 10 (25%) of the cases of central vision loss among the elderly participants were caused by age related macular degeneration, 8(20%) of the cases of central vision loss were caused by glaucoma, 4(10%) of the cases of central vision loss among the elderly participants were caused by uncorrected refractive errors and 6(15%) of the central vision loss cases of the participants were caused by diabetic retinopathy.

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Preventive measures of central vision loss among elderly patients.

Table 3: Preventive practices among participants

Practice	Frequency(n=40)	Percentage (%)
Wears protective glasses	4	10
Regular eye checkups(>=4x/year)	6	15
Awareness of the prevention of risk factors	10	25
Good sanitation and hygiene	5	12.5
Income stability (>Shs. 100,000/month)	5	12.5
Urban residence	7	17.5
Others	3	7.5

From the table 3, among the 40 participants with central vision loss, 4(10%) of the cases of central vision loss practiced the use of protective glasses, 6 (15%) of the cases of central vision loss among the elderly participants practiced regular eye checkups for four or more times a year 10(25%) of the cases of the participants were aware of the preventive measure for the risk factors of central vision loss, 5(12.5%) of the cases of central vision loss among the elderly participants practiced good sanitation and hygiene as the preventive measure, 5(12.5%) of the participants had a stable income of more than shs.100,000 per month, 7(17.5%) of the central vision loss cases of the participants were living in urban areas and 3(7.5%) of the participants practiced other preventive measures.

Figure 3: Showing the preventive practices among participants, *n=40.*

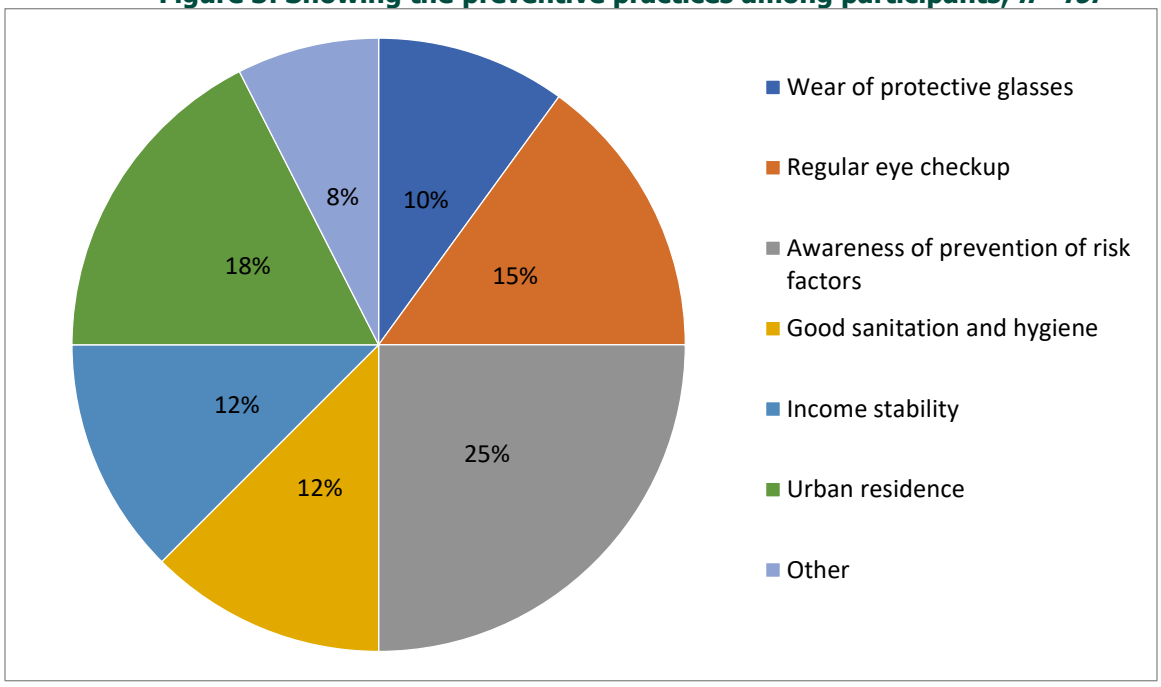

Figure 3, 10% of the cases of central vision loss practiced the use of protective glasses, 15% of the cases of central vision loss among the elderly participants practiced regular eye checkups for four or more times a year, 25% of the cases of the participants were aware of the preventive measure for the risk factors of central vision loss, 12% of the cases of central vision loss among the elderly participants practiced good sanitation and hygiene as the preventive measure, 12%

of the participants had a stable income of more than shs.100,000 per month, 18% of the central vision loss cases of the participants were living in urban areas and 8% of the participants practiced other preventive measures.

Discussions.

Prevalence of visual impairment among adults

The second objective was to determine the prevalence of central vision loss among patients who attend eye care services at JRRH. Data analysis and interpretation revealed the following major findings under this objective.

It revealed that the prevalence of central vision loss increases with increasing age among adults between 70 and 80 years, with the worst-affected accounting for 32.5% of the cases. This is possibly due to the increased risk of blinding conditions with increased age, such as cataract, glaucoma, and age-related macular degeneration, diabetic retinopathy, among others.

Data analysis and interpretation also revealed that the prevalence of central vision loss was greatest in the Basoga tribe (52.5%), this is probably because the hospital is located in Busoga region with the majority of the population being the Basoga compared to other tribes and the fact that it is a Regional Referral Centre for the Busoga region where most complicated eye conditions are referred.

It further revealed that the prevalence of central vision loss was highest among illiterate adults (32.5%) and decreased with increasing levels of education. This is probably because of poor health-seeking behavior among illiterates due to a lack of awareness about eye care services, while the decreased prevalence of eye care services among educated elderly patients is probably due to their good health-seeking behavior, since they are well informed about eye health and the fact that most educated adults can afford these services.

Occupation and marital status were the other factors that had no significant effect on cases of central vision loss among elderly patients.

These results agree with a study that was conducted about the prevalence of visual impairment and associated factors among older adults in Southern Ethiopia, 2022. Generally, there was an increasing prevalence of vision loss with increasing age. The prevalence of blindness was highest in people aged 61 years and above. It reveals that as age increases, the function of the entire body, including the visual system, becomes less efficient as a result of physiological deterioration and exposure to eye diseases. Similarly, the prevalence of vision loss among the respondents who had no formal education was due to their poor health-seeking behaviors and lack of knowledge of the risk factors for central vision loss (Getachew T et al 2022). The slight disparities in results are due to the fact that populations of different age groups were used and different methods of collecting data.

Factors associated with loss of central vision among elderly patients.

The first objective was to find out the factors associated with central vision loss among the elderly patients attending eye care services at JRRH. The following were the major findings under this objective as revealed by data analysis and interpretation.

Data analysis and interpretation revealed that central vision loss increased with increasing age. This is possibly due to the increased risk of blinding conditions with increased age, such as cataract, glaucoma, and age-related macular degeneration, diabetic retinopathy, among others.

It revealed that cataract was the leading cause of central vision loss among the elderly (30%) followed by age related macular degeneration (25%) and the third leading cause of central vision loss was glaucoma (20%) then diabetic retinopathy (15%) while uncorrected refractive errors was the least cause of central vision loss among the elderly (10%). Cataract was the leading cause of central vision loss among the elderly, probably because of a shortage of skilled personnel and facilities to adequately handle cases of cataract that keep rising due to population growth in the study area. Uncorrected refractive errors least contributed to the causes of central vision loss among the elderly patients, probably due to the fact that loss of accommodation(presbyopia) among the elderly masks refractive errors, and then senile lens changes also may give the illusion of improved vision.

These findings agree with a nationwide cross-sectional study on the factors and prevalence associated with blindness among registered pensioners in Ghana which discovered that the leading cause of central vision loss and blindness put together was cataract accounting for 52.3% and glaucoma (9.2%) also formed part of the top two causes of combined central vision loss and blindness among the pensioners in Ghana (Benjamin D Nuerty et al, 2019).

Preventive measures of central vision loss among elderly patients

The third objective was to determine the preventive measures for the loss of central vision among elderly patients attending eye care services at JRRH. Data analysis and interpretation revealed the following major findings under this objective.

It revealed that awareness of prevention of risk factors was the leading preventive measure of central vision loss among the elderly patients (25%) followed by urban residence (17.5%) and the third leading preventive measure of central vision loss was regular eye checkups (>=4x/year) (15%), good sanitation and hygiene and Income stability (>Shs.

100,000 per month) accounting for (12.5%) while wearing protective glasses and other preventive measures were the least used preventive measures with (10%) and (7.5%) respectively. Awareness of prevention of risk factors was the leading preventive measure of central vision loss among the elderly patients, probably because of the massive community mobilization and public awareness programs carried out by different stakeholders, like government and non-government organizations, people are aware of ways to prevent risk factors causing central vision loss. Wearing protective glasses and other preventive measures, at least, probably because of the high costs of the glasses, most of the participants couldn't afford, and other preventive measures were hindered by policy, and the government has failed to implement these policies, such as improving health infrastructure by the government.

These findings agree with a nationwide cross-sectional study on the prevalence of visual impairment and associated factors among older adults in southern Ethiopia, 2022, which discovered that increased public awareness, regular eye checkup (23.8%), and the use of eyeglasses were associated with visual impairment. It further revealed that age (61 and above), marital status, income status (occupation), wealth index, educational status, and not wearing the prescribed eye glasses are some of the contributors to vision loss and impairment, and need for urgent awareness coverage expansion for them to reduce vision loss (Mengistu M et al, 2022)

Conclusions.

The study established that elderly people have an increased risk of central vision loss. Cataract is the leading cause of visual loss, followed by age-related macular degeneration, glaucoma, diabetic retinopathy, and then uncorrected refractive errors as the least causative factor.

It was established that the prevalence of central vision loss was greatest in the Basoga tribe, patients between 70-80 years were the worst affected, and also highest in illiterate elderly adults, and least in literates.

This study also found out that the main preventive measures for loss of central vision included; creation of health awareness for the prevention of risk factors as the leading preventive measure, followed by urban residence, Regular eye checkups (>=4x/year), Good sanitation and hygiene, Income stability (>Shs. 100,000/month), wearing protective gears like sunglasses and goggles and other protective measures like improving health infrastructure by the government, avoiding self-medication especially for steroid drugs, cessation of smoking and living a healthy and balanced lifestyle.

Recommendations.

There is a need for the government and policy makers to employ more eye care workers immediately at lower health centers to detect and manage irreversible blinding eye disorders such as glaucoma, age-related macular degeneration, and reversible eye conditions such as cataract and refractive errors, that cause visual impairment.

The government should embark on training and retraining more eye care workers, such as Ophthalmologists, Optometrists, ophthalmic clinical officers, Ophthalmic assistants, among others, to ensure adequate skilled manpower and keep updating their skills so that the central vision loss prevalence can be reduced in the next 5 years.

The government, through district health teams and hospital administration, should carry out awareness programs in the community to improve health-seeking behavior, for example, through eye camps, so that the risk factors of central vision loss can be treated as early as possible among the population immediately.

More research needs to be carried out immediately to further understand the factors associated with loss of central vision in Uganda and expand the national database. This can be done by the government through researching hospitals, NGOs, as well as post-graduate students of ophthalmology.

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List of Abbreviations and Acronyms.

CDC	Centre for Disease Control and Prevention.
HMIS	Health Management Information System
JRRH	Jinja Regional Referral Hospital
OCO	Ophthalmic Clinical Officer
CV	Central Vision
PHC	Primary Health Care
TEM	Traditional Eye Medicines
WHO	World Health Organisation
ACB	American Council of the Blind
CLVT	Certified Low Vision Therapist
NFB	National Federation of the Blind

Source of funding.

The study was not funded.

Conflict of interest.

There is no conflict of interest.

Availability of data.

Data used in this study are available upon request from the corresponding author.

The author's contribution.

SB designed the study, conducted data collection, cleaned and analyzed data, drafted the manuscript, and VA supervised all stages of the study from conceptualization of the topic to manuscript writing and submission.

Author's biography.

Samuel Biringiro is a student of diploma in clinical ophthalmology at Uganda Ophthalmic Clinical Officers Training School, Jinja.

Violet Alimwenda is a research supervisor at Ophthalmic Clinical Officers Training School, Jinja.

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