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PATHOPHYSIOLOGICAL FACTORS THAT PREDISPOSE PEOPLE TO GLAUCOMA AND MEASURES OF PREVENTION OF GLAUCOMA AMONG THE PATIENTS RECEIVING EYE CARE SERVICES IN THE EYE CLINIC AT JINJA REGIONAL REFERRAL HOSPITAL. A CROSS-SECTIONAL STUDY.

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Abstract

Background

Glaucoma is a group of disorders characterized by progressive optic neuropathy resulting in a characteristic appearance of the optic disc and a specific pattern of irreversible visual field defects. The study aims to assess the pathophysiological factors that predispose people to glaucoma and measures of prevention of glaucoma.

Methodology

A cross-sectional quantitative study was conducted because data was collected at one point in time**.** A non-probability convenient sampling process was used since a specific group of patients with glaucoma was required among patients above 40 years of age receiving eye health services at JRRH.

Results

Most of the respondents 78% were above 40 years, 10% were 0 to 19 years with a percentage of 10%, 8.33% were 30 to 39 years and 3.33% were 20 to 29 years. Raised IOP contributed the highest percentage of 58% followed by systemic hypertension with a percentage of 16% then genetics and family history with a percentage of 12% followed medication-related IOP elevation with a percentage of 8% and finally myopia, systemic hypotension, and pseudoexfoliation syndrome all contributing to a percentage of 2% respectively. Early eye checkups turned out to be the most effective means for preventing glaucoma with the highest percentage of 34% followed by drug adherence with a percentage of 28% then reduction on steroid medication with a percentage of 12%.

Conclusion

Raised IOP and systemic hypertension were the significant factors in glaucoma while early checkups drug adherence and reduction of steroid medications were the significant prevention measures for glaucoma.

Recommendation

The Ministry of Health should equip all hospitals and health centers with the necessary equipment to enable eye health workers to diagnose glaucoma.

Keywords: *Prevention of glaucoma, Pathophysiological factors, Jinja regional referral hospital.*
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Background of the study

Glaucoma is a group of disorders characterized by progressive optic neuropathy resulting in a characteristic appearance of the optic disc and a specific pattern of irreversible visual field defects that are associated but most invariably with raised intraocular pressure. Glaucoma is classified into three major groups namely; Congenital or Acquired, Open-angle or Closed-angle, and Primary or Secondary glaucoma. Open-angle glaucoma is the most common type of glaucoma and is mostly a bilateral disease of adult-onset and is characterized by increased Intraocular Pressure (IOP) >21 mmHg, glaucomatous optic nerve damage, an open chamber angle, visual field loss. It is the most prevalent type of glaucoma in both whites and blacks. In analysis, those older than 70 years of age have a prevalence of 16% and it affects both males and females. Identifying the factors and possible preventive measures is a key public health goal in the management and prevention of glaucoma.

In glaucoma, oxidative stress is largely associated with the damage caused to the optic nerve. A Glaucoma prevention diet should be rich in antioxidants as it helps in preventing damage to the eye and some of those foods are black green tea, spinach, dark chocolate, cranberries, acai berries, and flax seeds (Houman Ahdieh, MD, 2021). Sleep posture has been associated with the possibility of elevating Intra-ocular pressure noting that it is important to sleep with the head elevated at around 20 degrees so that intraocular pressure does not increase when you are sleeping (Kierstan Boyd, 2020). Health-seeking practices could influence the diagnosis and prognosis of Glaucoma where patients who always see the eye specialist for eye exams

find or diagnose the disease in its early stages, then watch and treat it and also make it equally important to take glaucoma medication exactly as the doctor prescribes it (Adam Abroms, MD, 2019). Working conditions or environments such as the presence of protective gear could reduce the risks of eye injuries and illnesses such is recommended people always protect their eyes by wearing protective eyewear during sports or while working to avoid ocular injuries that may result in raised intraocular pressures leading to Glaucoma especially those participating in risky games and working areas (Ryan Shazier, 2022). Continued use of some medications has been found to have a potential risk of inducing glaucoma like corticosteroids induce glaucoma where in steroid-responsive patients, IOP elevation usually develops within the first few weeks of steroid administration and can be elevated within an hour or many years after chronic steroid use leading to increased IOP hence glaucoma (Sonia Phulke et al, 2017). Various physical and physiological factors may cause or increase the risk of developing glaucoma among the populations. The study aims to assess the pathophysiological factors that predispose people to glaucoma and measures of prevention of glaucoma among the patients receiving eye care services in the eye clinic at Jinja Regional Referral Hospital.

Methodology

Study Design

A cross-sectional quantitative study was conducted because data was collected at one point in time**.**

Study Area

The study area was the Eye Clinic of JRRH. The Hospital is located in the Eastern region of the country in Jinja Central Division, Jinja City near the source of the Nile which is 80 km east of Kampala the capital city of Uganda. It was founded in 1962 and has a bed capacity of 6oo. The hospital serves several clients/patients across the Busoga region, parts of Eastern Uganda, and some districts situated west of the River Nile including Buikwe and Kayunga districts. Clients are referred from District Hospitals and Health Centre IVs, while others are self-referred. Among the services provided include; comprehensive specialist services, involvement in health research and teaching in addition to daily immunization, HIV testing and counseling, reproductive health services safe male circumcision, etc.

The hospital has 15 wards which include surgical female /male, Medical female/ male, T.B, Eye, Urological, Grade A, A Annex, Psychiatric and Children's ward, Intensive care unit, Postnatal, Special Units, Gynecological and maternity ward. The study has been chosen due to the increasing cases of glaucoma among patients and it's easily accessible by the researcher.

Study Population

The study populations were all patients receiving eye health care services in the eye clinic at JRRH and diagnosed with glaucoma.

Sample size Determination

Using Button's (1965) formulae to calculate the sample size, 60 respondents were selected and interviewed during the study.

S=GR/O

Where S=Sample Size

G=Number of people interviewed per day

R=Maximum number of days for data collection

Maximum time the interviewer spends on each respondent

There S=5 x

= 60

The researcher reached out to 60 respondents.

Sampling Technique

A non-probability convenient sampling process was used since a specific group of patients with glaucoma was required among patients above 40 years of age receiving eye health services at JRRH.

Sampling Procedure

All eye health workers were sensitized about glaucoma. Then the researcher was given a chance to access the patients for data collection.

Inclusion Criteria

Only patients with glaucoma who received health services at JRRH consented to the study and were included.

Exclusion Criteria

All patients above the age of 40 who consented to the study were included.

Data Collection Methods

A qualitative survey method was used. The process of data collection began with the researcher having a self-introduction, with her introductory letter from the OCO training school in JRRH. The letter helped her to get permission from the hospital administration.

Data Collection Tools

An interview questionnaire was used. The questionnaires were written in English and constructed along the specific objectives of the study. It consisted of both closed-ended and ended questions.

Data Collection Procedure

An interview-administered questionnaire was used. The researcher fully explained the question to the respondents, interpretation was done for respondents who couldn't read and write. Each filled-in questionnaire was checked for accuracy and completeness by the researcher.

Piloting the Study

The researcher trained the assistants on how to apply data collection tools correctly.

The study tools were pre-tested on 5 to 10 patients to identify and correct any errors where they were identified. This was done by the researcher.

Quality Control

The report was presented to the supervisor for approval. The researcher trained the assistants on how to apply data collection tools correctly. The study tools were pre-tested and pilot testing was done to identify and correct errors. This was done by the researcher.

Pre-testing of the questionnaire

This aimed at evaluating the validity and reliability of the questionnaire. The data tools were therefore revised to suit realities by reconstructing questions and eliminating grammar errors and useless questions.

Data Analysis and Presentation

Completed questionnaires were edited for accuracy, and consistency, using Microsoft Excel and Microsoft Word, the data collected was presented in tables and figures using frequencies and percentages and some pie charts. The quantitative data was investigated for relevant information. A computer was used to type the report.

Ethical Considerations

A letter of introduction was provided by the principal ophthalmic clinical officer's school and it was delivered to the hospital director who introduced me to the in charge of the eye clinic and ward. She introduced the researcher to the respondents to get their consent. The respondents were assured of absolute confidentiality.

Results

Table 1: shows the demographic characteristics of the respondents (n=60)

FACTORS	VARIABLES	FREQUENCE (n=60)	PERCENTAGES (%)
AGE	0-19	6	10
	20-29	2	3.33
	30-39	5	8.33
	40-above	47	78.33
MARITAL STATUS	Single	1	1.67
	Married	42	70
	Separated	12	20
	Widow	5	8.33
EDUCATION LEVEL	Degree	2	3.33
	Diploma	8	13.33
	Certificate	8	13.33
	Uneducated	42	70
RESIDENCE	Village	45	75
	Town	15	25
OCCUPATION	Civil servant	11	18.33
	Business person	15	25
	Self-employed	20	33.33
	Others	14	23.33

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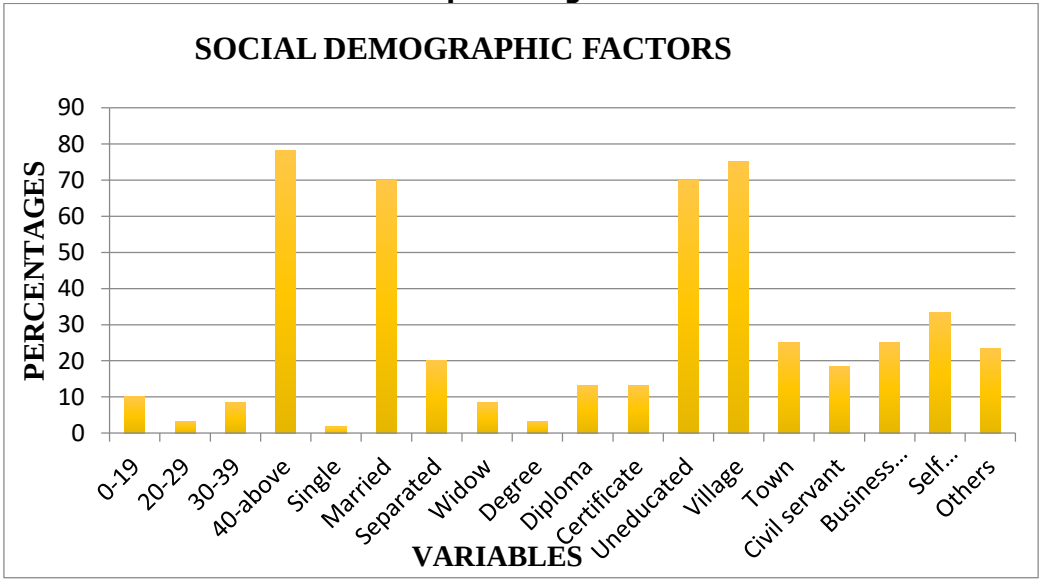
Figure 1: showing the socio-demographic characteristics of the respondents in percentage



According to the social demographic factors, respondents above the age of 40 years scored the highest percentage of 78% followed by 0 to 19 years with a percentage of 10%, then 30 to 39 years with a percentage of 8.33%, and finally 20 to 29 years with a percentage of 3.33%.

Regarding marital status, the married scored the highest percentage of 70% followed by the separated with a percentage of 20%, then the widows with a percentage of 833%, and finally the singles with a percentage of 1.67%.

Concerning education level, the uneducated scored the highest percentage of 70%, followed by diploma and certificate holders with the same percentage of 13.33%, and finally the degree holders with a percentage of 3.33%.

Based on the places of residence, people who lived in villages scored a percentage of 75% and those in town scored a percentage of 25%

Based on the nature of occupation, the self-employed scored the highest percentage of 33.33%, followed by business people with a percentage of 25% then civil servants with a percentage of 18.33%, and finally others with a percentage of 23.33%.

Pathophysiological factors influencing the prevalence

Table 2: Associated Factors Influencing Prevalence of glaucoma.

Variable	Frequency (n=60)	Percentage (%)
Raised IOP	35	58.3
Genetics and family history	7	11.7
Systemic hypertension	10	16.7
systemic hypotension	1	1.7
Myopia	1	1.7
medication-related IOP elevation	5	8.3
Pseudo exfoliation syndrome	1	1.7

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Figure 2: showing the pathophysiological factors influencing the prevalence of glaucoma.

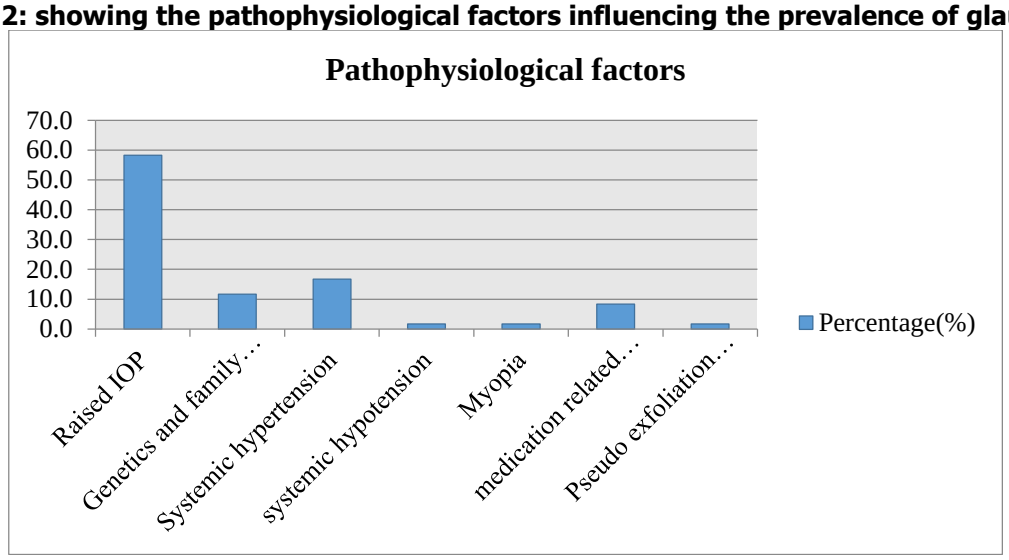

Figure 2, raised intraocular pressure had the highest percentage of 58.3% followed by systemic hypertension with a percentage of 16.7%, genetic and family history with a percentage of 11.7%, medication-related IOP elevations with a percentage of 8.3%, then systemic hypotension, pseudoexfoliation syndrome and myopia with a percentage of 1.7% respectively.

Figure 3 is a pie chart showing the pathophysiological factors influencing the prevalence of glaucoma.

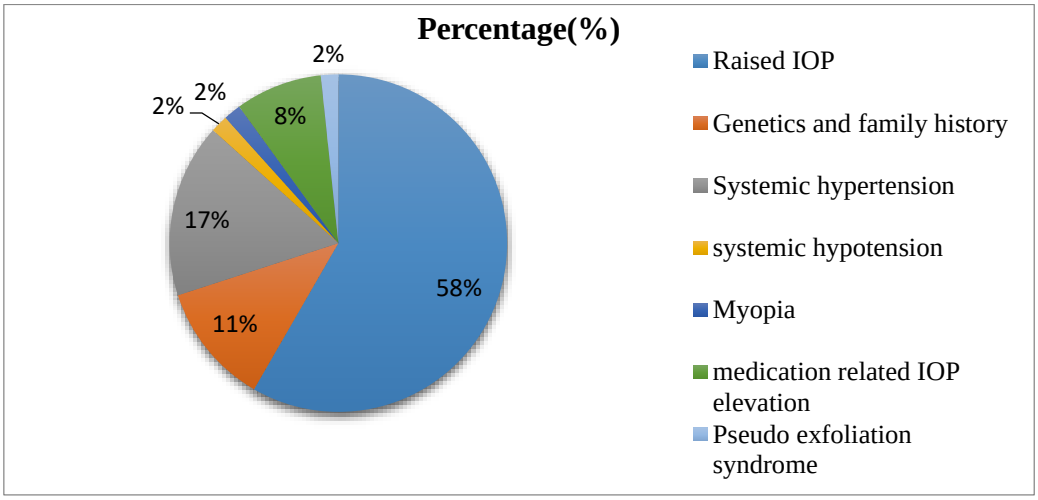

Figure 3, raised IOP contributed the highest percentage of 58% followed by systemic hypertension with a percentage of 16% then genetics and family history with a percentage of 12% followed by medication-related IOP elevation with a percentage of 8%, and finally myopia, systemic hypotension, and pseudoexfoliation syndrome all contributing to a percentage of 2% respectively.

Possible measures to prevent and control glaucoma.

Research has revealed that most of the patients about 75% have not sought medical attention to be diagnosed and treated for glaucoma because of lack of awareness about the eye disease. Most patients remember to seek medical attention in the late stages of the disease and some apply traditional eye medicine hence leading to blindness. These are some of the ways used in the prevention of glaucoma.

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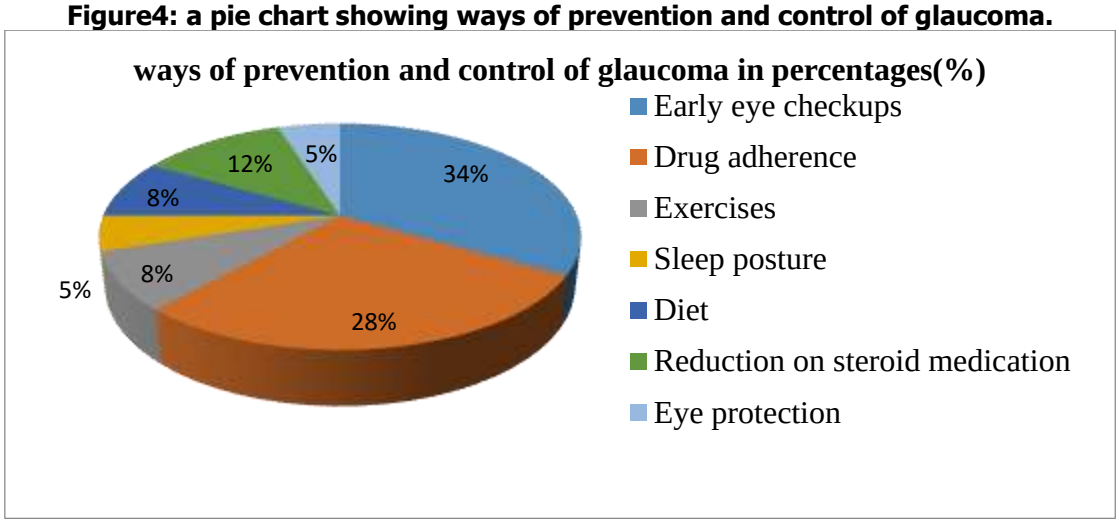
Table 3Possible measures to prevent and control glaucoma

Prevention	Frequency (n=60)	Percentages
Early eye checkups	20	33.33
Drug adherence	17	28.33
Exercises	5	8.33
Sleep posture	3	5
Diet	5	8.33
Reduction of steroid medication	7	11.67
Eye protection	3	5

Figure4: a pie chart showing ways of prevention and control of glaucoma.



Ways to prevent glaucoma

Figure 4, early eye checkups turned out to be the most effective means for preventing glaucoma with the highest percentage of 34% followed by drug adherence with a percentage of 28% then reduction on steroid medication with a percentage of 12% diet and exercises with a percentage of 8% and lastly sleep posture and eye protection contributing to a percentage of 5%.

Discussion

Pathophysiological factors

Raised intraocular pressure; raised intraocular pressure was the most prevailing factor among the pathophysiological factors with a percentage of 58%. This is due to the disruption in the production and flow of aqueous which causes the intraocular pressure to build up in the eye hence leading to glaucoma respectively.

Systemic Hypertension; the other factor that led to the increase in the prevalence of glaucoma was systemic hypertension with a percentage of 16.7%.Most of the people with glaucoma had a history of hypertension.

Prevention and control of glaucoma

Early eye checkups; the study has proved that early eye checkups have helped to combat glaucoma as early as possible before it progresses to its latest stages where its effects cannot be reversed. With early eye checkups, it became easy to diagnose glaucoma and quickly start the treatment as early as possible.

Conclusion

This study specifically sought to establish the factors associated with the prevalence of glaucoma and establish the possible available measures to prevent and control glaucoma in the eye clinic at Jinja Regional Referral Hospital.

The study established that glaucoma is more prevalent in people above the age of 40 years, hypertensive, and those with raised intraocular pressures especially those living in villages since they don't have easy access to comprehensive eye health services. Due to a lack of awareness about the disease, people resort to the use of traditional eye medicine which brings more problems to the eyes. The prevalence of glaucoma is higher in rural areas than in urban areas with a ratio of 3:1 respectively.

Recommendation

The District Health Services should create awareness among the public as regards the disease.

Jinja Hospital organization should organize continuing medical education about glaucoma, and its management

and should as well improve on the facilities used in the management of glaucoma.

All health workers should educate all diagnosed patients with glaucoma on the causes, effects, and prevention of glaucoma.

The Ministry of Education should allow Ophthalmic Clinical officers to go back for further training so that they can improve their knowledge and skills to diagnose such ocular diseases like glaucoma better.

The Government should recruit more eye specialists to different health centers to quickly diagnose and manage glaucoma.

The Ministry of Health should equip all hospitals and health centers with the necessary equipment to enable eye health workers to diagnose glaucoma.

Acknowledgment

I would like to give my sincere appreciation to the almighty God for his mercy and grace granted to me in this period of three years to attain knowledge and skills in the field of Ophthalmology.

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I also sincerely appreciate Jinja Regional Referral Hospital management for their effort to make me a competent ophthalmic clinical officer, especially OCO Namukuve Ritah and all members of the hospital community who gave me a helping hand in any way. I further acknowledge Mr. and Mrs. Wamala for being a source of inspiration and encouragement to me.

List of Abbreviations

OCO	Ophthalmic Clinical Officer
JRRH	Jinja Region Referral Hospital

Source of funding

There was no source of funding.

Conflict of interest

There was no conflict of interest declared.

Author Biography

Matama Sumaya is a student training for a Diploma in Clinical ophthalmology at the Ophthalmic Clinical Officers' Training School.

Ndhikuno Norman is a tutor at the Ophthalmic Clinical Officers' Training School.

Ajwika Samuel is a Principal at Ophthalmic Clinical Officers' Training School.

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