

EFFECTS OF IOP IN HUMAN HEALTH AMONG PATIENTS RECEIVING EYE HEALTH CARE SERVICES IN JINJA REFERRAL HOSPITAL. A CROSS-SECTIONAL STUDY.

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Page | 1 **Abstract**

Background

Elevated IOP may cause glaucomatous optic nerve damage and subsequent visual field deficits leading to substantial limitations in daily functioning and loss of autonomy. The study aims to assess the effect of IOP on human health among patients receiving eye health care services at Jinja Referral Hospital.

Methodology

A retrospective Cross-sectional descriptive study. Simple random sampling was used to select 20 respondents. The study was carried out from September 2022 to May 2023. Data was processed quantitatively by tallying and using SPSS and presented in tables and figures.

Results

The mean age of the respondents was 55 years with a standard deviation of 9. The mean weight was 55.6 kg with a standard deviation of 10.5. Out of 20 patients with increased IOP 4 patients had no problem with the eye and are normal. 1 patient had a sudden onset of painful eye and blurring of vision. 8 patients had increased IOP for 12 months and came with painless tubular vision. 5 patients had stayed with increased IOP for 24 months untreated and 2 patients spent 30 months with increased IOP. 16 of the clients who had increased IOP, were also affected with glaucoma. Those who were left untreated developed visual impairment and others went blind.

Conclusion

Increased Intraocular pressure can remain asymptomatic among patients for some time but can later cause varying symptoms like painless tubular vision, and blurred vision some may experience a sudden onset of painful eye and if left untreated it can eventually progress into glaucoma, and Blindness.

Recommendation

Jinja Hospital administration should organize continuous medical education about intraocular pressure and how it is associated with systemic factors.

Keywords: *Glaucoma, Optic nerve damage, Intraocular pressure, Visual field deficits.*

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Background

Elevated IOP may cause glaucomatous optic nerve damage and subsequent visual field deficits leading to substantial limitations in daily functioning and loss of autonomy. Exploring lifestyle factors related to IOP that are modifiable is of importance with epidemiological studies suggesting a positive correlation between systemic BP and IOP (Zhao, 2014). Changes in IOP caused a significant reduction in fundus pulsations, which was more pronounced in the macula at +10mmHg; at +20mmHg than in the optic disc at +10 mmHg; at +20mmHg. mean flow velocity in the central retinal artery (CRA) was reduced by -5 at +10 mmHg (ns) and by -14 at +20 mmHg, the resistive effect was increased by +4 at 10 mmHg and by +20 mmHg. in contrast, a rise in IOP did not affect blood flow parameters in the ophthalmic artery (OA).

Increased intraocular pressure (IOP) occurs when aqueous fluid in the eye is used to transport important nutrients to the lens and the cornea accumulates and cannot drain naturally (Living with Glaucoma, 2022). Elevation of intraocular IOP is a significant risk factor for the development and progression of glaucoma with previous prospective, randomized, long-term studies demonstrating the importance of reducing IOP in slowing glaucoma (Kim, 2018). Glaucoma an eye condition potentially causes loss of vision and blindness by damaging the optic nerve in the back of the eye (National Eye Institute, 2023).

High intraocular pressure causes glaucoma which later causes blindness, the population at highest risk is hypertensive patients, diabetic patients, and elderly. The estimated number of people with glaucoma worldwide is expected to rise from 76 million in 2020 to 111 million in 2040, with Africa and Asia being affected more heavily than the rest of the world (Allison, 2020). The leading

cause of irreversible blindness is Glaucoma worldwide and is most prevalent in individuals of African descent with about 6 million having glaucoma and up to half a million of them are already blind in Africa (Nkiru Kizor-Akaraiwe, 2021). The study aims to assess the effect of IOP on human health among patients receiving eye health care services at Jinja Referral Hospital.

Methodology

Study Design

This study is a descriptive, retrospective, and cross-sectional study. Involving quantitative methods to determine the systemic factors associated with intraocular pressure among subjects receiving eye health care in Jinja Regional Referral Hospital.

Study area

The study area was the eye clinic of Jinja RRH. The location is in the Eastern region of the country in the Jinja Central division, Jinja City near the source of the Nile which is 80km east of Kampala capital city of Uganda. It was founded in 1962 and has a bed capacity of 600. The hospital serves several clients/ patients across the region, some of whom are referred from other hospitals and health center IVs while others are self-referred. Among the services provided daily include immunization, HIV testing and counseling, reproductive health services, safe male circumcision, and SMC among others.

The hospital has 15 wards which include surgical female/male, medical female/male, TB, Eye, Urology, Grade A, Annex, psychiatric and children's wards, intensive care unit, postnatal, special unit, Gynaecological and maternity wards.

Time scope

The study was carried out from (September 2022 to May 2023).

Quantitative methods

This method was used to compile data in the form of tables, pie charts, and bar charts.

Study Population

The study population was the patients receiving eye care services in the eye clinic at Jinja Regional Referral Hospital. The study will take place at the eye clinic of Jinja Regional Referral Hospital.

Exclusion criteria

Patients with known allergies to the eye drops used in the study were not allowed e.g. local anesthetic drops like tetracaine and mydriatic eye drops like tropicamide

Patients who were too sick to endure the entire exercise of interviewing and medical examination were excluded from the study

Sample size determination

The sample size was calculated using the method below according to Button (1965)

$$S=GR/O$$

Where S=Sample size

Number of people to be interviewed per day

R=Maximum number of days for data collection

O=Maximum time the interviewer spends on each respondent.

There $S=5 * 3/0.3$

$$=30$$

Sampling technique and procedure

A simple random sampling technique was used to select 20 respondents. Because everyone in the target group has an equal chance of being included in the study, 40 papers written on Yes and No will be distributed to them in the eye clinic. Only the 20 respondents who picked the Yes papers will be included in the study.

Data collection tools and data collection procedure

Data was collected using an interviewer-administered questionnaire. The principal investigator started by creating rapport with the patients and reassuring them about confidentiality. The questions were read and interpreted for the patients to understand. Answers were given in the local language and written in English by the researcher and his assistants at the end.

Data processing, analysis, and presentation

Data was processed quantitatively by tallying and using SPSS and presented in tables and figures.

Quality assurance

Before the study, the principal investigator visited the Jinja Hospital Eye Department and obtained permission from the director of Jinja Regional Referral Hospital and ascertained that the study was relevant and needed.

Research assistants

The principal investigator was assisted by one research assistant who was selected according to the level of education, certificate holder qualification, communication skills, ability to speak the local language, and knowledge about the research topic. He was first trained and then oriented about the data collection process and was involved in the pre-testing of the questionnaire.

Pretesting of the questionnaire

The pretesting was done in Jinja Referral Hospital Jinja district among patients who attended eye health care services. 12 questionnaires were used. This aimed to evaluate the validity and reliability of the questionnaire. The data was therefore revised to suit realities by reconstructing questions and eliminating useless questions.

Ethical consideration

Introductory letter

A permission letter and introductory letter from the principal of the ophthalmic clinical officers training school were taken to the hospital director who recommended me to the in charge of Jinja Regional Referral Hospital Eye Department who then permitted me to carry out the study.

Informed consent

Verbal consent was sought from the patients after the explanation of the study topic.

The patients were assured of their right to consent

Confidentiality

Before data was collected the principal investigator and the research assistants first assured the patients that the information to be collected was to be kept confidential and was only to be used for academic purposes and planning to promote a better social life for patients. To further ensure this, code numbers were used instead of the patient's name as an assurance that no one was to know from whom the information had been gotten.

Results

Patient's demographic data (N=20)

The mean age of the respondents was 55 years with standard deviation of 9. The mean weight 55.6 kgs with standard deviation of 10.5.

Effects of high IOP in human health

Table 2; Out of 20 patients with increased IOP 4 patients had no problem with the eye and are normal. 1 patient had sudden onset of painful eye and blurring of vision.

8 patients had increased IOP for 12 months and came with painless tubular vision. 5 patients had stayed with increased IOP for 24 months untreated and 2 patients spent 30 months with increased IOP.

Table 1: SHOWING PATIENT'S DEMOGRAPHIC DATA.

Parameters	Mean+ SD	Range
Right IOP(mmHg)	13+_3.0	7-33.5
Left IOP(mmHg)	13+_3.0	7-33.8
Pulse rate (counts/min)	65.3+_11.2	40-143
Height (cm)	160.5+_9.2	131.5-185.5
Age(years)	55+_9	25-75
Weight	55.6+_10.5	34-180.3
Systolic BP (mmHg)	120.5+_11.5	85-195
Diastolic (mmHg)	75+_11.6	45-115
Mean BP (mmHg)	93.8+_13.2	70-150

Table 2 SHOWING EFFECTS OF HIGH IOP IN HUMAN HEALTH.

Number of clients	months spent with the condition	Visual field
4	3	90 degrees
1	7	60 degrees
8	12	40 degrees
5	24	30 degrees
2	30	<10 degrees

Figure 1 SHOWING MONTHS SPENT WITH CONDITION AGAINST IOP.

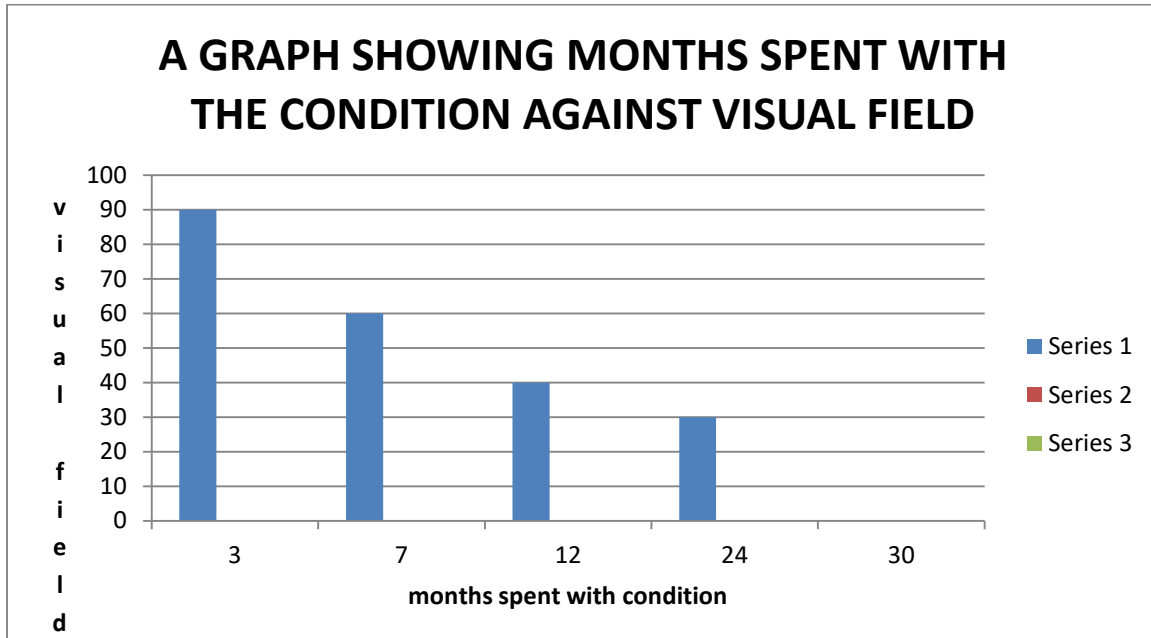


Figure 1, Visual field decrease was noted with an increase in months

Out of 20 clients 16 of the clients who had increased IOP, were also affected with glaucoma. This means approximately 80% of the patients with increased IOP, are glaucoma positive. The pressure generated within the eye damages the eye's optic nerve.

Those who were left untreated developed visual impairment and others went blind.

The disease damages the nerve fibers in the optic nerve and the retina limiting a person's field of view and quality of vision.

90% had open-angle glaucoma which is the most common type of glaucoma, 99% showed no obvious symptom in its early stage. As glaucoma progresses, the blind spot begins to develop in the peripheral view. This spot goes undetected until the optic nerve has experienced serious damage, or until it's detected by an eye care specialist through a complete eye exam. Similarly, people at risk for angle-closure glaucoma (10%) often do not experience symptoms before it occurs.

However, for those who experience symptoms, the remaining 1% may include severe pain in the eye or forehead, eye redness, decreased or blurred vision, seeing rainbows or halos around lights, headache, nausea, and vomiting. IOP and glaucoma can only be diagnosed during an eye examination.

Discussion

The effect of increased intraocular pressure on human health

In mild glaucoma, when treated IOP values were <21 mmHg, a 1mmHg increment in IOP was not associated with an increase in the rate of visual field (VF) worsening but rose >21 mmHg, a 1 mmHg increment in IOP was associated with faster VF worsening. In moderate or advanced disease, a 1mmHg increment in treated IOP was associated with faster VF worsening both below and above 21mm Hg, but the effect was much more pronounced in the higher range.

Intraocular pressure is currently thought of as the risk factor for open-angle glaucoma, and its sign of this is its effect on optic disc cupping as reflected in a larger C/D. we have found out that age affects this relationship such that the slope of change in C/D with IOP is steeper in persons 75 years of age or older than it is for younger age groups.

Refraction has been previously associated with glaucoma and IOP, and the C/D in myopic eye is greater than in eyes that are not myopic. It has been suggested that the higher C/D in eyes with higher myopia may predispose the nerve fibers to damage by IOP. Refraction attenuated the importance of the modifying influence of age in the association of IOP with optic disc cupping in the prevalence analyses. However, the prospective analyses, including both refraction and age (75 or greater) at

baseline indicated that both influence the association of baseline IOP to change in optic disc cupping.

Conclusion

Increased Intraocular pressure can remain asymptomatic among patients for some time but can later cause varying symptoms like painless tubular vision, and blurred vision while some may experience sudden onset of painful eye. If left untreated it can eventually progress into glaucoma and Blindness.

Recommendation

Jinja Hospital administration should organize continuous medical education about intraocular pressure and how it is associated with systemic factors, and their management and should also improve on the facilities used in the management of glaucoma.

Acknowledgment

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List of abbreviations

IOP: Intraocular pressure

CRA: Central retinal artery

BP: Blood Pressure

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There was no source of funding.

Conflict of interest

There was no conflict of interest declared.

Author Biography

Ronald Obonyo is a student with a diploma in Ophthalmology at Ophthalmic Clinical Officers Training School, Jinja.

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References

1. Allison, K., Patel, D., & Alabi, O. (2020). Epidemiology of Glaucoma: The Past, Present, and Predictions for the Future. *Cureus*, 12(11), e11686. <https://doi.org/10.7759/cureus.11686>
2. Kim, J. H., & Caprioli, J. (2018). Intraocular Pressure Fluctuation: Is It Important?. *Journal of ophthalmic & vision research*, 13(2), 170–174. https://doi.org/10.4103/jovr.jovr_35_18
3. Living with Glucoma. (2022, February 1). *Living with Glucoma*. Retrieved from Patient Resources: <https://livingwithglaucoma.com/2022/02/01/wh-at-is-elevated-intraocular-pressure-and-how-can-it-impact-your-vision/>
4. National Eye Institute. (2023, November 15). *Learn About Eye Health*. Retrieved from National Eye Institute: <https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/glaucoma>
5. Nkiru Kizor-Akaraiwe . (2021, 3 10). *Glaucoma blindness in Africa*. Retrieved from The International Agency for the Prevention of Blindness (IAPB): <https://www.iapb.org/blog/glaucoma-blindness-in-africa/>
6. Zhao, D., Cho, J., Kim, M. H. & Guallar, E. (2014).The association of blood pressure and primary open-angle glaucoma: A meta-analysis. *Am. J. Ophthalmol.* **158**, 615.E9-627.E9

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