



Lens Induced Glaucoma

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ABSTRACT

Background: Lens induced glaucoma (LIG) is a prevalent issue concerning eye health in Sudan. This study sought to evaluate the clinical demographic characteristics linked to lens-induced glaucoma in Western Sudan. **Methodology:** This retrospective study was conducted at Makkah Eye Complex in North Kordofan State, Sudan, from August 2021 to August 2022. The study analyzed a cohort of 130 patients who presented at the clinic with complaints of blurred vision, pain, and headache, ensuring comprehensive coverage during the designated period. **Results:** This study examined 130 patients with LIG, comprising 45 males (34.6%) and 85 females (65.4%), aged 46 to 90 years, with a mean age of 66 years. Seventy-six percent of the patients were rural inhabitants (99 out of 130). Phacomorphic cases accounted for 110 out of 130 (84.6%), while Phacolytic cases comprised 20 out of 130 (15.4%). **Conclusion:** LIG is commonly observed in Sudan, characterized primarily by the Phacomorphic type of glaucoma. Females are impacted more often than males. LIG is frequently observed among the older rural Sudanese population, highlighting the need for increased awareness and health education.

Keywords: Lens induced glaucoma, Phacomorphic glaucoma, eye, vision, Sudan

INTRODUCTION

Glaucoma comprises a collection of chronically progressive disorders affecting the optic nerve [1]. Glaucoma represents a category of conditions that result in irreversible vision loss, characterized by the progressive degeneration of retinal ganglion cells [2]. The condition arises from a combination of vascular, genetic, anatomical, and immune factors. Glaucoma represents a major public health issue, being the second leading cause of irreversible blindness following cataracts. An estimated 57.5 million individuals globally are affected by primary open-angle glaucoma (POAG). Individuals aged 60 and above, relatives of diagnosed glaucoma patients, users of steroids, diabetics, individuals with high myopia, hypertension, central corneal

thickness below 5 mm, and those with a history of eye injury are at heightened risk for glaucoma [3].

Glaucoma ranks as the second leading cause of blindness, accounting for 15% of cases in Africa. Individuals with black skin exhibit the highest prevalence of glaucoma [4]. Data on the epidemiology of glaucoma in Sudan is limited; however, high prevalence rates are anticipated. Lens-induced glaucoma (LIG) frequently presents in outpatient settings as an acute, painful reduction in vision accompanied by conjunctival redness. The presentation ranges from pediatric cases of ectopia lentis to geriatric cases of mature cataracts. LIG represents a form of secondary glaucoma that resembles acute angle-closure glaucoma (ACG), characterized by

normal intraocular pressure (IOP) and open angles in the contralateral eye, with symptoms alleviated promptly after cataract extraction [5]. This study sought to evaluate the clinical demographic characteristics linked to lens-induced glaucoma in Western Sudan.

MATERIALS AND METHODS

This retrospective study was conducted at Makkah Eye Complex in North Kordofan State, Sudan, from August 2021 to August 2022. The study analyzed a cohort of 130 patients who presented at the clinic with complaints of blurred vision, pain, and headache, ensuring comprehensive coverage during the designated period.

RESULTS

This study examined a cohort of 130 patients with LIG, comprising 45 males (34.6%) and 85 females (65.4%), aged between 46 and 90 years, with a mean age of 66 years. Most patients fell within the 65-69 age range, followed by those under 60 and those aged 70-74 years, accounting for 53 out of 130 (40.7%), 25 (19%), and 19

Ethical consent: All patients consented to participate in the study.

Ethical Approval: The human research ethics committee at MRCC has approved this research proposal (Approval number: HREC 0007/MRCC.3/24).

Statistical Analysis

The data sets were imported into the Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL), where a test indicated that p-values below 0.05 were statistically significant.

(14.6%), respectively. Most patients had a basic education level, followed by those who were illiterate and those with secondary education. This constituted 58 out of 130 (44.6%), 57 (43.8%), and 15 (11.5%), respectively. The majority of patients, 99 out of 130 (76%), were residents of rural areas, as shown in Table 1 and Figure 1.

Table 1. Distribution of the study subjects by demographic characteristics

Variable	Females n=85	Males n=45	Total n=130
Age			
<60years	19	6	25
60-64	9	9	18
65-69	37	16	53
70-74	10	9	19
75+	10	5	15
Education			
Basic	41	17	58
Secondary	10	5	15
Illiterate	34	23	57
Residence			
Rural	66	33	99
Urban	19	12	31

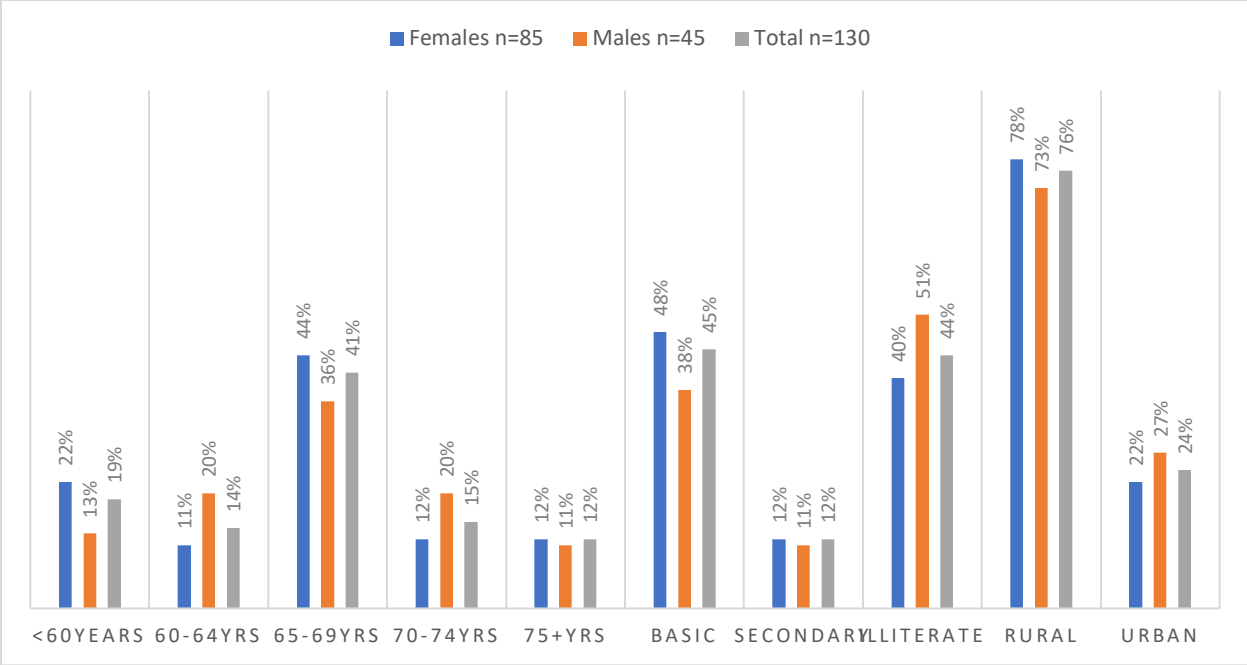


Figure 1. Description of the study subjects by demographic characteristics

Table 2 and Figure 2 summarize the LIG type according to demographic characteristics. Phacomorphic cases accounted for 110 out of 130 (84.6%), while Phacolytic cases comprised 20 out of 130 (15.4%). The distribution of LIG

type was similar across all demographic characteristics; however, when calculating the percentages within the entire groups, some variations emerged (Fig 2).

Table 2. Distribution of patients by LIG type by demographical characteristics

Variable	Phacomorphic n=110	Phacolytic n=20	Total n=130
Gender			
Females	74	11	85
Males	36	9	45
Age			
<60years	21	4	25
60-64	17	1	18
65-69	43	10	53
70-74	17	2	19
75+	12	3	15
Education			
Basic	50	8	58
Secondary	13	2	15
Illiterate	47	10	57
Residence			
Rural	84	15	99
Urban	26	5	31

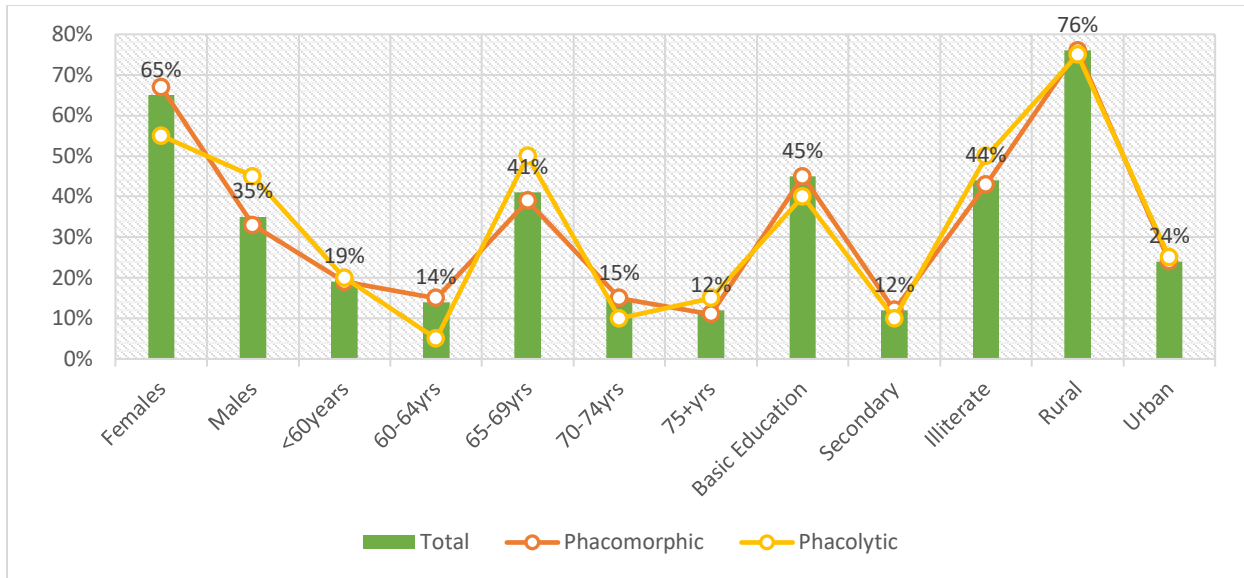


Figure 2. Description of patients by LIG type by demographical characteristics

In the initial clinical presentation, the majority of patients reported eye pain, followed by a decrease in vision (DV), and a combination of pain, redness, and DV, accounting for 65/130 (50%), 23/130 (17.7%), and 21/130 (16%), respectively. The distribution of these clinical presentations was relatively similar concerning Phacomorphic and Phacolytic conditions. In

terms of intraocular pressure (IOP), the majority of patients exhibited values exceeding 30 mmHg, followed by those in the 20-30 mmHg and 10-20 mmHg ranges, accounting for 82 out of 130 (63%), 20 out of 130 (15.3%), and 8 out of 130 (6%), respectively, as illustrated in Table 3 and Figure 3.

Table 3. Distribution of patients by LIG type and clinical characteristics

Variable	Phacomorphic n=110	Phacolytic n=20	Total n=130
Clinical presentation			
Pain	49	16	65
Redness	5	0	5
DV	16	0	16
Pain+Redness+DV	17	4	21
Pain+DV	23	0	23
IOP at presentation			
10-20	8	0	8
20-30	20	1	21
above 30	82	19	101

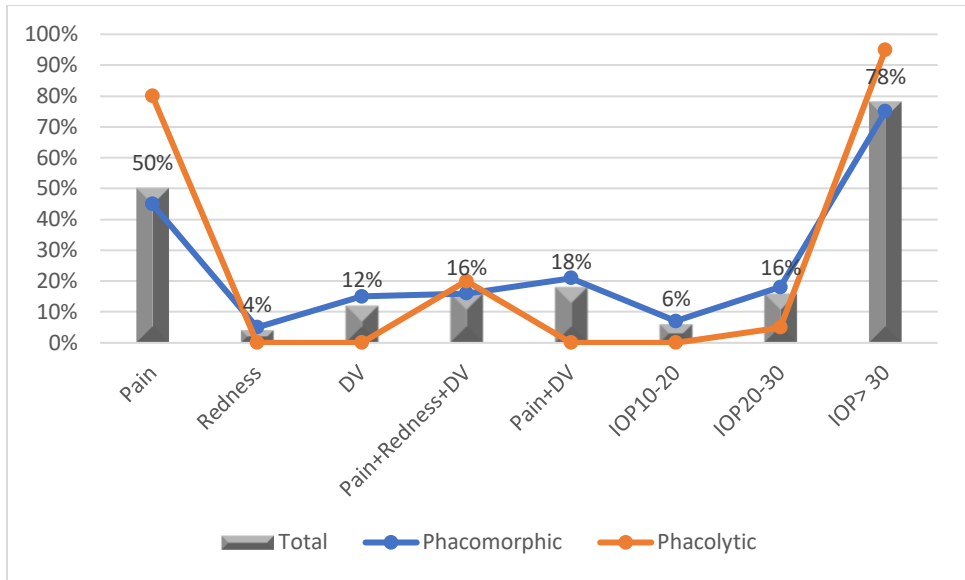


Figure 3. Description of patients by LIG type and clinical characteristics

DISCUSSION

LIG commonly manifests in outpatient environments as an acute, painful vision loss, accompanied by ocular erythema. The presentation encompasses pediatric cases of ectopia lentis and extends to older cases of mature cataracts. There is insufficient data concerning this issue from Sudan. This report presents cases from a single center located in El-Obeid city, Western Sudan. There are over three additional ophthalmology clinics in the city.

The findings of this study indicate that females were significantly more affected by LIG than males. Research suggests that females may encounter more adverse outcomes than males. A study indicated that females exhibit a higher incidence of adverse outcomes at 36.2 percent, compared to males, who show a rate of 30.5 percent [6, 7]. Phacomorphic and Phacolytic glaucoma predominantly affected elderly females aged 55 to 60 years. A young male primarily exhibited traumatic dislocations. Acute elevation of intraocular pressure (IOP), accompanied by pain and redness, was observed as a presenting feature [8].

The findings of this study indicate that the majority of patients with LIG were of advanced age. Multiple studies have documented

comparable results [9,10]. The majority of patients in this series originated from rural areas. LIG can occur in rural areas and is a preventable condition. Studies show that a lack of awareness about early cataract treatment can negatively impact visual outcomes after surgery [11]. The findings underscore the significance of prompt diagnosis and intervention for visually impairing cataracts. It is essential to inform both patients and cataract surgeons regarding the risks associated with lens-induced glaucoma and the adverse outcomes that may arise from delayed treatment.

The majority of patients exhibited Phacomorphic LIG. LIG presents as secondary glaucoma that resembles acute angle-closure glaucoma (ACG), characterized by normal intraocular pressure (IOP) and open angles in the opposite eye, with symptoms rapidly alleviated after cataract extraction.

LIG is classified further based on its pathogenesis as follows: Related to lens proteins: Leakage of lens protein through either an intact or compromised lens capsule. This classification encompasses Phacolytic glaucoma (PLG), Lens-particle-induced glaucoma (LPIG), and Phacoanaphylactic glaucoma (PAG). Aqueous flow obstruction refers to the anatomical

blockage of aqueous humor movement from the posterior to the anterior chamber. This category encompasses Phacomorphic glaucoma (PMG) and Pupillary block glaucoma (PBG). Certain causes, such as pseudo-exfoliation glaucoma and ciliary block glaucoma, are contentious classifications within LIG [12]. It has been claimed that the primary cause of LIG is Phacomorphic glaucoma caused by an untreated senile cataract [13].

In conclusion: LIG is widespread in Sudan, primarily manifesting as Phacomorphic glaucoma. Females are more often impacted than males. LIG is notably prevalent among the elderly rural Sudanese population, highlighting the need for awareness and health education.

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