



**SOCIO-ECONOMIC IMPACT OF GLAUCOMA AMONG GLAUCOMA PATIENTS IN JIMMA MEDICAL CENTER**

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JIMMA UNIVERSITY

INSTITUTE OF HEALTH, FACULTY OF MEDICAL SCIENCE,  
DEPARTMENT OF OPHTHALMOLOGY

**SOCIOECONOMIC IMPACT OF GLAUCOMA AMONG GLAUCOMA  
PATIENT IN JIMMA MEDICAL CENTER, SOUTH WEST ETHIOPIA:  
A CROSS-SECTIONAL STUDY**

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**RESEARCH THESIS TO BE SUBMITTED TO THE JIMMA UNIVERSITY  
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FACULTY OF MEDICAL SCIENCE IN THE PARTIAL FULFILMENT OF  
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OPHTHALMOLOGY**

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## Abstract

**BACKGROUND** -Glaucoma represents a group of diseases defined by a characteristic optic neuropathy that is consistent with changing of the connective tissue elements of the optic nerve head (also called the optic disc) and with loss of neural tissue associated with the eventual development of distinctive patterns of visual dysfunction. Glaucoma is the leading cause of irreversible blindness globally. Glaucoma patients face daily challenges such as the inability to perform normal duties due to routines poor vision and restricted visual field. Like other chronic diseases, glaucoma needs lifelong follow-up that incurs direct and indirect costs. Aside from these challenges, psychological effects such as fear of getting blind, depression, and other forms of anxiety are experienced by glaucoma patients and affect the quality of life.

**OBJECTIVE** –To determine the socio economic impact of glaucoma among glaucoma patients in Jimma medical center, south west Ethiopia

**Method-** a cross sectional study design was conducted on glaucoma patient who have follow up in glaucoma clinic from June 1 to August 30 who full fill inclusion criteria. Data was analyzed by statistical package for social science (SPSS) version 26.0. Descriptive statistics was applied for the analysis of socio-demographic related characteristics of the study participants, patients related characteristics and cost related characteristics including such as mean, standard deviation (SD), medians and percentiles. Chi-square, T-Test and ANOVA was done to test association for categorical variables and continuous variables like association between socio-demographic and cost related variables, and patient’s related characteristics and cost related characteristics.

**Result** - A total of 220 participants interviewed. Of 220 participants 150 (68.2%) were males and 70 (31.8%) were females. Majority 68 (30.9%) of participants were between age 61-70 years and mean age of participants is  $57.13 \pm 14.077$  (range 7-86). Near half 118 (53.6%) of participants earns between 400-1000 Ethiopian birr per month. Majority 163 (74.1%) of participant covered their own treatment by themselves. The average estimated income of participants which is range from zero (n=5, 2.3%) to 10000 ETB (n=2, 0.9%), with a mean of 1878.55 ETB. Two hundred fourteen (97.3%) of participants were on medical treatment with anti- glaucoma drugs at the time of interview and seventy (31.8%) undergo trab surgery. More than two third of participants who were on medical treatment (n=89, 40.5%) were on beta-blocker timolol. The monthly cost of medications was between 170 ETB and 1900 ETB, with an average of 550.89 ETB. Nine (4.1%) of the participants were afraid of their family members being diagnosed with glaucoma. Three (1.4%) of the participants were had a fear we are unable to buy medications. Three (1.4%) of participants were afraid loss of work due to their illness

**Conclusion;** the most significant influence of glaucoma on patients in this study was the financial burden and patients spent around 29% of patient reported income for medication only. Patients who come from rural area spent 54.5 % of their reported income. The average cost of medication depend on severity of glaucoma, patients who had advanced glaucoma spent higher cost for medications than patients with early and moderate glaucoma A significant percentage of the participants also reported occupational, psychological and social influence of glaucoma on them

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## Abbreviations and acronyms

IOP - Intra ocular pressure

POAG - Primary open angle glaucoma

CAI - Carbonic anhydrase inhibitors

CRVO - Central retinal vein obstruction

CRAO - Central retinal artery obstruction

GEB - Glaucoma economic burden

LMIC - low and meddle income countries

QOL - quality of life

WHO - world health organization

## CHAPTER ONE: INTRODUCTION

### 1.1. Background

Glaucoma represents a group of diseases defined by a characteristic optic neuropathy that is consistent with changing of the connective tissue elements of the optic nerve head (also called the optic disc) and with loss of neural tissue associated with the eventual development of distinctive patterns of visual dysfunction(1). Optic nerve damage happens with or without increase in intraocular pressure and eventually leads to vision loss(2).

Glaucoma can be classified as open-angle or angle-closure glaucoma and as primary or secondary. Open-angle glaucoma is traditionally classified as primary when there is no identifiable underlying anatomical cause of the events that led to obstruction of aqueous outflow and subsequent elevation of IOP. Angle closure glaucoma stated when there is either apposition or adhesion between peripheral iris and trabecular meshwork so that portion of the anterior chamber angle affected by such apposition is “closed,” and drainage of aqueous humor through the angle is reduced as a result. Glaucoma is said secondary when an abnormality is identified and a putative role in the pathogenesis of the disease can be ascribed to the abnormality(1).

Risk factors for the development of glaucoma are older age, black race (especially for primary open angle glaucoma), elevated IOP, positive family history, systemic hypertension and diabetes. Black individuals are at higher risk of blindness from POAG, and this increases with age: in persons aged 46–65 years, the likelihood of blindness from POAG is 15 times higher in blacks than whites. Elevated IOP is the only modifiable risk factor associated with glaucoma that has been consistently identified. Other likely risk factors incriminated are thinner central corneal thickness, higher cup-to-disk ratios of the optic disc, and higher pattern standard deviation values on the Humphrey automated perimeter at baseline(3).

Glaucoma can be managed either medically or surgically and the aim of intervention is to preserve visual function by lowering IOP to a level that is likely to prevent further optic nerve damage. Medical management can be given with agents like prostaglandin analogues  $\beta$ -adrenergic antagonists (nonselective and selective) adrenergic agonists, CAI (oral and topical), Para sympathomimetic agents, including cholinergic and anticholinesterase agents, combination medications and hyperosmotic agents. Surgically glaucoma managed with either laser in the form of trabeculoplasty, iridotomy, iridoplasty, cycloablation or incisional surgery in the form of trabeculectomy, trabeculotomy, canalostomy, canaloplasty and drainage device, respectively(4).

Glaucoma is a disease that generates economic and social losses to the society and the patients. Glaucoma patients face daily challenges such as the inability to perform normal duties or routines. Aside these challenges, psychological effects such as fear of getting blind, depression and other forms of anxiety are experienced by glaucoma patients and affect quality of life(5).



## 1.2. Statement of the problem

Glaucoma is the leading cause of irreversible blindness globally(6).It contributes to8%of blindness worldwide. The number of people with glaucoma worldwide was estimated to be 64.3 million in 2013. It increased to 76.0 million in 2020 and expected to raise to111.8 million in 2040 (7). This figure could be as high as 15% in some low- and middle-income countries (LMIC), particularly in Sub-Saharan Africa. Visual impairment from glaucoma weighs a heavier burden in the least developed regions (6). In 2005 in Ethiopia National Blindness and Low Vision Survey was conducted it shows glaucoma was found to be the fifth leading causes of blindness in Ethiopia (contributing 5.2% to the total blindness)(8).

Glaucoma is a disease that generates economic and social loses to the society and the patients. The more severe the disease, the cost higher for the treatment, as shown by across several European countries with medical costs ranging from €455 for earlier stages to €969 for more advanced disease. In the Unites States this ranged from \$623 for suspected glaucoma to \$2511 for advanced cases(9). Bulgarian glaucoma patient's pays half of their income for pharmacotherapy and visual loss due to glaucoma that generates economic losses of \$79000 per person for life time period(10).

The average glaucoma patient receiving medical treatment, with a monthly income of around USD211.8, spent an average of USD105.4 per month for anti-glaucoma medications, testing, transportation, and time away from work. This equates to 49.76% of their monthly income, totally unaffordable on the monthly income of the lowest-paid government worker. This situation often resulted in noncompliance with treatment and hospital follow-up visits and finally, it leads to blindness(11,12).

Patients living with glaucoma had also direct and indirect costs. The direct cost include total expenditure on travel, stay, and loss of wages of patients and accompanying persons ranged from 1.6% in the high-income group to 137% of the monthly income in the low-income group. Buying anti-glaucoma drugs on a regular basis was a burden for them since it raised their monthly expenditure exorbitantly beyond their monthly income. The indirect expenses include productivity losses caused by the non-capable working handicapped patient as well as the caretaking expenditures required by these patients. The total yearly indirect cost of all handicapped primary open-angle glaucoma patients is \$518,244,032 USD. As a result, the country suffered a significant loss(11,13).

This glaucoma-related decreased QOL was caused by a number of variables. People with advanced glaucoma, for example, will have peripheral and central vision impairment, which may impede their ability to move around, find objects, conduct everyday tasks, and adjust to changing lighting levels. They may be more vulnerable to falls and accidents. Using the GQL-15 assessment tool, they found that Ethiopian glaucoma patients had a poorer QOL compared to unaffected controls(14).

### 1.3 Significance of the study

This study will identify the socioeconomic impact of glaucoma on patients who are on long-term medical therapy , which included aspects on direct and indirect financial implications, time spent by a patient and caregiver to attend regular reviews in a glaucoma clinic, awareness about the disease and their ability to opt for surgical or laser therapy due to cost implications. This study may influence the hospital to avail glaucoma drugs in affordable price.

To the best of the author's knowledge, this study is the first at the study area hence can provide information on socio economic impact of glaucoma on patients. The study can also be used as initial point for the subsequent studies in the future.

## CHAPTER TWO: LITERATURE REVIEW

### 2.1. socioeconomic

According to a Systematic Review and Meta-Analysis on Global Prevalence of Glaucoma and Projections of Glaucoma Burden through 2040, the number of people with glaucoma worldwide will increase to 111.8 million in 2040, affecting people in Asia and Africa disproportionately high. These figures are critical for developing glaucoma screening, treatment, and related public health measures(7).

A research done in Bulgaria in 86,053 packages of anti-glaucoma drugs were dispensed to 78,487 patients, meaning that one patient may receive more than one pharmaceutical product, depending on the seriousness of glaucoma. The cost of anti-glaucoma medications is being reimbursed less since 2015, most likely as a result of the pricing strategy of seeking discounts with manufacturers and biannual price revisions. It should be remembered that anti-glaucoma medications are reimbursed at 50%, which can be an economic strain for economically marginalized elderly persons. The research also indicates that the societal burden in terms of DALYs is enormous, and it is likely the most significant lost for society(10).

A research done in India, shows that patients seen at the tertiary government hospital had an average monthly income of Rs. 10,912/ (range: Rs. 500/ to Rs. 50,000/), with approximately 56 percent of the patients earning less than Rs. 5000/month. The overall spending of patients including transport, stay, and salary loss, ranged from 1.6 percent in the high income group to 137 percent of the monthly income in the low income group. The average time needed for a glaucoma clinic visit was 15.66 hours (range: 6–96 hours per month). Around 2.7 percent reported systemic side effects, and 21.3 percent reported ocular side effects. Around 90% of the patients were compliant. For their care, 92 percent were not compensated by any health scheme or government payout(11).

In Mexico titled 'Socioeconomic Impact of Primary Open Angle Glaucoma it demonstrates every patient's gross direct expense rises to \$887 USD a year, reaching \$3,540 USD after five years. These figures, compounded by the number of affected people due to primary open angle glaucoma, add up to a yearly direct cost of \$626,367,505 USD. The indirect costs include economic reductions caused by the non-capable working disabled patient as well as the caretaking costs required by these patients. The total yearly indirect burden to all disabled primary open angle glaucoma patients is \$518,244,032 USD(12).

In the study, titled 'Cost of glaucoma therapy in a poor nation during a 5-year period,' files of 462 patients with recorded continuous follow-ups from 2007 to 2012 were analyzed, and glaucoma treatment expenses were grouped into three groups, as follows: Costs of hypotensive therapy, non-pharmacologic treatment, and consults and research. Groups were compared and categorized as mild, moderate, or severe based on POAG severity status, as well as those who progressed from mild to moderate and moderate to severe glaucoma. patients with low-income spent an average of 61.5 percent of their monthly income on glaucoma treatment, with the highest GEB observed in the group of patients with moderate glaucoma (92.8 percent); on the other hand, moderate-income subjects spent 19.5 percent on average, with the highest GEB observed in the group of patients with moderate glaucoma (92.8 percent) . Finally, only 20 patients were in the high-income group, and they spent an average of 7.9 percent of their monthly income on glaucoma treatment; 10 were in the mild-glaucoma stage, and 10 were in the severe group, with 6.4 percent and 9.4 percent total glaucoma treatment expenses from their monthly income, respectively(13).

A study done in Benin on the 'Socioeconomic facets of the treatment of primary open angle glaucoma' It involved patients over the age of 15 who were being cared for primary open angle glaucoma during the study time, and the results suggest there were 227 glaucoma diagnoses out of 15,592 patients, a male predominance (64 percent). For an estimated length of 17.8± 10.8 euros, the cost of drugs was 17.8± 10.8 euros. The appointments and medical testing took 7.4 ±7.4 months. 10.6 percent of the patients were followed on a daily basis. The estimated monthly cost of stable glaucoma was higher. A total of 17.6 percent of patients were followed to their appointments, which cost an average of 79.5± 59.9 euros. Each visit cost an average of 1.6 euros in transportation. For which often needed a wait of more than an hour the patients' monthly net salary was 187.7 euros. The cost of lost revenue as a result of waiting was not calculated. 72.7 percent of the patients were self-insured, which equated to 58.3 percent of their gross monthly salary(15).

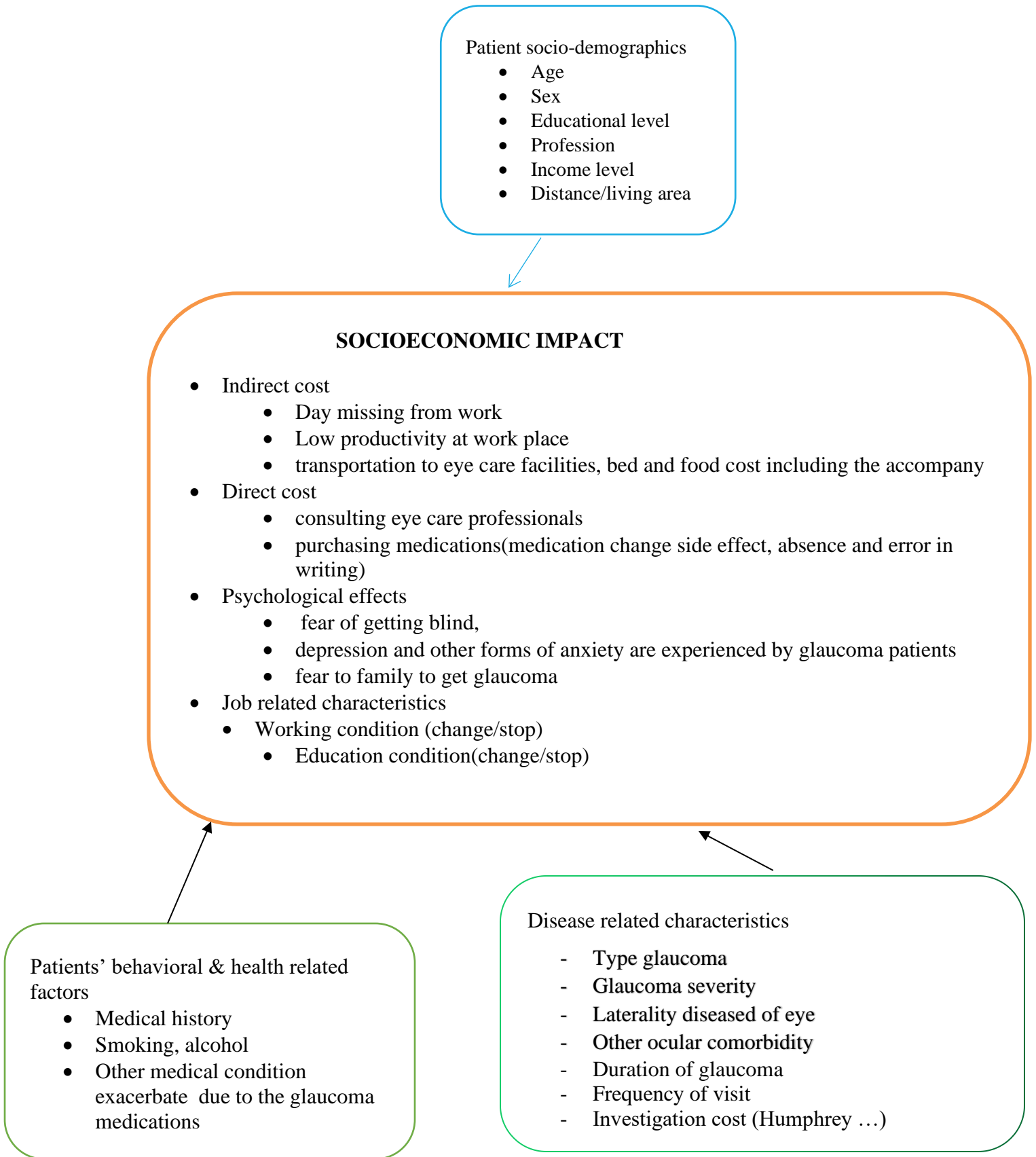
In Nigeria, research done 'on the Socioeconomic Influence of Glaucoma on Patients' socioeconomic data was collected from 150 glaucoma patients on treatment. The result shows that there were 77 females (51.33 percent) and 73 males (48.67 percent) among the 150 participants. The majority of the participants (55.33 percent) were not hired (unemployed, aged, or retired). Most of participants (70.67 percent) earned less than GH 400 a month, did not have a monthly income, or were unable to account for their monthly earnings. 112 (74.67 percent) of the participants said the cost of managing their disease was a financial burden for them, 56.67 percent were afraid of going blind, 51.33 percent were sad, 46.00 percent had their diet hampered, 42.67 percent had their job hampered, and 40.00 percent couldn't complete their daily tasks(16).

Analysis conducted at Cairo University Hospital it shows that patients had a mean IOP of 22.9 mm Hg (SD 11.5). Despite the fact that 88 percent of the patients were on prescription attention (an average of 2.1 medications), just under half of the patients had an IOP of more than 30 mmHg (SD 0.8). Patients were spending 79.5 LE (SD 95.3) a month on glaucoma drugs, which amounted to 30.1 % of their monthly income. 40% of patients were unaware that glaucoma causes blindness(17).

In a research conducted in Sydney, Australia, Ivan Quality of Life discovered that summary ratings differed substantially across individuals with mild, moderate, and severe glaucoma, indicating a pattern of decreasing quality of life with increasing disease severity. Activities requiring glare and dark adaption were the most difficult for everyone, but glaucoma patients felt substantially more impaired in central and near vision, peripheral vision, and outdoor mobility. Glaucoma-related QOL scores associated moderately and substantially with visual acuity, disease severity, and visual field measures, However, only severe glaucoma was a significant predictor of glaucoma-related quality of life deficits.(18).

A study done in Tanzania 'the cost and quality of life impact of glaucoma' shows Whilst medical therapy is over-whelming the first line treatment, the cost of maintaining this represents up to 25% of a patient's income. There is an impact of glaucoma on patients general well-being as determined by the EQ-5D and more tellingly on visual function with particular impact on role limitations as determined by the VF25, One-third of the population earned less than the monthly minimum wage of 170,000 Tanzanian Shillings (TZS)(19).

FIGURE 2. 1: THE CONCEPTUAL FRAMEWORK



## CHAPTER THREE: OBJECTIVES

### 3.1 General objective

- The main objective of the study is to determine the socioeconomic impact of glaucoma among glaucoma patients in Jimma medical center, south west Ethiopia

### 3.2 Specific objective

- To determine direct cost of glaucoma
- To determine indirect cost of glaucoma
- To determine social impact of glaucoma

## CHAPTER FOUR: METHODS AND MATERIALS

### 4.1 Study area and period

The study was conducted from June 1 to August 30 at Jimma university department of ophthalmology (JUDO) which is the only teaching and referral hospital at south west part of the country located in Jimma town located at 352 away from Addis Ababa. Jimma university medical center provides services for approximately 15,000 in patients, 160,000 out patients, 11,000 emergency cases and 4,500 deliveries in a year from catchment population of about 15 million with 1600 staff members, 32 care units and 800 beds. JUDO is one of the units which has different service areas including outpatient department (OPD), specialty clinics, wards, minor and major OR.

### 4.2 Study design

Hospital based cross sectional study design was conducted.

### 4.3 .Population

#### 4.3.1 .Source population

All patients who had glaucoma follow-up during the study period

#### 4.3.2 .Study population

All patient who were diagnosed with glaucoma and fulfill inclusion criteria

### 4.4. Sample size and sampling technique

The sample size for the study was calculated using single population proportion formula with the following assumptions(20)

- $Z (\alpha/2)$  = level of significance which is 95% = 1.96
- $p = 82.67\%$  (proportion of patient cover their cost by health insurance(5))
- $q = 1 - p$
- $d = 5\%$  margin of error

$$n = \frac{Z (\alpha/2)^2 p (1-p)}{d^2}$$

$$n = \frac{(1.96)^2 \times 0.8267 \times 0.1733}{(0.05)^2} = \frac{3.84 \times 0.14326711}{0.0025} = \mathbf{220}$$

#### 4.4.1. Sampling procedure

In jimma medical center there is follow up of glaucoma patient at glaucoma clinic from Monday –Thursday.

And study participant were selected consecutively from those having follow up at glaucoma clinic during study period.

#### 4.5. Inclusion and exclusion criteria

##### 4.5.1. Inclusion criteria

All glaucoma patient who have follow up at glaucoma clinic during the study period

##### 4.5.2. Exclusion criteria

- Patient who have follow up for less than 1 year

#### 4.6. Study variable

##### 4.6.1. Dependent variable

- Direct cost such as involves money used for consulting eye care professionals, purchasing medications,
- Indirect cost such as days missed from work and low productivity at the workplace cost of transport, food and lodging expense for the patient and accompanying person having no one to accompany them to health institutions
- psychological effects such as fear of getting blind, depression

##### 4.6.2. Independent variable

- Demographic variable as age, sex, religion, education status, residence, occupation, income, marital status.
- Stage of glaucoma, average frequency follow-up, duration of follow up, number of topical medication, frequency of doses, health insurance status



#### 4.7. Data collection instruments

Semi structured questionnaires was used for this study. Data was taken from patients, patient's care givers/parents, next of kin or guardians, patient's medical charts. A standard data recording format was used (Annex II) which is prepared by reviewing different literatures for important variables to assess socioeconomic impact of glaucoma. The following data was recorded for each patient: age, gender, residence, travel cost, income, drug cost,

#### 4.8. Data collection process and management

Initially patient charts was reviewed for inclusion and exclusion criteria at the time of follow up. Data collector reviewed the medical chart by using pre prepared standard questionnaires for all patients who fulfill inclusion criteria. All data was collected and recorded on standard questionnaire by two residents and one ophthalmic nurse working at Ophthalmology

#### 4.9. Data quality assurance

A semi-structured English version of the questionnaire was translated to Afan Oromo and Amharic languages and back to English to ensure accuracy and consistency. Before entry into SPSS for analysis, the data was categorized, compiled, cleared, and coded. The collected data underwent quality control check for completeness and duplication.

#### 4.10. Data processing and statistical analysis

After completion of data entry, it was exported to SPSS version 26.0 and pre analytical processing was made. Data was then analyzed using SPSS for window version 26.0D. Means, proportions and frequency were used for nominal variable. Graphs, bar charts and table were used as appropriate for data presentation and dissemination. Correlation test, one way ANOVA, T-test and chi-square was done to test association for categorical variables and continuous variables like association between socio-demographic cost related variables, and patient's related characteristics and cost related characteristics. We grouped two variable in into another group to do post HOC analysis for types of glaucoma with average cost per month. We include steroid induced glaucoma to JOAG and PCG to POAG.

#### 4.11. Ethical consideration

Ethical clearance was obtained from Institutional review board (IRB) of Jimma University. The research was done based on Helsinki declaration developed by world medical association. The hospital director and head of the Department of Ophthalmology was informed about the purpose of the study to get agreement and co-operation. Patients/parents or the guardians requested for written informed consent. Neither patient name nor MRN was used for data entry so that confidentiality was assured.

#### 4.12. Dissemination plan

- The result of study will be disseminated to: School of graduate's studies, Jimma University, Institute of health science, Jimma University, Jimma university medical center CEO, Department of Ophthalmology in Jimma University, Jimma zonal Health Bureau, Federal ministry of health, The summary report will be presented for the scientific communities
- We will publish on reputable journals

#### 4.13. Operational definition and definition of terms

Income:-the sum of all the wages, salaries, profits, interest payments, rents and other form of earnings received in a given period of time

The severity of glaucoma was staged using the Canadian Ophthalmological Society evidence-based clinical practice guidelines for the management of glaucoma in the adult eye(21).

- Early Glaucoma: Early glaucomatous disc features (e.g., VCDR 0.7) and (or) mild VF defect not within 10° of fixation (e.g., MD better than -6dB on HVF 24-2)
- Moderate Glaucoma: Moderate glaucomatous disc features (e.g., VCDR 0.75-0.85) and (or) moderate VF defect not within 10° of fixation (e.g., MD from -6 .to -12 dB on HVF 24-2)
- Advanced Glaucoma: Advanced glaucomatous disc features (e.g. VCDR >0.9) and (or) VF defect within 10° of fixation (e.g., MD worse than -12 dB on HVF 24-2)

## 5. Results

### Socio-demographic characteristics

In this study a total of 220 participants were interviewed. Of 220 these 150 (68.2%) were males and 70 (31.8%) were females. Around one third 68 (30.9%) of the participants were between age 61-70 years and the mean age of participants were  $57.13 \pm 14.077$  (range 7-86). More than third 80 (36.4%) of participant were farmer. Most 183 (83.2%) of the participants were married, and the rest 14(6.4%) of participant is divorced, 12(5.5%) of participant were widowed, 11 (5.0%) of participants were single. More than half 118 (53.6%) of the participants earns between 400-1000 Ethiopian birr per month. The average estimated participant reported income of participants ranges from zero (n=5, 2.3%) to 10000 ETB (n=2, 0.9%), with a mean of 1878.55 ETB. (See table 1)

Table 1. Socio- demographic characteristics of sampled glaucoma patients in Jimma university Department of ophthalmology of Ophthalmology, Jimma Ethiopia

Characteristics		Frequency [N (%)]
Gender	Male	150 (68.2)
	Female	70 (31.8)
Age(Years)	1-10	1 (0.5)
	11-20	6 (2.7)
	21-30	2 (0.9)
	31-40	14 (6.4)
	41-50	43 (19.5)
	51-60	61 (27.7)
	61-70	68 (30.9)
	71-80	22 (10.0)
	81-90	3 (1.4)
Literacy status	Illiterate	76 (34.5)
	Read and write	26 (11.8)
	Primary school	43 (19.5)
	Secondary school	21 (9.5)
	Preparatory	14 (6.4)
	Collage and above	40 (18.2)
Employment status	Farmer	80 (36.4)
	Merchant	19 (8.6)
	Civil servant	47 (21.4)
	House wife	29 (13.2)
	Private organization	26 (11.8)
	Retired	8 (3.6)
	Unemployed	11 (5.0)
Marital status	Married	183 (83.2)
	Divorced	14 (6.4)
	Widowed	12 (5.5)
	Single	11 (5.0)

Table 1. Socio- demographic characteristics of sampled glaucoma patients in Jimma university Department of ophthalmology of Ophthalmology, Jimma Ethiopia

Characteristics		Frequency [N (%)]
Residency	Rural	141 (64.1)
	Urban	79 (35.9)
Income level	<400 ETB	14 (6.4)
	400-1000 ETB	118 (53.6)
	>1000 ETB	83 (37.3)

### Disease characteristics

The most common type of glaucoma found in this study was POAG (90, (40.9%)), followed by PXG (72(32%)), PACG (25(11.4%)), NTG (20(9.1), JOAG11 (5.0%), 1 (0.5%) of participant have PCG and remaining steroid induced glaucoma were found in one patient for each (1(0.5%)). More than half 126 (57.3) of the participants had advanced glaucoma, while 54 (24.5) of had moderate glaucoma and remaining 40 (18.2) of had early glaucoma. (See Table 2) With regard to laterality 77 (35.0%) of one eye was affected and 143 (65.0) had bilateral involvement. There were total 43 patients with other ocular illness, from these 11(5.0%) of participants had ARIC, while 3(1.4%) of patient had Dry AMD, 2(0.9%) of patients had ARMC ,the remaining other ocular illness were BRVO ,Mild NPDR ,Moderate NPDR,RRD,VKC which account 1 (0.5%) patient for each.

Table 2.The distribution of study participants with regard to different types of glaucoma in Jimma university Department of ophthalmology, Jimma Ethiopia

Characteristics		Frequency [N (%)]
Type of glaucoma	POAG	90 (40.9)
	PXG	72(32)
	PACG	25(11.4)
	NTG	20(9.1)
	JOAG	11 (5)
	Steroid induced glaucoma	1(0.5)
	PCG	1(0.5)

Figure 1, Bar chart showing the distribution of study participant with regard to stage of glaucoma in Jimma university Department of ophthalmology, Jimma Ethiopia

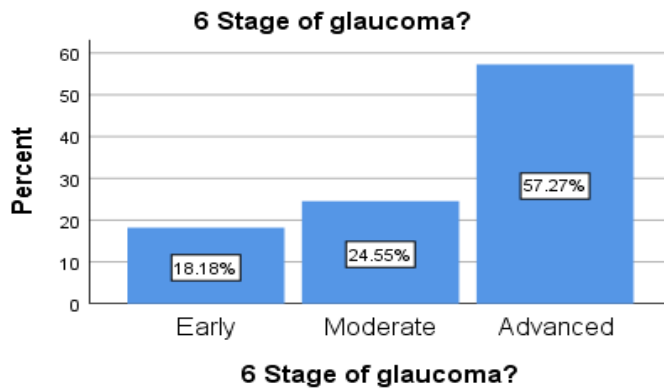


Table 3. The distribution of patients with patients who have other ocular illness in Jimma university Department of ophthalmology, Jimma Ethiopia

Characteristics		Frequency [N (%)]
Presence of other ocular illness	ARIC (OU)	11 (5.0)
	ARMC (OD)	2 (0.9)
	Dry AMD (OU)	3 (1.4)
	BRVO (OD)	1 (0.5)
	VKC (OU)	1 (0.5)
	Mild NPDR (OU)	1 (0.5)
	Moderate NPDR (OU)	1 (0.5)
	RRD (OD)	1 (0.5)

## Direct treatment costs

Majority 214 (97.3%) of the participants were on medical treatment with anti- glaucoma drugs at the time of interview and seventy (31.8%) underwent trabeculectomy surgery. Near half 105(47.7%) of the participants had been on the treatment for two to five years, while 53(24.1%) had been receiving for less than two years and the remaining 62(28.2%) were receiving for more than five years.

Of those participant who were on medical treatment more than one third 89 (40.5%) were on beta-blocker Timolol alone, 23(10.5%) were on latanoprost alone, 4(1.8%) were receiving Betaxolol alone and the remaining of were on different combination drugs. From these combination of drugs the most common ones were Latanoprost and Xolamol 50(22.7%) followed by Latanoprost and Timolol 28(12.7%), the remaining combination were, 5(2.3%) Latanoprost, Brimonidine and xolamol 1,3(1.4%) Latanoprost, Timolol and brimonidine, 3(1.4%) and 1(0.5) on xolatim and pilocarpine. From the reported experience of the respondent, one bottle of topical medications last for one month (n=179, 81.4%), for two week (n=19, 8.6%) to two month (n=16, 7.3%), on average one bottle last for 31 days.

The monthly cost of medications ranges between 170 ETB and 1900 ETB, with an average of 550.89 ETB. On the other hand hundred sixty three (74.1%) participants were finically responsible for their own treatment, while 45 (20.5%) reported that their family member paid for their treatment, for the remaining ten (4.5%) their treatment cost was covered by insurance, one (0.5%) participant reported that the treatment cost is being paid by NGO and another one (0.5%) participant reported that non –relative paid for his/her treatment. From 220 patient 132(60%) of participant had health insurance and the remaining 88(32%) had no health insurance. Seventy six participants (34.5%) reported that they had been offered surgery as alternative, and for 70 (31.8%) of them were trabeculectomy surgery was done. The cost of surgery was between 700 ETB and 4000 ETB, with an average 1535.3 ETB. Fifty nine (26.8%) subjects said that they had underwent central visual field test (HVFA) at some point in the past, which cost between 400 ETB - 800 ETB, with an average 477.60 ETB.

Table 4. The distribution of patients with persons responsible for payment in Jimma university Department of ophthalmology, Jimma Ethiopia

	Characteristics	Participants [N (%)]
Persons responsible for payment	Self	163 (74.1)
	Family members	45 (20.5)
	Non-governmental organization	1 (0.5)
	Insurance	10 (4.5)
	Non relative	1 (0.5)

Table 5. The distribution of patients with type of anti-glaucoma medications in Jimma university Department of ophthalmology, Jimma Ethiopia

Characteristics		Participants [N (%)]
Type of anti-glaucoma medications participants use	Betaxolol	4 (1.8)
	Latanoprost	23 (10.5)
	Timolol	89 (40.5)
	Latanoprost and Xolamol	50 (22.7)
	Latanoprost and Timolol	28(12.7)
	Xolamol	8 (3.6)
	Xolatim and pilocarpine	1 (0.5)
	Latanoprost,Brimonidine and xolamol	5 (2.3)
	Latanoprost,Timolo land brimonidine	3 (1.4)
	Timolol,latanoprost and pilocaripine	3 (1.4)

## Indirect treatment cost

Half patients visited the clinic regularly, every one month 112 (50.9%), while one third of patient visited every two month 78(35.5%), 27(12.3%) of them visited every three month, and 3(1.4%) of subjects visited every two weeks. Seventy (31.8%) subjects needs accompany to visit a hospital. The cost of transportation, food and bed for an accompanying person ranges from 10 ETB to 1500 ETB, with an average 275.10 ETB per visit. The cost of transportation food and bed for a patient ranges from 10 ETB and 2000 ETB, with average 303.30 ETB. The average time estimated number of hours lost while waiting for the doctor was 2.54 hours, range (1-8hours).The average estimated loss of hours during each visit is 12.11 hours, range (0-48 hours)

Table6.The distribution of patient with duration of follow-up in Jimma University Department of Ophthalmology, Jimma Ethiopia

Characteristics		Participants [N (%)]
How often do you visit the hospital for follow-up	Every two weeks	3 (1.4)
	Every one month	112 (50.9)
	Every two month	78 (35.5)
	Every three month	27 (12.3)

## Chronic concurrent illness

Among the participants of study,20(9.1%) patients were already on treatment of hypertension, 16(7.3%) were on treatment of diabetes mellitus, 1(0.5%) was on the treatment of both diabetes and hypertension, 2(1.4%) were on treatment of CHF, 2(1.4%) were on the treatment of Bronchial asthma, 1(0.5%) on the treatment of CKD, the other1 (0.5%) participant was on the treatment of toxic goiter.(see table 12).The cost of the medications for this chronic illness range from 150 ETB and 1000ETB, with average 268.60 ETB. Patients who had bronchial asthma 2(1.4%) they were receiving Timolol for the treatment of glaucoma and they were complain that this medication exacerbate their bronchial asthma.

Table 7. The distribution of patients with comorbid illness in Jimma university Department of ophthalmology, Jimma Ethiopia

Characteristics		Participants [N (%)]
Treatment for other medical condition	Hypertension	20(9.1)
	Diabetes Mellitus	16 (7.3)
	Both diabetes and Hypertension	1 (0.5)
	CHF	1 (0.5)
	Bronchial Asthma	3 (1.4)
	CKD	1 (0.5)
	Toxic Goiter	1 (0.5)



## Social –economic impact on participants

### Occupation and education

Among participants of the study, 36(16.4%) of participants were unable to farm because of their eye condition, 22(10.0%) of participants either changed or quitted their job, 7(3.2%) of participants were unable to cook because of their eye condition. Five (2.3%) of the participants reported an effect on education and all of them had quitted their education. (See table 13)

Table 8.The effect of glaucoma on occupation/education in patients attending glaucoma follow up clinic at Jimma university Department of ophthalmology, Jimma Ethiopia

<b>Effect on occupation/education</b>		<b>Frequency [N (%)]</b>
Work affected	Farming	36(16.4%)
	Cooking	7(3.2%)
	Change or quitted job	22(10.0%)
Education affected	Stopped education	5 (2.3%)

## Psychological

With regard to psychological effect more than two third 155 (70.5%) of participants were afraid of being blind. Nine (4.1%) of them were afraid of their family members being diagnosed with glaucoma. Three (1.4%) of them were having a fear unable to buy medications. Three (1.4%) of the participants were afraid loss of job due to their illness. Three (1.4%) of participant were having a fear of the availability of medication. (See table 9)

Table 9. The psychological effect of glaucoma in patients attending glaucoma follow-up clinic at Jimma university Department of ophthalmology, Jimma Ethiopia

<b>Psychological effect</b>	<b>Frequency [N (%)]</b>
Fear of blindness	155 (70.5)
Member of family diagnosed with the same illness	9 (4.1)
Unable to buy medications	3 (1.4)
Availability of medication	3 (1.4)
Loss of job	3 (1.4)

## Life style

In this study 67 (30.5%) of the participants reported having difficulties recognizing familiar faces. Eleven (5%) of them reported having difficulties of walking by themselves due to their eye conditions. Eleven (5%) of the participants reported they were not able to attend social events (marriage, funeral). Seven (3.2%) of the participants reported they were divorced due to their condition.

Table 10. The social effect of glaucoma in patient attending glaucoma follow-up clinic at Jimma university Department of ophthalmology, Jimma Ethiopia

Social effect	Yes [N (%)]
Identifying something from distant (people/cattle etc.)	67 (30.5)
Walking around unsupported	11 (5.0)
Attending social events (marriage, funeral)	11 (5.0)
Do you face a problem in your marriage because of your disease condition	7 (3.2)

The comparison between laterality and average cost of medication per month

The relation between a laterality and average cost of medication done by **T-Test** and it showed a patient who had bilateral glaucoma had high cost for medication when we compared with the patient had unilateral glaucoma (599.8 vs. 460.27)

Table 11. The relationship between laterality and average cost of medication in patients attending glaucoma follow up clinic at Jimma university Department of ophthalmology, Jimma Ethiopia

Which eye affected	Average cost per month
Unilateral	460.27
Bilateral	599.78
Total	550.89

95% CI interval for mean

### Paired Samples Correlations

	N	Correlation	Sig.
Pair 1 Laterality & average cost per month	214	.174	.011

The relationship of average cost of medication per month with type of glaucoma

The relation between the average costs of medication per month with type of glaucoma was done by one way **ANOVA** it shows the verge cost of glaucoma is affected by the type of glaucoma.

### ANOVA

The average cost per month

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1651371.540	4	412842.885	2.910	.023
Within Groups	29648611.637	209	141859.386		
Total	31299983.178	213			

(I) 5 which type of glaucoma do you have?	(J) 5 which type of glaucoma do you have?	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	
POAG	PXG	-93.788	60.170	1.000	-264.50	76.92
	PACG	-99.860	86.630	1.000	-345.64	145.92
	JOAG	-12.360	120.375	1.000	-353.88	329.16
	NTG	212.640	93.204	.235	-51.79	477.07
PXG	POAG	93.788	60.170	1.000	-76.92	264.50
	PACG	-6.071	89.092	1.000	-258.84	246.70
	JOAG	81.429	122.159	1.000	-265.15	428.01
	NTG	306.429*	95.496	.015	35.49	577.37
PACG	POAG	99.860	86.630	1.000	-145.92	345.64
	PXG	6.071	89.092	1.000	-246.70	258.84
	JOAG	87.500	137.139	1.000	-301.58	476.58
	NTG	312.500	114.034	.067	-11.03	636.03
JOAG	POAG	12.360	120.375	1.000	-329.16	353.88
	PXG	-81.429	122.159	1.000	-428.01	265.15
	PACG	-87.500	137.139	1.000	-476.58	301.58
	NTG	225.000	141.383	1.000	-176.13	626.13
NTG	POAG	-212.640	93.204	.235	-477.07	51.79
	PXG	-306.429*	95.496	.015	-577.37	-35.49
	PACG	-312.500	114.034	.067	-636.03	11.03
	JOAG	-225.000	141.383	1.000	-626.13	176.13

\*. The mean difference is significant at the 0.05 level.

Comparison of the direct cost of patients came from rural area and urban residents

Comparison of direct cost between a patients who come from rural and a patient who come urban was done by T-Test and it showed that a patients who come from rural have high direct cost compare with rural resident.(1019.3 vs. 531.8)

	Mean cost
Urban	531.8
Rural	1019.3

#### Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	.rural vs. urban & direct cost	220	.386	.001

Comparison of the patient who had trabeculectomy surgery with who had no history of trabeculectomy surgery with average cost of medication

The correlation between patients with trabeculectomy and patient without trabeculectomy Average cost of medication per month shows there mean cost reduction per month for patient with trabeculectomy.but the significance is done by **T-Test** shows that it is not statically significant (P=0.254)

#### Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Patient who undergone trabeculectomy vs undergo the average cost per month	214	.078	.254

	Means	N	St deviations
Yes	504.9	70	364.5
No	570.0	144	390.8
Total	550.3	214	383.3

Comparison of the patient who had trabeculectomy surgery with who had no history of trabeculectomy surgery with total cost.

The correlation between patients with trabeculectomy and patient without trabeculectomy With total cost

Total cost vs. have you under gone surgery	Mean	N	Std. Deviation
Yes	851.8	71	657.5
No	840.7	149	584.7
Total	844.3	220	607.6

Comparison between the stages of glaucoma with average cost of medication per month

The correlation between the average costs of medication per month with stage of glaucoma was done by one way **ANOVA** shows there is increase in mean cost of medication as the severity of glaucoma increase. But it is statically in significant (p=0.155)

	N	Mean
Early	40	454.75
Moderate	53	539.43
Advanced	121	587.69
Total	214	550.89

**ANOVA**

The average cost per month

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	548689.979	2	274344.990	1.882	.155
Within Groups	30751293.198	211	145740.726		
Total	31299983.178	213			

(I) 6 Stage of glaucoma?	(J) 6 Stage of glaucoma?	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Early	Moderate	-83.547	79.958	.892	-276.50	108.90
	Advanced	-133.686	69.627	.169	-301.71	35.63
Moderate	Early	83.547	79.958	.892	-109.41	278.26
	Advanced	-50.139	62.883	1.000	-201.89	103.99
Advanced	Early	133.686	69.627	.169	-34.34	301.51
	Moderate	50.139	62.883	1.000	-101.61	200.49

Comparison of the cost of drug with the number of medication used by the participants

The comparison between the costs of drug with the number of medication used by the participants done by ANOVA shows that as the cost of drug increase as the number of medications increase (p=0.001)

The mean cost

Number of medication	N	Mean cost
One medication	98	205.82
Two medication	51	640.39
Three medication	65	998.92
Total	214	550.28

### ANOVA

Number of medication

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	153.111	8	19.139	817.391	.001
Within Groups	4.800	205	.023		
Total	157.911	213			



Correlation test to assess the relationship of social impact versus the stage of glaucoma  
 Correlation was done by chi -square test between social impacts with the stage of glaucoma it shows there is no statically significant between social impact and stage of glaucoma it shows statistically in significance (  $\chi^2 = 0.555$ )

### Stage of glaucoma \* social impact

		Social impact		Total	
		yes	no		
Stage of glaucoma	Early	Count	18	22	40
		Expected Count	20.4	19.6	40.0
	Moderate	Count	26	28	54
		Expected Count	27.5	26.5	54.0
	Advanced	Count	68	58	126
		Expected Count	64.1	61.9	126.0
Total	Count	112	108	220	
	Expected Count	112.0	108.0	220.0	

### Chi-Square Tests

	Value	df	Asymptotic Significance (2- sided)
Pearson Chi-Square	1.195 <sup>a</sup>	2	.550
Likelihood Ratio	1.197	2	.550
Linear-by-Linear Association	1.163	1	.281
N of Valid Cases	220		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 19.64.

### Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.074	.550
	Cramer's V	.074	.550
N of Valid Cases		220	

Correlation between a patients who have comorbid illness with patient without comorbid illness

Correlation was done by T-test between patients who have comorbid illness with patient without comorbid illness it show there is no statically significance, mean cost per month (791.4vs 550.4) (p=0.289)

comorbid	Mean	N
Yes	791.4	43
No	550.4	177
Total	864	220

#### Paired Samples Correlations

	N	Correlation	Sig.
Pair 1 comorbid & cost	43	-.165	.289

Correlation was done with psychological impact with stage of glaucoma  
 Correlation was done by chi square test between psychological impact with the stage of glaucoma it shows there is no statically significant relationship between psychological impact and stage of glaucoma and it shows it is no statically significance ( $\chi^2=0.939$ )

#### Stage of glaucoma \* psychological impact

		psychological impact		Total	
		Yes	No		
Stage of glaucoma	Early	Count	33	7	40
		Expected Count	33.2	6.8	40.0
	Moderate	Count	45	8	53
		Expected Count	44.0	9.0	53.0
	Advanced	Count	104	22	126
		Expected Count	104.7	21.3	126.0
Total	Count	182	37	219	
	Expected Count	182.0	37.0	219.0	

### Chi-Square Tests

	Value	df	Asymptotic Significance (2- sided)
Pearson Chi-Square	.161 <sup>a</sup>	2	.922
Likelihood Ratio	.165	2	.921
Linear-by-Linear Association	.012	1	.913
N of Valid Cases	219		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.76.

### Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.027	.922
	Cramer's V	.027	.922
N of Valid Cases		219	

## 6. Discussion

To the best of our knowledge, this is the first study that evaluates the socio-economic impact of glaucoma among glaucoma patient in Jimma university department ophthalmology. Other studies evaluated glaucoma as a cause of blindness but the social and economic burden the condition leaves on patient was not studied. More than two third (68.2%) of the participants in this study were male and the remaining 32.8% of participant were female. The higher percentage of male participants in this study could be due to male autonomy to make health care decision than females. A study done by Mihretu et al which showed that 40.9% of participant women health care decision made by their husbands (22).

In our study over 70% of the participants were age above 50 years with primary open angle glaucoma. This correlates with the study done in Jimma by kumale et al who reported primary open angle glaucoma is most common form of glaucoma and its incidence increase with age(23). The study done by Solomon et.al in Nigeria showed that over 65% of glaucoma patient were above 50 years and the disease prevalence increases drastically with age(5).

According to our study patients spent around 29% of their reported income for medication only. More than 60% patients presented to us earned below 1000 ETB per month. Only 10 (4.5%) of patients had their medical costs reimbursed from health insurance. Buying anti-glaucoma drugs on a regular basis was a burden for them since it raised their monthly expenditure exorbitantly beyond their monthly income. This similar a research done in Nigeria by Solomon et al which revealed that the majority (70.67%) of the participants either earning a monthly reported income of less than GH¢ 400 or not earning a monthly income at all, approximately 11.60% - 38.00% or more of the monthly income of participants would be spent on just glaucoma medications(5).

In our study it showed that the direct cost expense in patients earned <400 ETB per month was 70.9 % of their reported monthly income. A research done by Gabriel lacanzo et al they showed that the low-income group average direct-cost expense of 61.5% of their monthly income and the cost of investigation and IOP measurement was free(13). There is around 9.4% difference in cost may be due to an additional cost of investigation.

Patients came from distant rural areas including transportation, lodging and for medication the cost rises to 43.3% of reported monthly income compared with urban patient which account only 28.3% of their reported monthly income (  $p=0.001$ ).this result comparable to a research conducted in an Indian population described the total cost of glaucoma treatment showed that the average cost of expense is around 41.9% of their reported monthly income in subjects coming from distant rural areas(11).A study done in Guragie zone by Alemayehu et al shows that the primary reason for failure to use eye care services in has been documented as indirect cost of travel and lodging reported by 40% of respondents associated with accessing appropriate services(24).

In our study most of patients (74.1%) are self-sponsored (they are responsible for their own treatment) and this result is comparable to study done in Benin by Assavado et al shows that 72.27% of patients responsible for their own treatment (15)

In our study 1.4% of our patients on timolol reported systemic side effects in the form of exacerbation of asthma from this 0.9 resulted in change in medication .this result is similar in research done by Nayak B et.al which showed that 2.7% of patients on timolol reported systemic side effects in the form of exacerbation of asthma.

In our study it shows that as severity the disease increase, the cost also increase for the treatment, for early stage of glaucoma the mean cost per month is 454.75 ETB, for moderate glaucoma 539.45 ETB and for advanced glaucoma 587.69 ETB .This is similar a research done by in several European countries with medical costs ranging from €37.9 per person per month for earlier stages to €80.6 for more advanced disease(7).In another study done in united stated that ranged from \$623 for suspected glaucoma to \$2511 for advanced cases(9).

In our study it showed that trabeculectomy surgery reduced the medical mean cost of anti-glaucoma medications compared with patients without trabeculectomy surgery ,for a patient with trabeculectomy the mean medication cost was 524.2 ETB and a patient without trabeculectomy the mean medication cost was 564.2 ETB ( $p=0.476$ ). This was comparable a research done in the Sweden by Calissendorff et al showed that surgical management of glaucoma over a 3-year period and found out there was no statistically significant difference between the costs of the two treatment options glaucoma surgery is not profitable within a 3-year postoperative period(26).

In our study the job of 29.6% of the participants was affected by their condition. From this 26.4% of patients they quitted or changed their job and the remaining 3.2% of patients unable to cook. A study done in Nigeria by Solomon et al it showed that 42.67% of the participants were affected by their eye condition and more than 55% of their patient either work in private organization or they are civil servant and this 13 % disparity may be due to 29 % of our patient is house wife(5).

In our study significant percentage of the participants were significantly affected by their eye condition. Over 83.2% of the participants were either afraid of getting blind, member of family of being diagnosed with the same illness, unable to buy medications and loss of job and this is similar to the study by Odberg et al showed that more than 80% of the participants reported negative emotions on learning that they had glaucoma, with one-third of them afraid of going blind(27). And another study done Solomon et al it showed that over 50% of the participants were either afraid of getting blind from the condition or were depressed as a result of the condition(5).A study was conducted on adults attending the Eye clinic of Jimma University Hospital by Aemero et al on Vision Loss and Psychological Distress showed that psychological distress was found in 49.8% of patients who had loss of vision at least in one eye(28).

## 7. Conclusion

According to our study patients spent around 29% of their income for medication only which was financial burden for patients.

Patients came from rural area had higher indirect cost compared with who are urban resident

The average cost of medication depend on severity of glaucoma, patients who had advanced glaucoma had higher cost compared with early and moderate glaucoma.

Patients who had bilateral glaucoma have higher average cost when compared with patients with unilateral disease.

Patient who had comorbid illness had higher direct cost patient with patient without comorbid illness.

Significant percentage of the participants also reported occupational, psychological and social influence of glaucoma on them.

## 8. Recommendations

The National Health Insurance should be restructured to cover more glaucoma medications and treatment to ease the financial burden on patients.

Consider trabeculectomy as first line of treatment for a patients who come from rural area and advanced glaucoma

All the stake holders must be involved to support the health system to the ease of this financial burden on the patients as well as on the government

Education and counselling of glaucoma patients is needed to increase the knowledge level of glaucoma patients about their conditions and to help them deal psychologically with their condition

Glaucoma support group may help support these patients' socio-economically as well as psychologically



## Strength

The first study that evaluates the socio-economic impact of glaucoma among glaucoma patient in Jimma university department ophthalmology

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## ANNEX

### Annex 1.2 patient information sheet

Name of investigator; tizazu yigzaw (MD)

Advisors; KumaleTolesa(MD , Ophthalmologist), Jemal Mohammed(Optometrlist ,MPH )

Name of the the study area Jimma University Department of Ophthalmology (JUDO) of Jimma university medical center (JUMC), Jimma, South West Ethiopia

Research budget covered by: Jimma University

Research objective to evaluate socioeconomic impact of glaucoma on patients at Jimma University Department of Ophthalmology of JUMC, Jimma, South West Ethiopia

Study procedure: Initially patients' charts will be reviewed for inclusion and exclusion criteria at the time of presentation. The data collectors will extract data from patient chart and interview patients /caregivers using questionnaires after obtaining consent from the patients or patients care giver

Risks: it is expected that the result of the study will not have any harmful effect on study of participant in any directions

Participant role; volunteerism and helping in providing information to the data collectors during the interview

Participant's right; taking part in this study is completely voluntary

Incentives the study participant will not be provided any incentives

Confidentiality any information of patients taken from patients or parents and medical records would be completely confidential and the data stored without their name and only used for the purpose of this study

Agreement patients care givers are expected to be fully voluntary to participate in the study

Contact if you have any kind of inconvenience about the study you can contact; Tizazu yigzaw (Principal investigator), Telephone 0913813031,tyigzaw34@gmail.com

## Annex 1.2; patient written informed consent form

Dear/sir/madam

My name is Tizazu yigzaw ,I am year four resident at jimma university .I am going to do a research on socioeconomic impact of glaucoma on patients at jimma university medical center, department of ophthalmology .therefore .for the success of this research your medical chart and your response to interview is paramount. Any information from you and medical record would be completely confidential to the research and the data are stored without your name and only used for the purpose of this study none of this would affect the care you receive from JUMC; rather it will contribute in managing your “ medical problem and also help in future planning for the hospital care. No identifying names or characteristics will go into my report, so you may share your thoughts openly. Additionally, taking part in this study is completely voluntarily. It is your choice whether to participate or not. You may skip any questions that you do not want to answer. Please ask me to stop as we go through the information and I will take time to explain. I would be grateful if you could sign the attached form to say you have no objections to our accessing any records and interviewing about you. Would you be willing to assist me by having a 5-10 minutes“ interview with me? Interview accepted; Yes..... No..... If the interviewee responds “Yes” please proceed and let him/her to sign or if replies “No” gratitude him/her and quit the interview

## Annex 1.3 data collection tool

### Topic

Table 7.1 data collection format for research paper titled ' socioeconomic impact of glaucoma on patients 'at JUDO jimma university medical center, jimma south west Ethiopia

#### A. sociodemographic characteristics

1. Card number: \_\_\_\_\_code\_
2. Age (years): \_\_\_\_\_
3. Sex: \_\_\_\_\_
4. Religion: Muslim  Orthodox  Protestant  Catholic  others (specify) \_\_\_\_\_
5. Occupation: Farmer  Merchant  civil servant  House wife   
Private Organization others (specify) \_\_\_\_\_
6. Literacy status: Illiterate  read and write  primary school  secondary school   
 preparatory  collage and above
7. Marital status: Single  Married  Divorced  Widowed
8. Family size: \_\_\_\_\_

#### B socioeconomic status

1. Income source: salary..... Farming land ..... organization ..... Self employed  
Other (specify)
3. Income (monthly),A.<400\_\_\_\_\_
- B.401-1000
- C.>1000\_\_\_\_\_

#### 3. Financial status

- A. Stable employment and not financially dependent on others
- B. Without employment and not financially dependent on others
- C. Without stable employment and financially dependent on others

D. Some employment but financially dependent on others

4. Who is paying for your eye care service?

A. Self..... B. Family members..... C. government..... D. non-Government organization..... E. Insurance..... F. Nonrelative-----others (specify) \_\_\_\_\_

4.1 Did you have health insurance    yes-----        No-----

4. Which type of glaucoma do you have? \_\_\_\_\_

5. Stage of glaucoma

A. Early

B. Moderate

C. Advanced

6. Which eye is affected

A. one    B. Both

9. Do you have other ocular illness?

10. How long have you been on glaucoma treatment?

A. Less than two year

B. 2-5 years

C. >5 years

11. How many medication u are using?

12. Which drugs do you use? Eye drops

(A) ---- (B) ---- (C) ---- (D) -----

13. How long does one bottle last?

A. 2 weeks ..... B one month    C 2 months..... D don't know

13.1. What is the average cost per month?

14. How often do you visit the hospital for follow-up?

A. Every week    B every 2 weeks..... C every month..... D every 2 months .....  
E 3 month..... F any time

15. Do you need to come with an escort?

A. yes    B. No

15.1 If yes what is the cost for transportation, food and bed for an escort

16. Estimate the cost of transportation per visit (if the patient come from outside jimma including cost for bed and food)

17. Estimate how much you lose in terms of man hours during each hospital visit

18. How long do you need to wait before you can see the doctor?

A one hour B 2 hours .....C... 2 to 4 hours

D more than 4 hours

19. Are you on treatment for any other medical condition?

A Diabetes B Hypertension C .both D. Other (specify)

20. Have you been offered surgery?

A yes B no

21. Have you ever had visual field exam before?

A Yes B No C Don't know

21.1. If yes, how much?

22. Have you undergone any glaucoma surgery?

A. Yes..... B. No..... C Don't know

18.1. If yes, how much was the total cost of surgery

C. impact

1. What activities did the visual problem prevent you from doing?

A. Farming No   yes   (for how long?) \_\_\_\_\_

B. Identifying something from distant (people/cattle etc.) No  yes  (for how Long?) \_\_\_\_\_

C. Walking around unsupported No   Yes   (for how long?) \_\_\_\_\_

D. Cooking No   yes  (for how long?) \_\_\_\_\_

E. Attending social events (marriage, funeral) No  Yes  (for how long?) \_\_\_\_\_

F. Changing job or stopped \_\_\_\_\_

G. Do you face a problem in your marriage because of your disease condition?

2. Other medical condition exacerbate due to the glaucoma medications No  Yes

2.1 If yes this exacerbation may result in change in medication No  Yes

3. Are you responsible for the decision to seek medical care and not dependent on other Household members for permission?  Yes   No (if No, who makes the decision?)

---



4. If patient age less than 18

3.1 .do you face a problem because of glaucoma

A. unable to attend in school yes  No

B. Unable to play with your friend yes  No

5. Do you have any fear associated with your illness? No  Yes

If yes, explain \_\_\_\_\_

1.2. በጽሑፍ የሰፈረ የታካሚው ስምምነት ቅጽ

ትዛዙ ይግዛው እባላለሁ አሁን በጅግ ዩኒቨርሲቲ አራት አመት የአይን ህክምና ተማሪ ስሆን . ግላኮማ በጂማ ዩኒቨርሲቲ የህክምና ማዕከል በሽተኞች ላይ ያለውን የ ማህበራዊ ና ኢኮኖሚያዊ ተፅዕኖ ምርምር ልሠራ ነው ለዚህ ምርምር ስኬት የእርስዎ የህክምና ሰንጠረዥ እና ቃለ መጠይቅ ምላሽ አስፈላጊ ነው ከእርስዎ እና የህክምና መዝገብ ማንኛውም መረጃ ለምርምሩ ሙሉ በሙሉ ምስጢር ይሆናል እና መረጃዎቹ ያለ ስምዎ ይከማቻሉ እና ለዚህ ጥናት ዓላማ ብቻ ጥቅም ላይ ይውላሉ. ከእነዚህ መካከል አንዳቸውም ቢሆኑ ከጅግ ዩኒቨርሲቲ ሜዲካል ሴንተር በሚሰጣችሁ እንክብካቤ ላይ ተጽዕኖ አያሳድሩም ይልቁንም የህክምና ችግርዎን ለመቅረፍ እና ወደፊት ለሆስፒታሉ ህክምና እቅድ ለማቀድ ይረዳል . ምንም መለያ ስሞች ወይም ባህሪዎች ወደ ሪፖርቱ አይገቡም, ስለዚህ እርስዎ ሀሳብዎን በግልጽ ሊያጋሩ ይችላሉ በተጨማሪም በዚህ ጥናት ለመሳተፍ ሙሉ በሙሉ በርስዎ ፍቃደኝነት ላይ የተመሰረተ ነው ተሳትፎ ማድረግም ሆነ አለመሳተፍ የእርስዎ ምርጫ ነው መልስ መስጠት የማትፈልጉትን ማንኛውንም ጥያቄ ልትተውት ትችላላችሁ . እባክዎን መረጃውን ስናልፍ ቆም እንድል ጠይቁኝ እና እኔም ጊዜ ወስጄ እገልጻለሁ ማንኛውንም መዝገብ ማግኘት እና ስለ እርስዎ ቃለ ምልልስ ማድረግ ምንም ተቃውሞ የለዎትም ለማለት የተያያዘውን ቅጽ ብትፈርሙ አመስጋኝ ነኝ ከ5-10 ደቂቃ ቃለ መጠይቅ በማድረግ እኔን ለመርዳት ፈቃደኛ ትሆናለህ?

1.3 መረጃ የመሰብሰቢያ ቅጽ

ርእስ

ግላኮማ በሽተኞች ላይ የሚያሳድረው ማህበራዊ ና ኢኮኖሚያዊ ተፅዕኖ የተሰኘ የምርምር ጽሑፍ መረጃ የማሰባሰብያ ፎርማት ጅምር ዩኒቨርሲቲ የህክምና ማዕከል፣ ጅምር ደቡብ ምዕራብ ኢትዮጵያ

1 የካርድ ቁጥር:- -----

2 እድሜ-----

3 ጾታ.....

4 ሃይማኖት.....አርቶዶክስ  እስልምና  ፕሮቴስታንት  ካቶሊክ  (ሌላ ከሆነግለጽ)

5 ሥራ-----

A.ግብርና

B.ንግድ

C.የመንግሥት ሠራተኛ

D.የቤት እመቤት

E.የግል ድርጅት (ሌሎች.ግለጽ) -----

6 የትምህርት ደረጃ-----

A.ማንበብ ና መፍ የማይችል-----

B.ማንበብ ና መፍ የሚችል-----

C.አንድ ደረጃ የተማረ-----

D.ሁለት ደረጃ የተማረ-----

E.ከፍተ መሰናዶ የተማረ-----

F.ኮሌጅ ና ከዚያ በላይ-----

7 የትዳር ሁኔታ -----

A.ያላገባ-----

B.ያገባ-----

C.የተፋታ-----

D.የፈታች-----

8 የቤተሰብ ብዛት-----

9.የትኛው አይነት ግላኮማ (ከካርድ የሚወሰድ)

10. የግላኮማው ደረጃ (ከካርድ የሚወሰድ)

11. የትኛው አይነት ነው የታመመው

- A. አንድ B. ሁለት

B. ማህበራዊ ና ኢኮኖሚያዊ ሁኔታ

A. የገቢ ምንጭ-----

B. ደሞዝ-----

C. የእርሻመሬት-----

D. ድርጅት-----

E. የግል ድርጅት-----

a. ገቢ በ ወር፣ <400-----

b. 401-1000-----

c. >1000-----

2. የገቢ ሁኔታ

A. ቋሚ ሥራ እና በሌሎች ላይ የገንዘብ ጥገኛ ያልሆነ

B. ሥራ የሌለው እና በሌሎች ላይ የገንዘብ ጥገኛ ያልሆነ

C. ቋሚ ስራ የሌለው እና በሌሎች ላይ የገንዘብ ጥገኛ የሆነ

D. ስራ ያለው ግን በሌሎች ላይ የገንዘብ ጥገኛ የሆነ

3. ለዓይን ህክምና አገልግሎት ማን ነው የሚከፍልልህ?

A. እራሴ

B. ቤተሰብ

C. ሌላ ሰው ቤተሰብ ያልሆነ

D. መንግስት

E. ግብረሰናይ ድርጅት

F. የጤና መድሀን

4. ለምን ያህል ጊዜ የግላኮማ ህክምና ላይ ቆይተሃል?

A. ለአንድ አመት እና ከዚያ በታች

B. 1-2 አመት

C. 2-5 አመት

D. ከ 5 አመት በላይ

5. የትኞቹን መድኃኒቶች ትጠቀማለህ? እሚዋጥ ወይስ ጠብታ

A \_\_\_\_\_

B \_\_\_\_\_

C \_\_\_\_\_

D\_\_\_\_\_

6.አንድ ጠርፎስ ለምን ያህል ጊዜ ይቆያል?

- A. ለ ሁለት ሳምንት
- B. ለ አንድ ወር
- C. ለ ሁለት ወር
- D. አላውቅም

7. በየወሩ በአማካይ የሚወጣው ወጪ ምን ያህል ነው?

8. ለመከታተል ወደ ሆስፒታል የምትሄደው ምን ያህል ጊዜ ነው?

- A. በየሳምንቱ
- B. በ የሁለት ሳምንቱ
- C. በየወሩ
- D. በየሁለት ወሩ
- E. በየሶስት ወሩ
- F. በማንኛውም ጊዜ

9. አስታማሚ ይዘቶች መምጣት ያስፈልጋችኋል?

- A. ያስፈልግኛል
- B. አያስፈልግኝም

10. በእያንዳንዱ ክትትል የመጓጓዣ ዋጋ ምን ያህል ብር ይሆናል?

11. ሐኪም ለማግኘት ምን ያህል ጊዜ መጠበቅ ያስፈልግሃል?

- A. አንድ ቀን
- B. ሁለት ቀን
- C. ሶስት ቀን
- D. አራት ቀን

12. ሌላ የአይን ህመም አለብዎት?

ካለብዎት ፣ ምን አይነት መድሃኒት ይወስዳሉ

13. ሌላ ተጨማሪ በሽታ አለብዎት?

- A. ግፊት
- B. ስኳር
- C. ሌላ

14. የግላኮማ ኦፕሬሽን እንዲሰራዎት ተጠይቀዋል?

- A. ተጠይቄአለሁ
- B. አልተጠየቅሁም

15. የእይታ አድማስ ተሰርቶለዎታል? A ተሰርቶልኛል B. አልተሰራልኝም

15.1 ከተሰራልዎት ምን ያህል አወጡ ?

16. የግላኮማ ኦፕሬሽን ተሰርቶዎላችኋል ያውቃል?

- A. ተሰርቶልኛል
- B. አልተሰራልኝም

16.1 ከ ተሰራልዎት ምን ያህል ገንዘብ አወጡ?

c. የግላኮማ ተፅዕኖ

1. በግላኮማ የመጣው የማየት ችግር ምን ነገሮችን እንዳታደርግ እንቅፋት ሆኖብሃል?

A. እርሻ ማረስ ተቸግረሃል? የለም · አዎ · (መልሱ አወን ከሆነ ለምን ያህል ጊዜ)

B. ከፍቅ ነገሮችን መለየት አስቸግሮሃል/አስቸግሮሻል (ለምሳሌ ሰዎችን/ከብት ወዘተ.) የለም . አዎ . ( መልሱ አወን ከሆነ ለምን ያህል ጊዜ)

C. ያለ ምንም ድጋፍ መንቀሳቀስ ይችላሉ? የለም . አዎ . ( መልሱ አወን ከሆነ ለምን ያህል ጊዜ)

D. ምግብ ማዘጋጀት? የለም . አዎ . ( መልሱ አወን ከሆነ ለምን ያህል ጊዜ)

E. በማህበራዊ ዝግጅቶች ላይ መገኘት (ለምሳሌ ሰርግ/ለቅሶ) የለም . አዎ . (መልሱ አወን ከሆነ ለምን ያህል ጊዜ)

F. ሥራ መቀየር ወይም ማቆም? የለም . አዎ . (መልሱ አወን ከሆነ ለምን ያህል ጊዜ)

G. በግለሰብ መካከል የእይታ ችግር ምክንያት በትዳራችሁ ችግር ገጥሟችኋል? (ለምሳሌ መጋጨት/መፋታት/ የለም . አዎ .

2. የህክምና እርዳታ ለማግኘት የመወሰን ኃላፊነት አለህ ወይስ በሌሎች ላይ ጥገገኛ ነህ?

A. እኔ እወስናለሁ B. ሌላ ሰው ይወስንልኛል (ሌላ ሰው የሚወስንልህ ከሆነ የሚወስንልህ ማንው?)

3. በግለሰብ መካከል መድሃኒት ሚክንያት የተበባሰብህ በሽታ አለ? የለም . አዎ .

3.1 ካለ በዚህ ሚክንያት መድሃኒት እንድትቅደር አርጎሃል ? የለም . አዎ .

4. በሽተኛው ዕድሜው ከ18 ዓመት በታች ከሆነ

4.1 በግለሰብ መካከል የእይታ ችግር ምክንያት ችግር አጋጥሞህ ይሆን ? ለምሳሌ

A. ትምህርት ቤት መማር አለመቻል? የለም . አዎ .

B. ከጓደኞቻችህ ጋር መጫወት አለመቻል? የለም . አዎ .

5. ከሕመምህ ጋር ተያይዞ ምን ፍራቻ አለህ ? የለም . አዎ .

4.1 ካለህ እስኪ አብራራልን

Annex 1.4  
Afan Oromo

**Mata duree**

Foormii sassaabbii odeefannoo kan giddu gala fayyaa Jimmaatti mata duree “socioeconomic impact of glaucoma on patients” jedhu irratti taasifamu

1. lakk kaardii: \_\_\_\_\_
2. umrii: \_\_\_\_\_
3. saala: \_\_\_\_\_
4. amantaa: Muslima  Ortodoksii  Proteestaantii  kaatoolikii  kan broo(ibsi) \_\_\_\_\_
5. gahee hojii : qotee bulaa  daldalaa  hojjataa mootummaa  Haadha manaa   
Dhaabbata dhuunfaa  kan broo(ibsi) \_\_\_\_\_
6. sadarkaa barnootaa: kan dubbisuuf barreessui hin dandeenye  kan dubbisuuf barreessuu danda’u  sadarkaa jalqabaa  sadarkaa lammaffaa  qophaa’ina  kolleejii fi sanaa ol
7. gaa’ila: kan hin fuune/hin heerumne  kan gaa’ila horate  kan hiike  kan hiikamte
8. baayyina maatii: \_\_\_\_\_

**B socioeconomic status**

1. madda galii : mindaa..... lafa qonnaa..... dhaabbata ..... qacaramaa dhuunfaa kan biro(ibsi)
  1. galii (kan ji’aa),
    - <400
    - 401-1000
    - >1000 \_\_\_\_\_
  3. haala galii fi qabeenyaa
    - a. qacaramaa of dandahaa fi gargaarsa nama biro hin eegne

- B. qacaramaa miti garuu galiin of dandahaa kan tahe
- c. qacaramaa dhaabbataa miti garuu gargaarsa hin barbaadu
- d. qacaramaa dha garuu gargaarsa barbaada

4. yaala ijaa argattuuf eenyutu siif kafal?

Ofii koo .....maatii..... mootummaa.....qaama miti mootummaa.....  
Inshuraansii.....nama fira hin taane -----kan biroo(ibsi) \_\_\_\_\_

5. Which type of glaucoma do you have?

7. Stage of glaucoma

A.Early

B.Moderate

C.Advanced

8. Ija tokko moo lammanuu?

A.one B. Both

9. Dhukkuba ijaa biraa qabdaa?

- o Eeyye
- o Hin qabu

10. yaalaa fi hordoffii gilaakooma erga eegaltee hammam taha?? \_\_\_\_\_

A. woggaa tokkoo gadi

B .woggaa 1-5

D. woggaa 5 OL

11. qoricha gosa meeqa fayyadamta?

12. qoricha gosa kam fayyadamta? Xabbitaa ykn kan cophu/ kan liqimfamu

(A) ---- (B) ---- (C) ---- (D) -----

13. xabbitaan qodaa tokkoo hammam siif tura?

A.torbee l;ama .....B ji'a tokko C ji'a lama..... D hin yaadadhu

13.1. ji'atti giddu galeessaanm mallaqa meeqa baasta?\_\_\_\_\_

14. hordoffii kee haammam turaa deddeebita?

A. torbee torbeen B turban lamaan..... C ji'a ji'aan..... D ji'a lamaan ..... E ji'a sadiin..... F akkuma natti toletti

15. dhufuuf geejjina si barbaachisaa?

A. eeyye B. lakki

15.1 eeyye yoo tahe gejjibaaf, nyaataaf akkasumas bultiif hammam si barbaachisa

16. Magaala jimmaatii alaa dhufama yoo ta'e giddu galeessan baasii hammam barbaachisa

17. tilmaamaan sababa hordoffiif sa'aatii meeqatu si jalaa gubata?

18. Haakima argachuuf hammam eegda?

A sa'aatii tokko B sa'aatyii lama .....C sa'aatii lamaa-afurii

D sa'aatii afurii ol .....E turee hin beeku

19. dhibee biraa kan yaala fudhattu jiraa?

A sukkaara B dhiibbaa dhiigaa C kan biroo\_\_\_\_\_

20. yaalli baqaqsanii yaaluu siif taasifamee beekaa?

A eeyye B lakki

21. kana dura qorannoon ijaa siif godhamee beekaa?

A eeyye B lakki C hin yaadadhu

21.1. eeyye yoo tahe , yeroo meeqa\_\_\_\_\_

22. gil;aakoomaaf yaaliin baqaqsanii yaaluu siif godhamee beekaa?

C. eeyye..... B. lakki..... C hin yaadadhu

18.1. eeyye yoo tahe tajaajila kanaaf mallaqa meeqa baastan?\_\_\_\_\_

### C. impact

1. rakkoon ija keetii maal hojjachuu irratti si rakkisa?

A. qonna lakki \_\_\_\_\_   eeyye   (yeroo hammam) \_\_\_\_\_

B. wantoota fageenya irraa hubachuu lakki  eeyye  (yeroo hammam?)

\_\_\_\_\_

C. gargaarsa malee adeemuu lakki   eeyye   (yeroo hammam?) \_\_\_\_\_

D. nyaata bilcheessuu lakki   eeyye  (yeroo hammam?)

\_\_\_\_\_



E. taateewwan hawaasummaa (cidha, booya) lakki  eeyye  (yeroo hammam?) \_\_\_\_\_

F. hojii jijjiiruu yookiin dhaabuu \_\_\_\_\_

G. rakkoon dhibee kanaa gaa'ila kee irratti dhiibbaa geese ni qabaa?

2. qoricha gilaakooma kanaan dhibeen biro kan sitti hammaatui ni jiraa lakki  eeyye \_\_\_\_\_

2.1 eeyye yoo tahe sababa sanaaf qorich geeddartee beektaa lakki  eeyye

3. yaalaa fi hordoffii dhibee keetii murteessuuf gahee yookiin angoo qabdaa

eeyye  lakki (lakki yoo ta'e eenyutu murteessa?)

4. dhukkubsataan waggaa 18 gadi yoo tahe

3.1 .sababa dhibee kanaaf rakkoon sirra ni gahaa?

A. mana barumsaa irraa hafuu eeyye  lakki

B. hiriyyoota wajjiin taphachuu dhiisuu eeyye

akki

5. dhibee keetiin walqabatee soda ni qabdaa? Lakki  eeyye

Eeyye yoo tahe ibsi, \_\_\_\_\_