



Awareness of Glaucoma and Associated Factors Among Adults in Gish Abay Town, Northwest Ethiopia

This article was published in the following Dove Press journal:
Clinical Optometry

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Purpose: The purpose of this study was to determine the awareness of glaucoma and associated factors among adults living in Gish Abay town, Northwest Ethiopia.

Methods: A population-based cross-sectional study was conducted on 594 adults who were selected using systematic random sampling from April to May 2018. Data were entered into Epi Info version 7 and were analyzed by SPSS version 23. Binary and multivariable logistic regression was used to determine factors associated with awareness. Variables with *P*-value < 0.05 were considered statistically significant.

Results: The proportion of awareness of glaucoma was 24.4% [95% CI; 21.0, 28.1]. It was positively associated with educational status, primary education [AOR: 3.15; 1.72, 5.77], secondary education [AOR; 3.11: 1.66, 5.84], college and above [AOR; 6.10; 2.80, 13.27], history of eye examination [AOR: 6.52; 3.46, 12.25], income level >2000 Ethiopian birr [4.65; 2.59, 8.37] and history of chronic diseases [AOR; 2.93: 1.25, 6.85].

Conclusion: The status of glaucoma awareness in Gish Abay town can be said to be low as compared to studies. Higher educational status, eye examination, history of chronic diseases and better income level were significantly associated with awareness of glaucoma.

Keywords: awareness, glaucoma, Gish Abay, Ethiopia

Introduction

Glaucoma is a group of diseases characterized by progressive optic neuropathy which may be asymptomatic in the majority or may result in symptoms like diminished vision and loss in the visual field.¹

Globally, 15% of blindness is due to glaucoma and about 600,000 people go blind annually.² Africa accounts for 15% of the world's blindness burden due to glaucoma.³ It is the fifth common cause of blindness in Ethiopia which results in irreversible sight loss for 62,000 adults.^{4,5}

Glaucoma is the leading cause of irreversible blindness in the world. Yet, because glaucoma is a slowly progressive disease, often with few noticeable symptoms, about half of affected individuals are unaware of the disease.⁶ As such, they do not seek adequate care. It had been estimated that half of glaucoma patients were already blind in at least one eye upon their presentation at health institutions in Africa.⁷ The situation is worse in sub-Saharan Africa, where it is further compounded by poor awareness in the region.⁸ Many people assume that the presence of glaucoma would be heralded by symptoms and therefore they underestimate the serious nature of this insidious disease.⁹

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Glaucoma represents a major public health challenge in the aging population as it is the second largest cause of preventable blindness in the world.¹⁰ The increasing prevalence of glaucoma is expected to cause a significant economic burden and poor quality of life.

Glaucoma is believed to negatively influence the quality-of-life of affected individuals. Patients with glaucoma who live in a developing country have less functional status than non-glaucomatous patients. The constant fear of going blind and the need for continuous therapy can physically and emotionally interfere with one's life,¹¹ and the impact of sight loss has negative implications not only for the person affected but also for society as a whole.¹²

Prompt diagnosis before significant visual loss requires the presence of a high level of public awareness about glaucoma and a culture of routine eye examination to increase early case detection.¹³ These are both absent in Ethiopia.

Improved awareness and better perception can positively influence the accuracy of eye health education and are key to the development of a positive outlook. A positive outlook can motivate patients to ensure that family members undergo glaucoma screening regularly, thereby enhancing prompt diagnosis and reducing the risk of blindness from glaucoma. It can also improve adherence and persistence to treatment and follow-up in patients.¹³

Creating public awareness of glaucoma and its risk factors is essential to increase participation in screening programs and possible treatment,¹⁴ thereby reducing its devastating consequences. Contrary to this, lack of awareness appeared to influence self-care practices negatively.¹⁵

Increased awareness can change the social perceptions of ocular health and influence people to participate in regular ophthalmic screening.¹ Published evidence indicates that the late diagnosis of glaucoma is an important risk factor for subsequent blindness and is associated with poor knowledge about the condition.¹⁰ Assessment of awareness is thus the first step in planning disease management.¹⁶ Therefore, the purpose of this study was to determine the proportion of awareness of glaucoma and its associated factors in the study area.

Methods

Study Setting and Population

A population-based cross-sectional study was conducted in Gish Abay town on 602 adults from April to May 2018. Gish Abay town, which is located 463 km from Addis

Ababa, is the capital of Gish Abay in West Gojjam administrative zone. All adults ≥ 18 years were included in the study.

Sample Size Determination

The entire sample size for awareness of glaucoma by taking a proportion of awareness of glaucoma $p=35$.¹⁷ was 602, which was determined using the single population proportion formula with the assumption of a 95% confidence interval ($Z\alpha/2=1.96$), 4% margin of error (w) and 10% non-response rate ([Appendix 1](#)).

Sampling Procedure

A systematic random sampling technique was used to select households using the sampling fraction. The sampling fraction was determined by taking the ratio of households (8883) to the sample size, i.e. 14. Finally, one eligible adult was selected from each household using a simple random sampling/lottery method if more than one adult was living in the house.

Data Collection Tool and Procedure

A structured questionnaire adapted from previously published studies^{1,10,16–20} was utilized. It was initially prepared in English, translated into Amharic (local language) and re-translated into English to check consistency in the meaning of words and concepts. The questionnaire included background information, clinical characteristics and questions to measure awareness of glaucoma ([Appendix 1](#)). The data were collected through face-to-face interviews by five trained BSc optometrists.

Operational Definition

Awareness was measured when a participant responded “yes” to the question “have you ever heard of glaucoma” and chose at least one answer among the alternatives which explains the condition as “glaucoma is high eye pressure”, “glaucoma is high eye pressure causing blindness”, “glaucoma causes damage to the eye nerve”, “blinding eye disease causing eye nerve damage, eye disease causing visual field loss”¹⁸ or similar answers when asked. In this study, hearing of glaucoma alone was not considered as awareness because merely being aware of the term did not ensure awareness about the disease. A previous study on a similar topic in Ethiopia¹⁸ and the pre-test procedure of this study indicated that participants who said “Yes” for the question “have you ever heard of glaucoma?” actually meant

“trachoma”, probably because they have the same suffixes “-oma”.

Data Management and Analysis

After checking for clarity and completeness, data were entered into Epi Info 7 and exported into statistical package for social science/SPSS version 23 for analysis. Both descriptive and analytical methods were employed for analysis. The descriptive parts of the data were summarized using measures of central tendency and dispersion.

A binary logistic regression model was used to identify factors which were associated with glaucoma awareness. Variables were fitted into the model using the enter method. Hosmer and Lemeshow model fitness was checked. Multi-collinearity between the independent variables was also checked by tolerance and variance inflation factor (VIF). The adjusted odds ratio with 95% confidence interval was used to identify the significant factors. Variables with *p*-value less than 0.05 were considered statistically significant.

Results

A total of 594 adults participated with a response rate of 98.7%. The median (IQR) age was 28 (22–45) years. About 308 (51.9%) of the respondents were females. A majority 359 (60.4%) of the participants had no formal education (Table 1).

About 43 (7.2%) adults had chronic diseases, either diabetes mellitus or hypertension or both, and around 74 (12.5%) adults had history of eye examination at least once in their life. Twenty-four (4%) adults had positive family history of glaucoma and about 10 (1.7%) of the participants had positive history of glaucoma.

One hundred and ninety-two (32.3%) of the participants had heard of glaucoma. However, only 145 (24.4%) [95% CI: 21.0, 28.1] of them were aware of glaucoma.

In the multivariable analysis after adjusting for age, sex and ethnicity: history of eye examination, educational status, level of income and positive history of chronic diseases, either diabetes mellitus or hypertension or both, were significantly associated with awareness of glaucoma.

The odds of being aware of glaucoma among adults with primary education [AOR: 3.15; 95% CI: 1.72, 5.77] and secondary education [AOR; 3.11, 95% CI: 1.66, 5.84] were three times greater than among those without formal education. Similarly, the odds of being aware of glaucoma among adults who had college and above education were

Table 1 Socio-Demographic and Socio-Economic Characteristics of the Study Participants in Gish Abay Town, Northwest Ethiopia, June 2018 (n=594)

Characteristics	Frequency	Percentage
Sex		
Female	308	51.9
Male	286	48.1
Age (years)		
18–22	169	28.5
23–27	144	24.2
28–45	140	23.6
≥46	141	23.7
Religion		
Orthodox	586	98.7
Others*	8	1.3
Ethnicity		
Amhara	584	98.3
Oromo	10	1.7
Level of Education		
No formal education	359	60.4
Primary education	101	17.0
Secondary education	90	15.2
College and above	44	7.4
Marital Status		
Single	275	46.3
Married	288	48.5
Divorced	14	2.4
Widowed	17	2.9
Type of Occupation		
Farmer	156	26.3
Government employee	48	8.1
Merchant	185	31.1
Housewife	72	12.1
Job seeker	64	10.8
Others**	69	11.6
Monthly Income (ETB)		
≤750	298	50.2
751–1300	115	19.4
1301–2000	62	10.4
≥2001	119	20

Notes: Others*=Muslim and Catholic. Others**=students, driver and religious leader.

about six [AOR; 6.10, 95% CI: 2.80, 13.27] times greater than their counterparts.

The odds of glaucoma awareness among adults with history of eye examination were 6.5 [AOR: 6.52, 95% CI: 3.46, 12.25] times greater than their counterparts.

The odds of being aware of glaucoma among adults with positive history of chronic diseases, either diabetes

mellitus or hypertension or both, were nearly three [AOR; 2.93, 95% CI: 1.25, 6.85] times greater as compared to their counterparts.

Furthermore, the odds of being aware of glaucoma among adults with higher income level (≥ 2001 ETB) were 4.6 [AOR; 4.65, 95% CI: 2.59, 8.37] times greater than those adults with lower income levels (Table 2).

Discussion

The proportion of awareness of glaucoma was 24.4% (95% CI: 21.0, 28.1). This finding is lower than the reports from Gondar, Northwest Ethiopia (35.1%)¹⁷ and Addis Ababa (28.4%), Central Ethiopia.²⁰ This might be due to the differences in educational status between the study participants. The study in Gondar showed that only 32.7% of

adults had no formal education whereas in this study more than half (60.2%) of adults had no formal education. From previous studies, educational status is the significant predictor for awareness of glaucoma.^{7,10,14,17,20,21}

This finding is also lower than the reports from Ghana (39.3%),²² Nepal (60.6%),¹⁴ Puducherry, India (45%),¹ Tehran, Iran (46.6%),²³ Birmingham, UK (67%)²⁴ and Philadelphia, USA (73%).⁷ This might be due to differences in socio-demographic and socio-economic status, and participants from developed countries (UK, USA) will access or utilize eye care services easily and will be occupied by health insurance.¹⁵ The other possible explanation for this discrepancy might be that the way we measure awareness is quite different. For the above studies a participant was said to be aware of glaucoma if the

Table 2 Factors Associated with Awareness of Glaucoma Among Adults in Gish Abay Town, Northwest Ethiopia, June 2018 (n=594)

Awareness of Glaucoma				
Variables	Yes	No	COR (95% CI)	AOR (95% CI)
Age Category (years)				
18–22	35	134	1.00	1.00
23–27	43	101	1.63 (0.97, 2.73)	1.27 (0.70, 2.29)
28–45	45	95	1.81 (1.08, 3.03)	1.60 (0.85, 3.02)
≥ 46	22	119	0.70 (0.39, 1.27)	0.57 (0.25, 1.28)
Sex				
Male	84	202	1.00	1.00
Female	61	247	0.59 (0.41, 0.86)	0.79 (0.50, 1.25)
Educational Status				
No formal education	56	303	1.00	1.00
Primary education	32	69	2.50 (1.51, 4.16)	3.15 (1.72, 5.77)***
Secondary education	33	57	3.13 (1.87, 5.24)	3.11 (1.66, 5.84)***
College and above	24	20	6.49 (3.36, 12.54)	6.10 (2.80, 13.27)***
Ethnicity				
Amhara	140	444	1.00	1.00
Oromo	5	5	3.17 (0.90, 11.11)	0.62 (0.12, 3.20)
Income Level (ETB)				
≤ 750	34	264	1.00	1.00
751–1300	35	80	3.39 (1.99, 5.79)	2.44 (1.34, 4.43)**
1301–2000	21	41	3.97 (2.10, 7.51)	3.50 (1.73, 7.06)**
≥ 2001	55	64	6.67 (4.01, 11.08)	4.65 (2.59, 8.37)***
Eye Examination				
No	98	422	1.00	1.00
Yes	47	27	7.49 (4.44, 12.63)	6.52 (3.46, 12.25)***
Chronic Diseases				
No	121	430	1.00	1.00
Yes	24	19	4.48 (2.37, 8.46)	2.93 (1.25, 6.85)*

Notes: * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$; 1.00=reference.

Abbreviations: CI, confidence interval; COR, crude odds ratio; AOR, adjusted odds ratio.

participant had only heard of glaucoma, whereas in this study after they had heard of glaucoma the participant must give at least one possible and plausible explanation which defines the condition.

However, the current level of glaucoma awareness is better as compared to the report from Agaro town in Jimma (2.4%), Southwest Ethiopia.¹⁸ This might be due to the age difference among study participants. In the later study, the participants had an average age of 54.5 years as compared to 28 years in this study. Previous studies showed that older age demonstrated less awareness of glaucoma.^{1,7,17,20,25}

This finding is also higher than reports from Ghana (3.6%),²⁶ Nepal (2.43%),²⁷ urban India (13.5%¹⁰ and 2.3%²⁸) and rural parts of India (0.32%²⁹ and 8.3%¹⁶). This might be the age difference among study participants: 50 years in Ghana,²⁶ 55 years in Nepal,²⁷ 54 years in urban Chennai¹⁰ but 28 years in this study.

On the other hand, the finding of the present study is in line with studies from Ebonyi state, Nigeria (21.1%)¹⁹ and Switzerland (24.7%).³⁰ This might be due to the same study setting. This could also be because the age difference of the respondents was almost similar (28 vs 31 years).

Higher educational status was found to be an important factor for awareness of glaucoma. This was supported by different literature.^{7,10,17,20,21,26} This might be because health-related information transmission is higher as educational status increases^{1,20,31–33} and similarly educated adults do self-reading on personal health-related materials.¹⁷ This might be also due to educated adults seeking modern medicines as their first choice whereas those adults without formal education need it last after they tried traditional medicines and failed, which in turn affects their level of awareness.

History of eye examination was another important factor found for awareness of glaucoma.^{7,17,21} This might be due to the fact that adults coming for eye examination will attend health education programs and will familiarize themselves with the condition.

Adults with positive history of chronic diseases, either diabetes mellitus or hypertension or both, were positively associated with awareness of glaucoma.¹ This might be due to the fact that this portion of adults have regular eye check-ups which in turn helps them to familiarize with the disease.

Better income level was also found to be an important determinant for awareness of glaucoma.^{1,17,25,26,29,31,33}

This might be because adults with higher levels of income can afford and seek medical attention more than their counterparts.

In general, the proportion of awareness in this town was low compared to other studies. The reasons for such a low level of awareness were there were no ophthalmic professionals in the town, and no government sponsored programs to overcome this. Therefore, it is highly recommended to start regular health education campaigns especially in such rural parts of the country.

Conclusion

About one-fourth of adults were aware of glaucoma and it was low. Higher educational status, eye examination at least once in life, positive history of chronic diseases, either diabetes mellitus or hypertension or both, and higher income level were positively associated with awareness of glaucoma.

Ethics Approval and Consent to Participate

Ethical clearance was obtained from University of Gondar Ethical Review Committee and a letter of permission was obtained from Gish Abay Administrative Office. Permission was also gained from each household head before contacting study participants. Written informed consent was obtained from each study participant. This study was conducted in accordance with the Declaration of Helsinki.

The study participants were informed about the purpose of the study and their right to refuse and withdraw from the study at any time. Confidentiality was also maintained by excluding identifiers and using codes. Glaucoma-related information was given orally for all study participants after completion of the interview.

Data Sharing Statement

The dataset used and/or analyzed during this study are available from the corresponding author upon a reasonable request from Mr Zewdu Yenegeta (contact address: zewduyenegeta@gmail.com).

Acknowledgments

We would like to acknowledge all participants of the study who kindly volunteered to answer the interview. Our gratitude also goes to data collectors for their tireless work during data collection.

Author Contributions

All authors contributed equally to data analysis, drafting or revising the article, gave final approval of the version to be published, and agree to be accountable for all aspects of the work.

Disclosure

We, the authors, declare no competing interests.

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