Pharma Multidisciplinary Research Journal (PMRJ) Open Access 2025, Volume 2, Issue 1; ISSN Online: 3006-2896,
https://pmrj.epua.online/index.php/pmrj

Original Article

Eye care services utilization and associated factors among older adults in Yirgalem town, Sidama Regional State, South Ethiopia, 2022: A community based cross-sectional study

Yishak Tongola[1] Alazar Mama Abda[2], Helen Tiruneh [3], Mathewos Geta[4]

[1]Yirgalem General Hospital, Sidama Regional State [2]Lecture, Department of Pharmacy College of Health Science, Dilla University, Ethiopia [3]Public Health Department, Pharma College Hawassa Campus, Hawassa, Ethiopia, P.O.B. 67 Ethiopia, [4]Coordinator, Research and Community Service Office, Pharma College Shashemene Campus, Shashemene, Ethiopia

***Correspondent author**: Email: matgeta1@gmail.com

Abstract

Background: In many developing regions, the utilization of eye care services remains low, even when such services are available. The aim of this study was to assess the prevalence of eye care service utilization and associated factors among older adults in Yirgalem town, Sidama Region, South Ethiopia, in 2022.

Methods: A community-based cross-sectional study was conducted from April 5 to June 10, 2022, among 584 randomly selected older adults in Yirgalem town. Data were collected using pre-tested, structured face-to-face interviewer-administered questionnaires. Epi Data version 4.6.0.2 and SPSS version 23 were used for data entry and analysis, respectively. Bivariable and multivariable binary logistic regression models were employed to identify eye care service utilization factors. Adjusted Odds Ratios (AORs) with 95% confidence intervals (CIs) were estimated to determine the strength of associations. Statistical significance was set at $p < 0.05$.

Results: The overall prevalence of eye care service utilization was 46.2% (95% CI: 41.7 - 50.1). The factors that significantly associated with eye care service utilization were family income > 7,000 ETB (AOR = 5.573, 95% CI: 2.011-15.443), diabetes mellitus (AOR = 2.561, 95% CI: 1.514 - 4.335), history of eye disease (AOR = 15.353, 95% CI: 7.786 - 30.278), family history of eye disease (AOR = 2.070, 95% CI: 1.146 - 3.741), and awareness about the importance of regular eye checkups (AOR = 9.137, 95% CI: 5.040 - 16.564).

Conclusion: The study revealed a moderate level of eye care service utilization in the study area. Higher income, personal and family history of eye disease, diabetes mellitus, and awareness about regular eye checkups were identified as significant factors influencing service utilization. Community-wide awareness campaigns led by healthcare facilities are recommended to improve eye care utilization

Keywords: Utilization, visual impairment, dissatisfaction with services, eye care services, and information.

Introduction

Eye care service utilization is the use of eye care service by persons for the purpose of preventing and curing eye problems, promoting maintenance of eye health or obtaining information about one's eye health status and prognosis (1). With an ageing global population, the demands for eye health services are increasing (2). Demographic, personal, social and cultural factors may influence utilization of eye care service. Where there is poor utilization of available services, educational campaigns would lead to better understanding and promote greater utilization of eye care services (3). Despite being more affected by visual impairment and blindness than any other population age group, the elderly are least likely to seek help when faced with eye problems (4,5). Eye care utilization among the aged is influenced by a number of predisposing, enabling and need factors (6). These are quite challenging for public health promoters to overcome, as they aim at making eye care accessible to the most deprived communities. Hence, an in depth understanding of the various barriers to uptake of eye care services becomes a prerequisite to effective health promotion (7). Ethiopia launched the Vision 2020 Initiative in September 2002 to develop a sustainable comprehensive eye health care system to ensure the best possible vision for all people and thereby improve their quality of life. Despite this, the national prevalence of blindness is 1.6% and that of low vision is 3.7% (8).

Utilization of eye care services varies globally, with notable disparities between high- and low-income regions. In South Korea, for instance, a national survey found a 58% utilization rate among older adults, indicating high service uptake associated with healthcare accessibility and insurance coverage (9). However, in South Ethiopia, eye care utilization among older adults remains low, primarily due to a lack of affordable services and inadequate healthcare outreach (1). Studies in other African regions, such as South Africa and Ghana, reveal similar challenges. Ntsoane & Oduntan (2010) report low service uptake in rural communities, particularly among populations unaware of available services or unable to afford them (3). In Ghana, the elderly population faces compounded barriers, where affordability and access issues intersect with cultural beliefs, limiting eye care seeking behavior (6).

A variety of personal, social, and systemic factors influence eye care service utilization. Key determinants include socioeconomic status, accessibility, awareness, and demographic factors like

gender and age. Low income and lack of knowledge are significant barriers to eye care access in rural South Africa (3), while systemic challenges in developing countries such as limited healthcare infrastructure and personnel shortages limit service access (7). Education also plays a crucial role in eye care uptake. In the U.S., adults with higher education levels and health insurance are more likely to seek eye care services, underscoring the role of health literacy and economic stability. In Ethiopia, cultural beliefs about eye health further influence care-seeking behavior, with some older adults relying on traditional healers rather than medical services (1).

Barriers to accessing eye care are multifaceted, involving both direct and indirect costs, logistical issues, and cultural factors. In low-resource settings, distance to facilities and associated travel costs often deter older adults from seeking care (10). In Malawi, reluctance to accept cataract surgery is linked not only to logistical barriers but also to cultural factors, which similarly impact rural Ethiopia (11). Additionally, gender disparities are common, with women often experiencing greater barriers to accessing eye care (12). Equity-focused initiatives are critical for addressing these gaps; targeting vulnerable groups and integrating eye care into broader healthcare access programs (13).

Methods and Materials

Study setting design, and period

A community based cross sectional study was conducted in Yirgalem town, Sidama Regional State, Southern Ethiopia from April 5 to June 10, 2022. Yirgalem town situated about 47 Km away from Hawassa city, capital of Sidama Regional state. According to the town health office report of 2019 the total population of the city is estimated to be 79,605, of which 39,166 are men whereas 40,439 are women. The urban population account for 48,605 and the rural accounts for 31,000 (14).There is one secondary eye care service and training center for eye care professionals such as ophthalmic nurses in the town.

Population, Eligibility, Sample Size Determination and Sampling Procedure

All older adults who live at Yirgalem town were our source population. Whereas, randomly selected older adults who live in randomly selected Kebeles of Yirgalem town were our study population. Adults' age ≥ 40 years old who live permanently in Yirgalem town were included in the study and adults who were incompetent for the study due to mental problems and suffered from severe illness were excluded from the study.

The sample size for first objective was calculated by using a single population proportion formula considering the following assumptions, proportion of eye care service utilization (23.8%) conducted at Hawassa city Ethiopia at 5% margin of error, 95 % Confidence level, design effect of 2, and considering 5% for none response rate (15). Then after by substituting the above figures in to the sample size calculation, the calculated sample size becomes 584. Sample size for the second objectives has been determined by using double population proportion formula using Epi-info version 7.1 by considering power of the study of 80%, CI of 95% Household income Higher family income (>6000 ETB) as significant variable from previous studies which given the smaller sample size.

Multistage sampling technique was used to select the study participants. First 4 Kebeles were selected randomly using a lottery method from the total of 7 kebeles of Yirgalem town. Then sample size proportionally allocated according to population size of each selected kebeles. Then the required households were selected by systematic random sampling from the list of households in the kebele which consist a total number of 5256 households. The households are selected with the interval of every 9 households.

The study participant was selected by simple random sampling from household with more than one family member. Households that were not available during the first visit of the data collection period, we revisited for the second times.

Data collection tools and quality assurance

A structured face-to-face interviewer-administered questionnaire which was prepared in English **(Supplementary Material S1)** and translated to Amharic **(Supplementary Material S2)** languages was used to collect the data. A qualified language expert translated the English questionnaire into Amharic to check for consistency. Three trained BSc degree holders Optometrist and two Master of Public Health holders were recruited as the data collector and supervisor respectively. The overall activities of the data collection processes were supervised daily by the two supervisors. The principal investigator performed double data entry into Epi data version 3.1 to ensure the accuracy and completeness of the data. Data quality was ensured through four-day training of data collectors, consisting of three trained optometrists and one ophthalmologist, physician as a supervisor.

Variables of the study and operational definitions

The dependent variable of the study was eye care service utilization with responses yes or no. Whereas, the independent variables of the study were

Socio-demographic related factors: Age, Sex, Marital Status, Religion, Educational status Level, Occupation, and monthly income of the household**.**

Chronic medical problem: High cholesterol, Hypertension, Cardiovascular problem, and DM. **Personal and other related factors:** Previous history of eye problems**,** Family history of eye disease**,** Awareness of eye care services utilization, Health insurance**,** and Family support/escort

Operational Definition

Awareness of eye care service utilization: individuals who had heard the need of regular eye checkup or eye examination is considered a sharing awareness of eye care service utilization and if they had not heard they are considered as they have no awareness.

Eye care service utilization: If an individual reported that he/she had visited an eye care service providing a center for eye checkup or examination, at least once within the last two years, he/she is considered as utilized eye care service for this study.

Eye care service providing center: health institution where ophthalmic diagnostic instruments and at least one eye care provider (ophthalmologist, optometrist, ophthalmic nurse, ophthalmic officer, or cataract surgeon) are available.

Data processing and analysis

The collected data were coded, entered and cleaned by Epi data version 3.1 and exported to statistical package for social science (SPSS) version 23.0 for further analysis. Descriptive statistics frequency mean with standard deviation and percentages, were performed to describe the characteristics of respondents and the data were presented using statistical tables and texts. Bivariable and multivariable binary logistic regression analysis was employed to examine the statistical association between utilization of eye care services and every single independent variable. Variables which showed statistical significance during bivariable analysis at (p-value < 0.25) were entered into multivariable binary logistic regression to control confounding and identify statistically significant variables. Multi-collinearity was tested by using variance inflation factor and tolerance test. The Hosmer-Lemeshow test (16) was used to check the model fitness for analysis. Adjusted odds ratios (AOR) with 95% CI were estimated to assess the strength of

associations and statistical significance was declared at a p-value < 0.05.

Results

Socio-demographic characteristics of the participants

A total of 567 older adults participated in the study, representing a strong overall response rate of 97.1%. Females comprised 56.4% (n=320) of the participant.

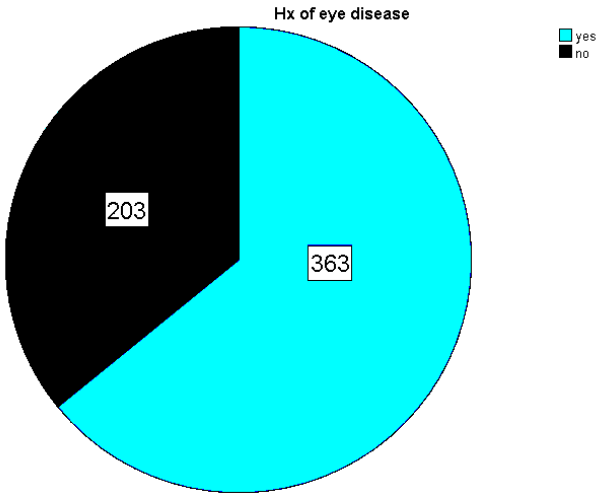

Figure 1: History of eye disease among older adults in Yirgalem town, Sidama Regional State, South Ethiopia, 2022**.**

The mean (±SD) age of the respondents was 50.5 years (±2.8). Notably, the majority (66.1%, n=375) were aged 55 or above, confirming the focus on older adults. In terms of educational attainment, 42.5% (n=241) of participants reported having a college degree or Higher Education (Table 1).

Individual Medical related factors

Out of the total participants, 363 (64%) had a previous history of eye disease. Two hundred forty-four (43%) respondents have enrolled in community-based health insurance. Two hundred (35.5%) and 190 (33.5%) of the respondents had diagnoses of hypertension and diabetes mellitus, respectively. Out of the total respondents, nearly two-thirds (372, 65.6%) of them claimed that they knew where to go when noticing eye problem (Table 2)

Table 1: Socio-demographic characteristic of the study participants in Sidama regional state Yirgalem town, 2022.

Characteristics	Frequency	Percent
Age		
○ **<55**	192	33.9
○ **≥55**	375	66.1
Sex		
○ **Male**	247	43.6
○ Female	320	56.4
Religion		
○ Orthodox	193	34.0
○ Protestant	225	39.7
○ Muslim	87	15.3
○ Catholic	28	4.9
○ Others	34	6.0
Marital status		
○ Single	33	5.8
○ Married	438	77.2
○ Divorced	64	11.3
○ Widowed	32	5.6
Educational status		
○ No formal education	170	30.0
○ Primary education	69	12.2
○ Secondary education	87	15.3
○ College and above	241	42.5
Occupation		
○ Employed	216	38.1
○ Unemployed	351	61.9
Family income		
○ <3000	233	41.1
○ 3001-5000	170	30.0
○ 5001-7000	100	17.6
○ > =7000	64	11.3

.

Table 2. Individual medical-related characteristics of study participants in Sidama Regional State Yirgalem town, 2022

Characteristics	Frequency	Percent
Community-Based Health insurance		
○ **Yes**	244	43.0
○ **No**	323	57.0
Hypertension		
○ **No**	339	59.8
○ **Yes**	200	35.3
○ **I don't know**	28	4.9
DM		
○ **No**	346	61.0
○ **Yes**	190	33.5
○ **I don't know**	31	5.5
History of eye disease		
○ **Yes**	363	64.0
○ **No**	203	35.8
Eye affect daily activity		
○ **Yes**	202	55.6
○ **No**	161	44.4
Family history of eye disease		
○ **No**	211	37.2
○ **Yes**	151	26.6
○ **I don't know**	205	36.2
Awareness on eye care services		
○ **Yes**	159	28.0
○ **No**	405	71.4
Types of eye problem		
○ **Distance**	125	22
○ **Near**	141	24.9
○ **Pain**	33	5.8
○ **Redness**	28	4.9
○ **Itching**	22	3.9
○ **Tearing**	20	3.5
Go to eye health center when noticing an eye problem		
○ **Yes**	372	65.6
○ **No**	189	33.3

Magnitude of Eye care service utilization

The overall use of eye care services was found to be 262 (46.2%), CI: 41.7% 50.1%) in this study. In contrast, no eye care services were used by 395 (53.8%) of the population. The reason for not utilizing the eye service of 188 (45.9%) study participants was lack of information regarding the services (Figure 2).

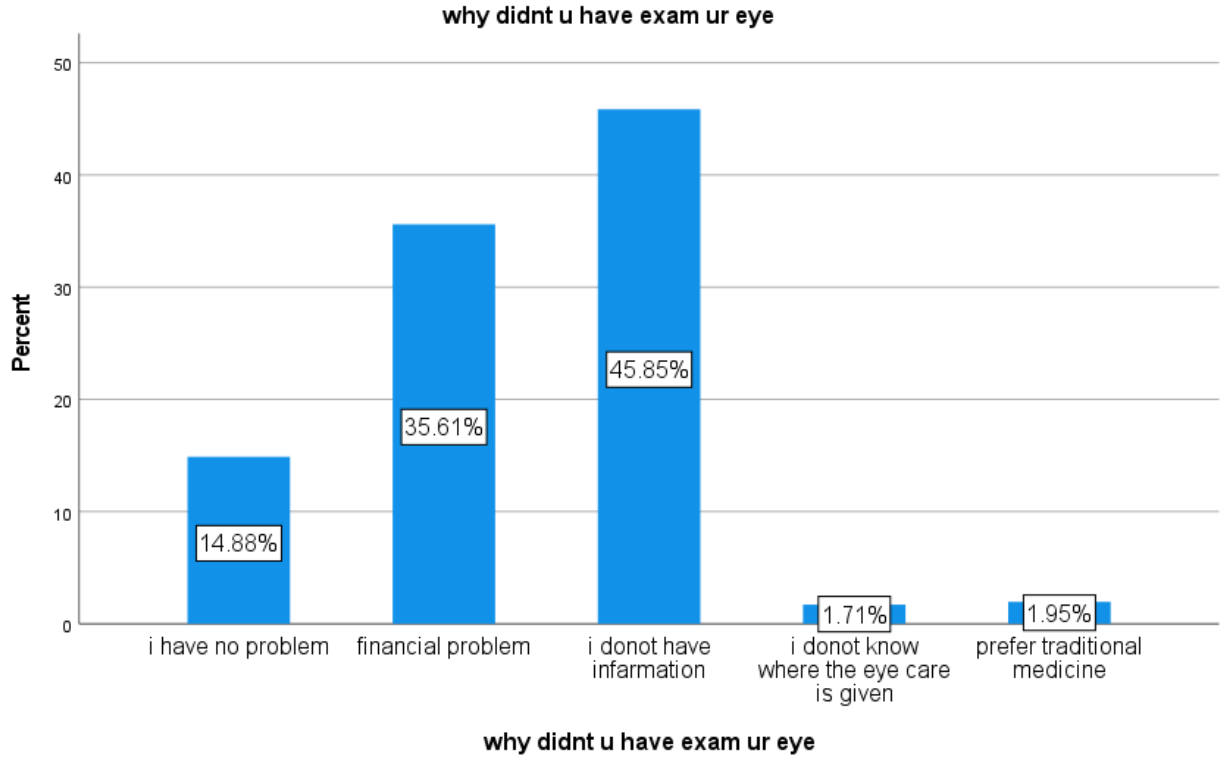

Figure 2 Reason for not having usual visit of eye care services among women older adults in Yirgalem town, Sidama Regional State, South Ethiopia, 2022**.**

Factors associated with eye care service utilization

Multivariable logistic regression analysis revealed that several factors were significantly associated with eye care service utilization among older adults in Yirgalem town. Participants with a monthly income exceeding 7,000 Ethiopian Birr (ETB) were 5.573 times more likely to utilize eye care services compared to those with a monthly income below 7,000 ETB AOR= 5.573, 95% CI: 2.011-15.443) (Table 3). Participants diagnosed with Diabetes Mellitus were 2.56 times more likely to utilize eye care services compared to those without a diagnosis (AOR = 2.561, 95% CI: 1.514 - 4.335). Participants with a personal history of eye disease were 15.35 times more likely to utilize eye care services compared to those without a history (AOR = 15.353, 95% CI: 7.786 - 30.278). Participants with a family history of eye disease were 2.07 times more likely to utilize

eye care services compared to those without a family history (AOR = 2.070, 95% CI: 1.146 - 3.741). Participants who were aware of the importance of regular eye checkups were 9.14 times more likely to utilize eye care services compared to those who lacked awareness (AOR = 9.137, 95% CI: 5.040 - 16.564) (Table 3).

Table 3. Factors associated with eye care service utilization of study participants in Sidama regional state, 2022

Variable	Eye care service		COR (95%CI)	AOR (95%CI)
	Yes (#.)	No (#.)		
Age category				
○ < 55	76	116	1	1.505 (.837, 2.706)
○ > 55	189	186	1.185(0.785-1.79)	1
Sex				
○ Male	114	133	0.996 (.714 – 1.390)	0.920 (.552 - 1.535)
○ Female	148	172	1	1
Educational status				
○ Non-formal education	82	103	1	1
○ Primary	31	38	1.25 (0.713-2.207)	0.904 (.3982 - 0.056)
○ Secondary	37	50	1.138(0.6731.922)	0.563 (.256-1.238)
○ College & above	127	114	1.713(1.150-2.55)	0.521 (.231, 1.177)
Occupational status				
○ Employed	122	94	1.95 (1.38-2.75)	1.705 (.893-3.256)
○ Unemployed*	140	211	1	1
Family income				
○ <3000	95	138	1	1
○ 3001-5000	71	99	1.042(0.69-1.55)	1.468 (.783 - 2.752)
○ 5001-7000	48	52	1.341(0.34-2.14)	1.448(.639- 3.283)
○ > 7000	48	16	4.358(2.33-8.12)	5.573 (2.011-15.443)**
Health insurance				
○ Yes	126	118	1.468(1.05-2.05)	1.475 (.825- 2.635)
○ No	136	187	1	1
Hypertension				
○ Yes	141	87	2.920(2.063-4.133	2.509 (1.47 - 4.283)**
○ No	121	218	1	1
Diabetes Mellitus				
○ Yes	145	76	3.733(2.61-5.33)	2.561(1.514 – 4.335)**
○ No	117	229	1	1
History of eye disease				
○ Yes	118	186	0.044(0.26-0.76)	15.353 (7.786 - 30.278)**
○ No	245	17	1	1
Family history of eye disease				
○ Yes	164	192	3.468(2.335- 5.151)	2.070 (1.146-3.741)*
○ No	98	113	1	1
Awareness about regular eye checkup				
○ Yes	119	286	21.480(12.280-37.57)	9.137 (5.040-16.564)**
○ No	143	16	1	

Discussion

In this study, the prevalence of eye care service utilization among older adults in the study period was found to be 46.2% (95% CI: 40.7%-50.1%). This rate is comparable to findings in Pakistan, where 45.3% of older adults reported utilizing eye care services (17). However, it is significantly higher than those reported in other areas such as Southern Ethiopia (Hawassa) at 23.8% (1), Ghana at 32.2% (6), South Africa (Limpopo Province) at 19% (18), Edo State in Nigeria at 32% (19) and Abuja, Nigeria at 38% (20). On a global scale, studies indicated a prevalence rate of 18% in eye care utilization among older adults, underscoring the relatively low uptake worldwide (6).

Several factors may contribute to these differences. Regional disparities in socio-economic conditions, healthcare infrastructure, and availability of specialized eye care services likely play a role. Additionally, differences in study methodologies, population characteristics, and timeframes across studies can influence reported utilization rates. The comparatively higher prevalence of utilization in Yirgalem town may reflect improved health service outreach or increased public awareness over time. Nevertheless, the current study's findings fall below the utilization rates observed in South Korea (73.5%) (9) and South Africa's Limpopo Province (62.7%) (18). Higher utilization rates in these regions may stem from comprehensive healthcare systems, greater accessibility to eye care services, and established preventive health measures, including routine screenings. The methodological approaches used in these studies, including varying definitions and measurements for eye care utilization, may also partly explain the observed discrepancies.

This study demonstrated that awareness of eye care services is a significant factor in service utilization, as participants with prior awareness of eye care services were more likely to utilize them. This finding aligns with similar studies in South Africa, where awareness significantly impacts eye care-seeking behavior (3,21). Awareness likely facilitates knowledge of available resources, helping individuals recognize symptoms or conditions that require medical attention and encouraging timely visits to healthcare facilities.

Further, participants with diagnosed eye diseases, diabetes, or a family history of eye disease were more likely to utilize eye care services than those without such health conditions. This finding is consistent with studies conducted in the United States, where individuals with higher disease risk factors, such as diabetes or a family history

of eye disease, frequently engage in regular eye exams to manage their conditions and prevent vision loss (22,23). The higher utilization rates in these groups highlight the critical role of continuous medical supervision in reducing preventable vision impairment through early detection and treatment. Schaumberg *et al*., (2000) reported the likelihood of using eye care services increased with the presence of eye problems like systemic diseases such as diabetes and hypertension (21).

Income also emerged as a key determinant in eye care utilization, with higher-income participants more likely to access services. This finding supports results from previous studies in Southern Ethiopia, particularly in Hawassa, where higher income levels were associated with better access to healthcare services (1). Financial stability enables individuals to cover the costs associated with medical care, including consultation fees, medication, and transportation, thus facilitating greater access to eye care.

Limitation of the study

This study is limited in terms of generalizability since the study was conducted in restricted area; Yirgalem town and majority of the respondents were illiterate, which might have impacted the level of recall bias. No temporal relationships could be identified due to the cross-sectional nature of the study. The study miss qualitative data or focus group discussions to explore sociocultural, geographic, and psychological barriers to eye care utilization.

Conclusion

This study found that eye care service utilization among older adults in Yirgalem town, Sidama Regional State, was moderate, reflecting an improvement over time. A key barrier to utilization was the perception among many participants that they had no eye problems. Consequently, only a moderate percentage sought regular check-ups. Several factors were significantly associated with increased utilization, including a history of eye disease, awareness of the need for check-ups, a history of diabetes, family history of eye disease, being employed, having support, and higher family income. To improve service utilization, the study recommends providing community-based eye health education, collaborating with local healthcare facilities to create targeted campaigns for older adults, exploring subsidized care, and integrating eye care into senior programs. Developing different policies and strategies is required to improve awareness on eye health care utilization as well as socio economic status. Furthermore, the study suggests developing educational

materials for diabetic patients, regularly monitoring service trends, and investing in local research.

Declarations

Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

Pharma College has supported the study financially. The funder had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Ethical approval and consent of participants

Ethical clearance was obtained from the Institutional Research Ethics Review Committee (IERC) of Pharma College, ensuring the study adheres to ethical research principles. A community based cross-sectional study was performed at Yirgalem town. Following IERC approval, submissions were made to the administrative offices of Yirgalem town Health Department for their respective approvals. All subjects were requested voluntary for informed written and finger print assent from participants after they were introduced to the purpose of the study. All the reasons why the subject was chosen and why the research was done and the right to withdraw at any time from the study were explained to the study subjects. The participants were also informed that confidentiality of all the data to be gained will be seriously maintained.

Acknowledgments

The authors acknowledge Pharma College, Yirgalem town health Departments and study participants for their cooperation.

Consent for publication

Not applicable.

Availability of data and materials

For those who are interested; the datasets of this study could be accessed from the corresponding author on reasonable request

Author Contributions

YT: Conceptualization, Methodology, Data analysis, Supervision, Writing - Original Draft, Writing - Review & Editing, interpretation of data and approved the final manuscript. AMA, HT, MG: Data collection, Investigation, Writing - Review & Editing, interpretation of data and approved the final manuscript. All authors have made substantial contributions to this manuscript.

References

1. Efa DM, Betelhem TY, Mebratu MT. Eye care service utilization and associated factors among older adults in Hawassa city, South Ethiopia. PLoS ONE 2020;15(4): e0231616.
2. Seth RF, Rupert RAB, Serge R, Peter A, Tasanee B, Maria VC, Aditi D, Jost BJ, Jill K, John HK, Janet L, Hans L, Kovin N, Konrad P, Alex S, Gretchen AS, Nina T, Tien YW, Hugh RT. Global causes of blindness and distance vision impairment 1990-2020: A systematic review and meta-analysis. Lancet Glob Health. 2017;5(12):e1221-e1234.
3. Ntsoane MD, Oduntan OA. A review of factors influencing the utilization of eye care services. South Afr Optometrist. 2010;69(4):182-192.
4. Rupert RAB, Seth RF, Tasanee B, Maria VC, Aditi D, Jost BJ, Jill K, John HK, Janet L, Hans L, Kovin N, Konrad P, Serge R, Alex S, Gretchen AS, Nina T, Tien YW, Hugh RT. Magnitude, temporal trends, and projections of the global prevalence of blindness and distance and near vision impairment: A systematic review and meta-analysis. Lancet Glob Health. 2017;5(9):e888-897.
5. Pascolini D, Mariotti SP. Global estimates of visual impairment: 2010. British journal of Ophthalmolog. 2012;96(5):614-618.
6. Ocansey S, Kumi-KA, Awusabo-AK, Ilechie A, Boadi-Kusi S, Abraham C. Utilization of eye care services among ghanaian elderly population: evidence from a peri-urban community. Ophthalmolog Res: Intl J. 2013;1(2):89-101.
7. Abdullah KN, Al-Sharqi OZ, Abdullah MT. Barriers to the uptake of eye care services in developing countries: a systematic review of interventions. Health Education J. 2013;72(6):742-754.
8. Berhane Y, Worku A, Bejiga A, Adamu L, Alemayehu W, Bedri A, Haile Z, Ayalew A, Adamu Y,Gebre T, Kebede TD, West E. Prevalence and causes of blindness and low vision in ethiopia. Ethiopian J Health Developent. 2007;21(3):204-210.
9. Yong SK, Hwan H, Byeong JY, Young-Woo S, Seung-Hyun K, Shin HP, Key Hwan L , Sung JL, Song HP, Seung-Hee B. Prevalence and Factors associated with the Use of Eye Care Services in South Korea: Korea National Health and Nutrition Examination Survey 2010-2012. 2017. Korean J Ophthalmol: KJO (Korean J Ophthalmol 2017; 31(1):58-70.
10. Melese M, Alemayehu W, Friedlander E, Courtright P. Indirect costs associated with accessing eye care services as a

barrier to service use in Ethiopia. Trop Med Int Health. 2004;9(3):426-431.

11. Courtright P, Kanjaloti S, Lewallen S. Barriers to acceptance of cataract surgery among patients presenting to district hospitals in rural Malawi. Trop Geogr Med. 1995;47(1):15.
12. Schaumberg DA, Christen WG, Glynn RJ, Buring JE. Demographic predictors of eye care utilization among women. Med Care. 2000;38(6):638-646.
13. Ramke J, Zwi AB, Palagyi A, Blignault I, Gilbert CE. Equity and blindness: closing evidence gaps to support universal eye health. Ophthalmic Epidemiol. 2015;22(5):297-307
14. Abiy M, Telake A, Yohannes M, Selam K, Girum N, Abenet K, Jerman D, Neim B, Deribe BD, Henock Asfaw. Prevalence of depressive symptoms and their associated factors among older adults in Yirgalem town, Southern Ethiopia: A community-based cross-sectional study. Front Psychiatry. 2023 29;14:1148881.
15. Park SH, Lee JS, Heo H, et al.; for the Epidemiologic Survey Committee in the Korean Ophthalmological Society. A nationwide population-based study of low vision and blindness in South Korea. Invest Ophthal-mol Vis Sci. 2015;56:484-493.
16. Surjanovic, N.,Loughin, T. M. Improving the Hosmer-Lemeshow goodness-of-fit test in large models with replicated Bernoulli trials. *J Appl. Stat*. 2023, *51*(7), 1399-1411.
17. Aljied R, Aubin MJ, Buhrmann R, Sabeti S, Freeman EE. Eye care utilization and its determinants in Canada. Can J Ophthalmol. 2018;53(3):298-304.
18. Ntsoane MD, Oduntan OA, Mpolokeng T. Utilization of public eye care facilities by the rural community residents in the Capricorn district, Limpopo Province, South Africa. Afr J Pharm Health Care Fam Med. 2012;4(1):Art. #302, 7 pages.
19. Ibeneche B, Ekpenyong B, Ebri A. Utilization of eye care services in rural Edo State, Nigeria. Niger J Clin Pract. 2018;21(5):632-638.
20. Ja YF, Go OO. Barriers to eye care services utilization in Abuja, Nigeria. Niger J Ophthalmol. 2019;27(1):1-6.
21. Chandrasekhar TS, Bhat HV, Pai RP. Coverage, utilization and barriers to cataract surgical services in rural south India: results from a population-based study. Public health 2007; 121(2):130-136
22. Chou C-F, Barker LE, Crews JE, Primo SA, Zhang X, Elliott AF, Kai MB, Linda SG, Jinan BS. Disparities in eye care utilization among the United States

adults with visual impairment: findings from the behavioral risk factor surveillance system 2006-2009. Am J Ophthalmol. 2012;154(6):s45-s52.e

23. Gerald MJ, Bradford M, Karen S, Michael AA, Richard F, John OM, Martin T, Cynthia O. Examining the association between age-related macular degeneration and motor vehicle collision involvement: A retrospective cohort study. Br J Ophthalmol. 2013;97(9):1173-1176.
24. Schaumberg D, Christen W, Glynn R. Buring RJG. Demographic predictors of eye care utilization among women. Med Care, 2000;38(6):638-646.