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Research Article

Prevalence of Cataract and its Associated Factors among Adults Aged 40 Years and Above in Waghimra zone, Northeast Ethiopia

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Abstract

Background: Globally, lens opacity is a foremost cause of treatable blindness. Its paramount burden is found in unindustrialized countries. Hence, estimating the magnitude and delineating the risk factors would be critical in planning strategies for early detection and treatment. Therefore, this study aimed to measure the prevalence of cataract and its contributing factors among adults aged 40 years and above in Waghimra Zone, Amhara, Ethiopia.

Methods: A cross-sectional study was commenced among 528 adults living in Waghimra Zone. To select a representative sample, multi-stage random sampling was used**.** An interviewer-administered questionnaire, Snellen's chart, and penlight torch were used to collect data and screen the study subjects. To enter and analyze the data, Epidata version 3.1, and SPSS version 21 were used, respectively. Frequencies, percentages, and median were used to describe the variables. Bivariate analysis using logistic regression were carried out to select candidate variables. An adjusted odds ratio (AOR) with a 95% CI and a p-value of < 0.05 were used to declare a statistically significant association after running multivariable logistic regression analysis.

Result: The prevalence of cataracts among the study subjects was 20.1% (95% CI: 16.87, 23.32). In this study, a year increment in age was associated with a 1.05 (95% CI: 1.01 - 1.08) times occurrence of cataract. The odds of cataract was 6.2 (AOR = 6.2, 95% CI: 1.60, 23.9), and 2.46 times higher (AOR = 2.46, 95% CI: 1.10, 5.48) among those who were single, and divorced compared with those who had married, respectively.

Conclusion: The study revealed that burden of cataract in the study area was huge. Besides, the role of increasing age, and being single, divorced, widowed pointing towards a multi-factorial association. Hence, the concerned bodies should strengthen further screening and treatment of cataract patients who are targeted groups such as the aged population as early as possible.

***Keywords**: Prevalence; Cataract; Waghimra Zone; Ethiopia*

Introduction

A cataract is defined as the opacification of the crystalline lens of the eye [1]. Worldwide, approximately 50% of the 285 million visually-impaired people is due to age-related cataracts [2]. The prevalence of cataracts and cataract related blindness in Sub-Saharan Africa

(SSA) accounts for 50% [3-5]. Likewise, 80% and 90% of cataract-related blindness, and visual impairment are concentrated in low and middle-income countries (LMICs), respectively where health care access is limited [6-8]. In Ethiopia, cataract is also the primary cause of visual impairment and blindness in Ethiopia [9]. Numerous studies showed that different factors were positively linked with cataracts such as being female, educational level, residence, occupation, family size, older age, household wealth status, and educational level [10,11]. Besides, smoking, alcohol consumption, and hypertension have been related with cataracts [1,2]. Therefore, measuring the extent of cataracts and their associated factors in the given community is helpful for early detection and treatment. Furthermore, it gives an input for the successful implementation of VISION 2030 programs in Ethiopia. However, there were few community based studies done on the identified topic in Ethiopia in general, and no study were done in the study area in particular. So, this study designed to seal this dearth.

Materials and Methods

Study setting design and period

A cross-sectional study was conducted from May 1 - June 30, 2019, in the Waghimra zone. This is located in Northeast Ethiopia under Amhara regional state. The districts found in the zone are: Gazgibla, Dehana, Ziquala, Abergelle, Sehila, and Sekota.

Source and study population

All adults aged 40 years and above, and randomly selected adults aged 40 years old and above in Waghimra Zone were the source population and the study population, respectively.

Inclusion criteria

Study participants who reside for more than six months in the study area were included in the study.

Sample size determination

Single population proportion formula was used to estimate the sample size by using the following assumptions: 5% margin of error, 95% confidence level, and 181(20.5%) proportion from a previous study [12]:

$$n = \frac{(Za/2)^2(PQ)}{d^2}$$

$n = \frac{(1.96)^2(0.205)(0.795)}{(0.05)^2}$ = 251. The final sample size becomes 528 by adding a non-response rate 5% and a design effect of 2.

Sampling procedure

To select a representative sample, multi-stage random sampling was used. Three districts (Ziquala, Sekota Zurea, and Dehana) were selected randomly. Then kebeles in the selected districts were stratified into urban and rural kebeles. Kebeles (smallest unit in each district) in the selected districts were selected using a simple random sampling technique. Adults age 40 and above in the selected kebeles were identified and a sampling frame was prepared. The samples were allocated proportionally based on the number of households. Finally, participants in each selected kebeles were selected by using simple random sampling. In households with two or more individuals more than 40 years of age, one was selected randomly by the lottery method.

Study variables

The main outcome of interest was the prevalence of cataract. Age, sex, marital status, residence, educational level, occupation, income, family size, history of hypertension, smoking cigarette, and alcohol drinking were independent variables selected based on a literature review.

Data collection instruments and procedure

An interviewer-administered questionnaire was used to collect data regarding the independent variables followed by clinical examination using Snellen's visual acuity chart and penlight torch to identify the presence of a cataract by two experienced ophthalmic nurse practitioners and one cataract surgeon. During the data collection period, close supervision was done to assure the quality of the data. The completeness of the questionnaire was checked in the field and each questionnaire was checked before data entry.

Data processing and analysis

To enter and analyze the data, Epidata version 3.1, and SPSS version 21 were used, respectively. Frequencies, percentages, and median were used to describe the variables. Bivariate analysis using logistic regression were carried out to select candidate variables. An adjusted odds ratio (AOR) with a 95% CI and a p-value of < 0.05 were used to show a statistically significant association after running multivariable logistic regression analysis.

Result

Socio-demographic characteristics of the respondents

All (528 study subjects) were participated in the study. Among them, 59.7% of the participants were male, 52.5% lived in an urban area, and the median age of the participants was 59.0 years (Table 1).

Variables	Category	Frequency	Percentage
Sex	Male	213	40.3
	Female	315	59.7
Age (years)	Median ± IQR: 59.0 ± 20		
Marital status	Single	22	4.2
	Married	229	43.4
	Divorced	165	31.3
	Widowed	112	21.2
Residence	Urban	277	52.5
	Rural	251	47.5
Educational status	Can't read and write	100	375
	Able to read and write	4	27
	Primary/secondary	2	20
Occupation	Farmer	422	79.9
	Employed/daily laborer	26	4.9
	Merchant/housewife	44	8.3
	Others*	36	6.8
Family size	Median ± IQR: 4 ± 3		
Monthly income (Birr)	Median ± IQR:700 ± 1000		

Table 1: *Socio demographic characteristics of the respondents in Waghimra zone, 2019 (n = 528).*

**: Shows retirement, commercial sex worker.*

Health-related profile of the study participants

About, 88.8% of the participants were drunk alcohol, 98.9% didn't smoke cigarettes, and 96.2% didn't have hypertension (Table 2).

Variables	Category	Frequency	Percentage
Drunk alcohol	Yes	469	88.8
	No	59	11.2
Smoked cigarette	Yes	6	1.1
	No	522	98.9
Hypertension	Yes	20	3.8
	No	508	96.2

Table 2: *Health-related profile of the study participants in Waghimra Zone, 2019 (n = 528).*

Prevalence of cataract

In the present study, the prevalence of cataracts was 20.1% (95% CI: 16.87, 23.32).

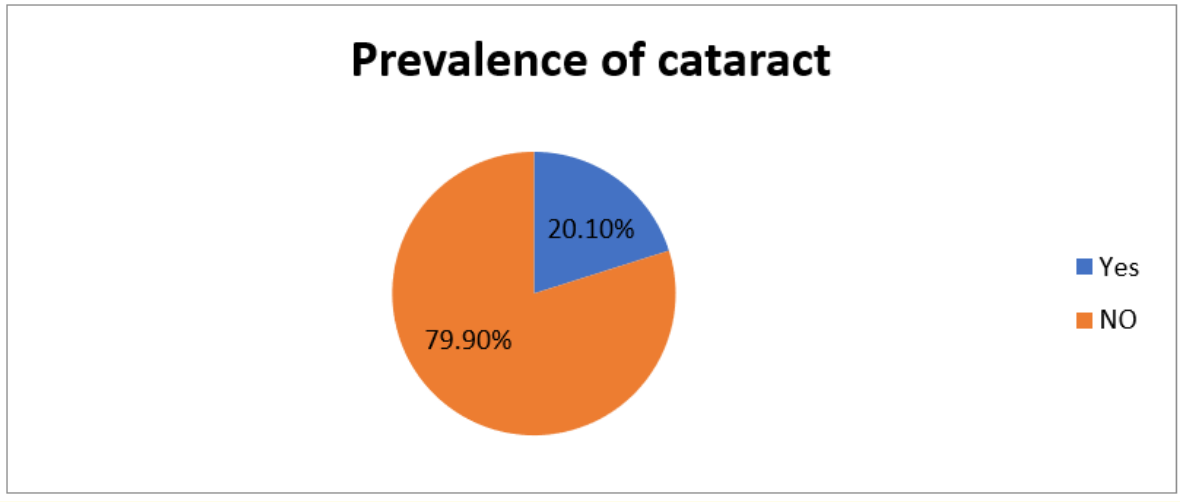

Figure 1: *Prevalence of cataract among adults aged 40 years and above in Waghimra zone, Northeast Ethiopia, 2019.*

Factors related with cataracts

In Bivariate logistic regression analysis, factors such as age of the respondents, sex, marital status, residence, educational status, occupation, family size, monthly income, and cigarette smoking were associated with cataract at a P-value of< 0.25 (Table 3).

Variables	Category	Cataract		p-value
		Yes	No	
Sex of the respondents	Male	53	160	0.024
	Female	53	262	
Age (years)	Median ± IQR: 59.0 ± 20			< 0.001
Marital status	Single	6	16	< 0.001
	Married	27	202	
	Divorced	31	134	
	Widowed	42	70	
Residence	Urban	40	237	0.001
	Rural	66	185	
Educational status	can't read and write	100	375	0.249
	able to read and write	4	27	
	Primary/secondary education	2	20	
Occupation	Farmer	94	328	0.08
	Employed/daily laborer	2	24	
	Merchant/Housewife	4	12	
	Others*	6	36	
Family size	Median family size: 4			0.002
Monthly income	Median monthly income: 700			0.025
Alcohol	Yes	92	377	0.46
	No	14	45	
Smoking	Yes	4	2	0.016
	No	106	420	
Hypertension	Yes	2	18	0.265
	No	104	404	

***Table 3**: Bivariate analysis of factors associated with cataract among adults aged 40 years and above in Waghimra zone, Ethiopia, 2019 (n = 528).*

Multivariable binary logistic regression analysis to identify factors associated with cataract

Variables which had a p-value of < 0.25 in bivariate analysis were included in a multivariable logistic regression model. It was found that age and marital status of the respondents were statistically significantly associated with cataract (p-value < 0.05). In this study, a year increment in age was associated with a 1.05 (95% CI: 1.01 - 1.08) times occurrence of cataract. The odds of cataract was 6.2 (AOR = 6.2, 95% CI: 1.60, 23.9), and 2.46 times higher (AOR = 2.46, 95% CI: 1.10, 5.48) among those who were single, and divorced compared with those who had married, respectively (Table 4).

Variables	Category	Cataract		COR (95 % CI)	AOR (95 % CI)	p-value
		Yes	No			
Sex of the respondents	Male	53	160	1.64 (1.06- 2.51)	1.16 (0.60-2.22)	0.66
	Female	53	262	1	1	
Age (years)	Median ± IQR: 59.0 ± 20			1.07 (1.05-1.09)	1.05 (1.01-1.08)	0.007*
Marital status	Single	6	16	2.8 (1.01- 7.78)	6.20 (1.60-23.9)	0.008*
	Married	27	202	1	1	
	Divorced	31	134	1.73 (0.98-3.03)	2.46 (1.10-5.48)	0.028*
	Widowed	42	70	4.49 (2.58-7.82)	2.38 (1.07- 5.29)	0.033*
Residence	Urban	40	237	1		
	Rural	66	185	2.11 (1.365-3.27)	0.77 (0.42-1.43)	0.414
Educational status	Can't read and write	100	375	1	1	
	Able to read and write	4	27	0.56 (0.19-1.62)	1.06 (0.27-4.06)	0.932
	Primary or secondary	2	20	0.38 (0.61-11.6)	0.68 (0.10-4.59)	0.695
Occupation	Farmer	94	328	1	1	
	Employed/ daily laborer	2	24	0.29 (0.06-1.253)	0.51 (0.07-3.57)	0.498
	Merchant/ house wife	4	12	0.35 (0.12-1.00)	0.78 (0.22-2.93)	0.734
	Others*	6	36	0.69 (0.28-1.73)	0.44 (0.15-1.26)	0.126
Family size	Median ± I QR: 4 ± 3			0.83 (0.734-0.93)	0.97 (0.78-1.20)	0.76
Monthly income	Median ± IQR :700 ± 1000			1.00 (0.99-1.00)	1.001 (1.00-1.001)	0.086
Smoking	Yes	4	2	8.24 (1.48-45.6)	2.01 (0.199 -20.4)	0.55
	No	106	420	1	1	

Table 4: *Multivariable analysis of factors associated with cataract among adults aged 40 years and above in Waghimra zone, Ethiopia, 2019 (n = 528).*

**: Statistically significant association with a p-value of < 0.05; Hosmer-Lemeshow goodness of fit (p-value: 0.78).*

Discussion

The study revealed that the prevalence of cataracts was 20.1% (95% CI: 16.87, 23.32). This finding is higher than other studies conducted within the communities in India [13], Korea [14], Ghana [15] and Nigeria [16], but lower than studies conducted in Srilanka [6], Singapore [17], China [18], Ghana [19] and India [20,21]. This may be explained due to different methodological approaches, difference in study area (urban versus rural), and sample size differences.

The prevalence of cataract also increased in this study due to age increment. This finding also well documented by studies done in India [20,22,23], China [24], Taiwan [25], and Korea [14]. This may be explained by as age increases, the formation of protein aggregates in the lens also increase, which leads to opacity of the lens (cataract) [26].

The present study also adds to the literature that being married decreasing the odds of cataracts compared with being single, widowed, or divorced participants. Similarly, a studies done in Kenya, Philippines, and Bangladesh showed that being married was a protective factor for cataracts [27]. This is due to the 'marital effect' has important public health implications because being married may decrease vision impairment due to the availability of material resources, emotional support, self-fulfillment, and information concerning eye care, vision rehabilitation, and healthy lifestyle [28].

Conclusion

The study revealed that burden of cataract in the study area was huge. Besides, the role of increasing age, and being single, divorced, widowed pointing towards a multi-factorial association. Hence, the concerned bodies should strengthen further screening and treatment of cataract patients who are targeted groups such as the aged population as early as possible.

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Author's Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

Ethical clearance for the study was obtained from the ethical review committee of Woldia University, Faculty of Health Sciences. Permission to conduct the study was also be obtained from the Waghimra Zone and Woredas health office. Individual verbal and written informed consent was obtained from every study participant and those who agree were participated in the study.

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Availability of Data and Materials

The datasets used or analyzed during the current study are available from the corresponding author on reasonable request.

Consent for Publication

Not applicable.

Disclosure

We confirm that this research is our original paper and that there is no conflict of interest in this work.

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