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# Knowledge, Attitude, and Associated Factors Towards Spectacle Use Among Adults in Debre Berhan Town, North Shewa, Ethiopia, 2023

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## Abstract

**Objective:** This study aimed to assess the knowledge, attitude, and associated factors towards spectacle use among adults in Debre Berhan town, North Shewa, Ethiopia.

**Design:** A community-based cross-sectional study was conducted using a multistage sampling method.

**Setting:** The study was conducted in Debre Berhan town, North Shewa, Ethiopia.

**Participants** The study included 1022 adults with aged ≥18 years who lived in Debre Berhan town for more than 6 months.

**Main outcome measures**: Data were collected using face to face interview completed by an interviewer.

**Results:** The study included 1022 adults with a median age of 45 years. Of 1022 participants, 86.01% (95% CI: 83.88, 88.14) had adequate knowledge and 85.32% (95% CI: 83.15, 87.50) had favorable attitude towards spectacle use. Older age (AOR = 1.21, 95% CI: 1.17, 1.26), higher educational status (AOR = 2.65, 95% CI: 1.06, 6.60), a history of spectacle use (AOR = 3.20, 95% CI: 1.31, 7.83) and a family history of spectacle use (AOR = 4.75, 95% CI: 2.31, 9.75) were positively associated with adequate knowledge of spectacle use. Higher educational status (AOR = 2.56, 95% CI: 1.26, 5.21), a history of spectacle use (AOR = 3.22, 95% CI: 1.58, 6.55), family history of spectacle use (AOR=1.89, 95%CI: 1.13, 3.16) and adequate knowledge about spectacle use (AOR= 4.63, 95%CI: 2.69, 7.98) were positively associated with favorable attitude towards spectacle use.

**Conclusion:** This study revealed that the proportion of adults with adequate knowledge and favorable attitude towards spectacle use was good. Higher educational status, history of spectacle use and family history of spectacle use were significantly associated with adequate knowledge and favorable attitude towards spectacle use.


**Keywords:** Spectacle use, knowledge, attitude, Debre Berhan town, Ethiopia

## Strengths and limitations of this study

- This study presents updated evidence on the magnitude and associated factors of knowledge and attitude towards spectacle use to reduce visual impairment in refractive error patients who do not use spectacles in North Shewa, Ethiopia.
- As this study demonstrates the temporal association of predictors with knowledge and attitude towards spectacle use rather than identifying the actual cause.
- Since the study mainly focuses on quantitative data, it provides limited information on the qualitative aspects and their impact relationship.

## Introduction

Spectacles are optical devices consisting of a frame with lenses used to correct distance and/or near vision, for protection and to gain self-confidence.[1 2] Spectacle is the world's most cost-effective method of correcting refractive errors (REs).[3] The proportion of adults who could benefit from spectacles to correct RE but do not yet own or use them is high in many countries: 60% in rural China.[4] and 71.58% in Finote Selam town, Ethiopia.[5] The prevalence of inadequate knowledge and an unfavorable attitude towards spectacle use among adults worldwide ranges from 8% to 80% and 0.8% to 69%, respectively.[6-9]

Evidence have shown that knowledge towards spectacle use was positively associated with male sex, college and above educational status, history of spectacle use, history of eye examination, self-reported reduction in vision, and family history of spectacle use[10-13], and a favorable attitude towards spectacle use was significantly associated with older age, college and above educational status, urban residency, a positive history of spectacle use, and knowledge about spectacle use.[8 14 15]

Adults' knowledge and attitude towards spectacle use play an important role in encouraging people to seek treatment to correct refractive errors and improve eye health seeking behavior.[15-17] In addition, wearing glasses for refractive errors helps to minimize the burden of visual impairment.[6 15] In contrast, inadequate knowledge and an unfavorable attitude towards spectacle use lead to visual impairment and blindness due to uncorrected refractive error, which hinder education, productivity, limited social participation, psychological impact and reduced quality of life.[18-24] This also leads to an enormous burden on the healthcare system.[6 25-28]

Although numerous studies have been conducted to determine the prevalence of refractive error, there is comparatively insufficient data on the knowledge and attitude towards spectacle use. Providing update information on knowledge and attitude towards spectacle use is very crucial for policy maker and stakeholders' works on reduction of refractive to design the platform in awareness creation in spectacle use. The main objective of this study was to investigate the knowledge, attitude and associated factors towards spectacle use among adults in Debre Berhan town in North Shewa, Ethiopia.

# Methods and Materials

## Study Design and Setting

A community-based cross-sectional study was conducted in Debre Berhan town, North Shewa, Ethiopia, between May 8 and June 8, 2023. The town is located in North Shewa, Amhara National Regional State Government, 130 kilometers away from Addis Ababa, the capital city of Ethiopia, and 688 kilometers away from Bahir Dar, the capital city of Amhara National Regional State. The total population who are living in the town have 88,375 (39,961 males and 48,414 females), of which 56,914 are adults aged ≥18 years.[29] It has nine administrative kebeles. There is a tertiary eye care center with ophthalmologists, optometrists, ophthalmic nurses and nurses serving more than 3 million people in the catchment area, as well as a private eye clinic in the town. There are also more than three optical workshops in the town.

## Study Population and Sample size

All adults aged ≥ 18 years who lived in Debre Berhan town for more than 6 months and available during the data collection period were included in the study. However, adults who were unable to respond the questionnaire due to serious illness or mental impairment were excluded.

**The sample size Determination for Objective One**

The sample size was determined using single proportion formula that n $=\frac{(Z\,\alpha/_2)^2 x\,P\,(1-P)}{d^2}$ with the following consideration (n=sample size, Z- the value of z statistic at 95% confidence level = 1.96, P=the expected proportion of adequate knowledge and a favorable attitude towards spectacle use were 90.6% and 90.4%,respectively which were taken study done in Gondar, Ethiopia.[9] and d=margin of error of 5%. According to this, the calculated sample sizes were 131 and 134 for adequate knowledge and favorable attitude towards spectacle use, respectively.

**The sample size Determination for Objective Two**

Educational status was consistently associated with knowledge about spectacle use[9] used for determine sample size for the second objective of knowledge about spectacle using the software EPI INFO version 7, considering a confidence level of 95%, power of 80%, a ratio of unexposed to exposed patients of 0.989, an odds ratio of 0.31, and the

proportion of case in exposed and unexposed groups were 83.2% and 94.1%, respectively. The computer-generated sample size was 300.

In contrast, occupational status was consistently associated with attitudes towards spectacle use[9] used for determine sample size for the second objective of knowledge about spectacle using the software EPI INFO version 7, considering a confidence level of 95%, power of 80%, a ratio of unexposed to exposed patients of 1.00, an odds ratio of 0.376, and the proportion of case in exposed and unexposed groups were 86.6% and 94.5%, respectively. The computer-generated sample size was 478. Finally, the sample size calculated on the basis of occupational status was selected because it was sufficient to meet both objectives. And, by considering a design effect of 2, and a non-response rate of 10%, the final planned sample size was 1052.

## Patient and public involvement

Patients and/or the public were not involved in the study design, conduct of the study or plan to disseminate the result of this study to the study participants.

## Operational Definitions

**Knowledge about spectacle use** was assessed using 15 “yes” or “no” questions requiring a total of fifteen correct answers. The answers were Yes = 1 and No = 0. The median score for knowledge was 11. Participants who answered median score or above of knowledge-related questions were considered to have adequate knowledge about spectacle use, otherwise, inadequate knowledge about spectacle use.

**Attitudes towards spectacle use** was assessed by fifteen attitude questions using a 5 point Likert scale. The responses were: strongly agree =1, agree =2, neutral =3, disagree =4 and strongly disagree =5. The score points range from 15 -75 points and the median attitude score was 57. Thus, respondents who answered more than or equal to the median score of the attitude-relate questions had a favorable attitude towards spectacle use while respondents who answered less than the median score had an unfavorable attitude.

**History of eye examination:** the study participants had performer an eye examination at least once in the last 2 years.[17]

## Data collection procedures

The data were collected through face to face interview. The interview was conducted using pretested structured questionnaires which was adapted from the previous similar studies.[7 13] the questionnaires included questions on socio-demographic characteristics, previous ocular history, personal medical history, and knowledge and attitude related questions. Four optometrists had participated to collect the data. Inter examiner reliability was assessed, and Cohen's kappa statistic was 0.79 and 0.81 for knowledge and attitude towards spectacle use, respectively.

Multi stage sampling procedure was applied to obtain the sampling unit. First, four kebeles were selected from nine kebeles using the lottery method. The sample size was proportionally allocated to the size of the population in each selected kebeles. Finally, a systematic random sampling method was applied to select households using a constant interval of 10. The interval was calculated as the total number of households in the selected kebeles divided by the sample size (K=N/n=10,519/1052=10). We then randomly chose a number between 1 and 10 to select the first household to be included in the sample, and every 10$^{th}$ household was randomly selected. Moreover, if more than one eligible adult aged ≥18 years was found in the selected household, study participants were recruited by lottery. The household was visited twice if the eligible person could not be found during data collection. An immediate neighboring household was included in the survey if there was no eligible person in the selected household who met the inclusion criteria (figure 1).

## Statistical Analysis

After checking the completeness and consistency of the data were entered into Kobo Collect version 2021.4.4 and exported to Stata version 14 for analysis. Both descriptive and analytical statistics were performed. Multicollinearity was checked using variance inflation factor (VIF) and tolerance. A bivariable logistic regression followed by a multivariable binary logistic regression was fitted to identify possible predictors of knowledge and attitude towards spectacle use. The strength of the association between predictors and outcome variables was shown using an adjusted OR (AOR) with a 95% CI. The model of fitness was ensured through the Hosmer and

Lemeshow goodness of fit. A variable with a p value of 0.05 in multivariable binary logistic regression was considered statistically significant.

# Results

## Socio-Demographic Characteristics of the Study Participants

A total of 1022 study participants were included with a response rate of 97.15%. The median age of the study participants was 45 years, with an IQR of 37–54 years Of the 1022 study participants, 687 (67.22%) were male, 812 (79.45%) were married and 468 (45.79%) had college and above educational status (table 1).

## Clinical Characteristics of the Study Participants

Out of 1022 participants, about 285 (27.89%) of the participants had worn spectacles at least once in their life, 542 (53.03%) had self-reported visual deterioration, 137 (13.41%) had a history of eye training, and 424 (41.49%) had a family history of spectacle use (table 2).

## Knowledge about Spectacle Use among Study Participants

In this study, the proportion of adequate knowledge about spectacle use was 86.01% (95% CI: 83.88, 88.14).

Regarding detail knowledge about spectacle use, out of 1022 participants, 249 (24.36%) said that eye drops can be an alternative to spectacles correction, 238 (23.29%) thought that spectacles prescribed for one person can be used for another, 241 (23.58%) assumed that you get spectacles once and then they always have the same meaning for the rest of your life, and only 637 (62.33%) assumed that spectacle wearers must wear them regularly.

## Attitude towards Spectacle Use among Study Participants

Eight hundred and seventy-two (85.32%; 95% CI: 83.15, 87.50) of the total 1022 study participants had a favorable attitude towards spectacle use. Of those who had a favorable attitude, 71.10% were male.

Of the study participants, 102 (9.98%) strongly agreed that wearing spectacles can lead to activity limitations, 230 (22.50%) agreed that wearing spectacles is fashionable, 128

(12.52%) strongly disagreed that wearing spectacles makes you look better, 108 (10.57%) agreed that wearing spectacles worsens vision, and 111 (10.86%) agreed that wearing spectacles is uninteresting.

## Factors associated with knowledge about spectacle use

In bi-variable binary logistic regression analysis, female sex, increasing age, marital status (being widowed), higher education status (secondary school and college and above), occupational status (being a merchant and housewife), history of training on the eye, history of eye examination, history of spectacle use, history of self-reported reduction in vision, history of cataract surgery, and family history of spectacle use were associated with knowledge about spectacle use. However, multivariable binary logistic regression analysis revealed that age, educational status, history of spectacle use, and family history of spectacle use were significantly associated with knowledge of spectacle use.

This study revealed that as age increases by one unit, the odds of adequate knowledge towards spectacle use increase by 1.21 times (AOR=1.21, 95%CI: 1.17, 1.26). The odds of adequate knowledge among participants with a higher level of education (college and above) were 2.65 times higher as compared to those who cannot read and write (AOR = 2.65, 95%CI: 1.06, 6.60).

The odds of adequate knowledge among participants with a positive history of spectacle use were 3.20 times higher as compared to those who had no positive history of spectacle use (AOR=3.20, 95%CI:1.31, 7.83). The odds of adequate knowledge among participants with a positive family history of spectacle use were 4.75 times higher as compared to those who had no family history of spectacle use (AOR= 4.75,95%CI: 2.31, 9.75) (table 3).

## Factors associated with attitude towards spectacle use

By applying bivariable binary logistic regression analysis, female gender, older age, higher education level (secondary school and college and above), occupational status (being a merchant, housewife or unemployed), history of eye examination, history of spectacle use, history of self-reported vision reduction, history of cataract surgery, family history of spectacle use and knowledge about spectacle use were significantly associated with attitude toward spectacle use. However, multivariable logistic regression analysis revealed that educational status, history of spectacle use, family history of spectacle use and knowledge of spectacle use were significantly associated with attitudes towards spectacle use.

The odds of a favorable attitude among those who had higher education levels (college and above) were 2.56 times higher as compared to those who could not read and write (AOR=2.56, 95%CI: 1.26, 5.21). The odds of a favorable attitude among those who had a positive history of spectacle use were 3.22 times higher than those who had no history of spectacle use (AOR =3.22, 95% CI=1.58, 6.55). The odds of a favorable attitude among those who had a positive family history of spectacle use were 1.89 times higher as compared to those who had no family history of spectacle use (AOR = 1.89, 95% CI=1.13, 3.16). The odds of a favorable attitude among those who had adequate knowledge towards spectacle use were 4.63 times higher than those who had inadequate knowledge towards spectacle use (AOR=4.63,95%CI=2.69, 7.98) (table 4).

## Discussion

In this study, about 86.01%(95%CI:83.88, 88.14) of the study participants had adequate knowledge towards spectacle use. This result is lower than in the studies in Gondar (90.6%),[9] South Africa (94%),[22] and India (92%).[16] The difference could be due to the fact that the socio-demographic characteristics, past ocular history and inclusion of the study population vary from country to country. For instane, in the study in Gondar, the number of spectacle users was higher than in the current study,[9] which led to an overestimation of the proportion of adequate knowledge in Gondar. The use of spectacles has been shown to have a major impact on knowledge of spectacle use.[13 30] Furthermore, the studies conducted in India and South Africa were conducted by participants with high educational status, with the Indian study including secondary school students and the South African study including university students. Therefore, The different levels of education of the study participants could therefore lead to different levels of knowledge about spectacle use. Knowledge about spectacle use was influenced by the participants' level of education.[8 9 16 22 31]

However, this result is higher than the studies in Egypt (67%),[32] Ghana (38.5%),[13] Nigeria (38%),[33] Saudi Arabia (23%),[14] China (33.3%),[30] and Indonesia (20%).[8] The difference could be due to the different in the study setting and study population. The study conducted in Saudi Arabia was conducted among women. However, in the present study, most of the participants were males who easily obtain information about spectacles from colleagues and trainings compared to females, resulting in a high proportion of adequate knowledge about spectacle use in this study.[33 34]

The odds of adequate knowledge towards spectacle use among study participants who had a higher level of education (college and above) were 2.65 times higher than those participants who were unable to read and write. This finding is consistent with the findings of studies conducted in Gondar, Ethiopia,[9] and Indonesia.[8] This association might be because individuals with a high level of education are more likely to attend health education programs, understand written and visual documents, and approach different sources of information that builds knowledge about spectacle use.[35]

Age was significantly associated with adequate knowledge towards spectacle use. As age increases by one unit, the odds of adequate knowledge towards spectacle use increase by 1.21 times. This finding is in line with other research conducted in Nigeria[36] and Indonesia.[8] This association might be due to older people are more likely to be presbyopic;[37 38] they need spectacles for near vision. This exposes to those population to get enough information about their spectacles.[8]

The odds of adequate knowledge towards spectacle use among study participants who had a positive history of spectacle use were 3.20 times greater than those among participants who did not use spectacles. This finding is supported by studies conducted in Ghana[13] and China.[30] This might be due to spectacle users seeing the advantage of spectacle use as improving their vision or providing protection. The methods of wearing spectacles may be explained to patients before dispensing them, so respondents may understand what spectacle use is.

The odds of adequate knowledge towards spectacle use among study participants with a family history of spectacle use were 4.75 times higher as compared to those who had no family history of spectacle use. This result is in line with the findings of studies conducted in Nigeria[12] and Swaziland.[39] This might be due to the chance of obtaining information from family experiences about the advantages of spectacle use.[12]

In the present study, the proportion of favorable attitude towards spectacle was 85.32% (95% CI: 83.15, 87.50). This finding is lower than other studies conducted in Gondar (90.4%)[9] and India (99.2%).[6] This may be due to the higher knowledge of spectacle use among the population in those studies, as attitude is influenced by knowledge,[8 9] easily accessible information, and eye care centers in India,[40] which can affect people's attitude towards spectacle use, facilitating an affirmative attitude.

In contrast, the finding of the present study was higher than the studies performed in Nigeria (36%, 61.62%),[33 41] India (23.5%),[42] Oman (53.5%),[15] and Indonesia (50%).[8] The difference could be due to variation in the study population; in previous studies, participants were between 15 and 35 years old, whereas in this study, most of the participants were older than 35 years old and were more likely to be presbyopic and

more likely to use spectacles for near vision. As a result, their attitude towards spectacle use became favorable as practice changed.[37 38]

The odds of having a favorable attitude among participants with a higher level of education (college and above) were 2.56 times higher than to those who cannot read and write. This finding is supported by studies in Gondar,[9] Oman,[15] and Indonesia.[8] This might be because when people's educational levels increase, they might be highly concerned about their vision, and they may use spectacles to improve it. They also had a good attitude towards spectacles. Moreover, their visual needs may also be a factor for these educated groups, which prompts them to be spectacle users.[43]

The odds of having a favorable attitude among participants with a positive history of spectacle use were 3.22 times higher as compared to those who did not have a positive history of spectacle use before. This result is supported by studies performed in Ghana[13] and Saudi Arabia.[14] This might be because when individuals use spectacles, they have improved vision, and they receive advice when the spectacle is dispensed.

The odds of having a favorable attitude among participants with a family history of spectacle use were 1.89 times higher as compared to those who did not have a family history of spectacle use. This result is supported by studies that were performed in Nigeria[12] and Indonesia.[8] Parents who were spectacle-wearers were more likely to allow their families to wear spectacles.[12]

The odds of having a favorable attitude among participants with adequate knowledge towards spectacle use were 4.63 times higher as compared to those who had inadequate knowledge towards spectacle use. This result is in agreement with the findings of studies conducted in Gondar[9] and Indonesia.[8] This might be due to individual knowledge improvement, which can positively change the attitude of participants towards spectacle wear.[8 15]

## Conclusion

This study revealed that the proportion of adequate knowledge and a favorable attitude towards spectacle use was good. Increasing age, higher level of education, positive history of spectacle use, and family history of spectacle use were significantly associated with adequate knowledge of spectacle use.

Besides, higher educational status, positive history of spectacle use, family history of spectacle use, and adequate knowledge of spectacle use were positively associated with a favorable attitude towards spectacle use. We recommend that strengthening the existing knowledge and attitudes towards spectacle use by disseminating information at community meetings for individuals with a low level of educational status.

## Declarations

### Ethical approval

This study was conducted in accordance of accordance with the Declaration of Helsinki. Ethical approval was obtained from the Ethical Review Committee at University of Gondar, College of Medicine and Health Sciences, Comprehensive and Specialized Hospital, and School of Medicine. A letter of support was provided by the administration of Debre Berhan. Verbal informed consent was obtained from all participants after detailed explanation of the purpose of the study. Verbal informed consent was approved by the ethical review committee at University of Gondar, and the ethical approval number was 622/05/2023. All included participants were informed of their right to withdraw from the study at any time during the interview. No risk was taken for the selected study participants. Confidentiality was maintained by not using personal identifiers in the data collection tools and by password-protecting the data on a computer.

### Consent for publication

Not applicable.

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## Conflict of interests

All authors declared that there is no conflict of interest in this research work.

## Data availability of statement

All data are relevant to the study are included in the article or uploaded as supplemental information.

## Authors' contributions

MMB conceptualised the research design, formulated the research questions, takes full responsibility for the work, designed and implemented the research methodology, and conducted extensive reviewers of the manuscript. NFA and ASA contributed to refining the research objectives and conceptualization of the study, conducted statistical analyses and interpreted the results. NFA, ASA and TCZ assisted in refining the methodological approach and methodological decisions, led the data collection efforts, organized and managed datasets, and ensured data quality and integrity. MTT and AFS conducted statistical analyses, interpreted the results, drafted the initial manuscript, outlining the research background, methodology and results, and reviewed the manuscript. MMB acts as a guarantor.

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**Table 1** Socio-demographic characteristics of the study participants in Debre Berhan town, North Shewa, Ethiopia, 2023 (n = 1022)

| Variables | Categories | Frequency | Percentage |
|---|---|---|---|
| Sex | Male | 687 | 67.22 |
| | Female | 335 | 32.78 |
| Marital status | Not married | 135 | 13.21 |
| | Married | 812 | 79.45 |
| | Divorced | 48 | 4.70 |
| | Widowed | 27 | 2.64 |
| Educational status | Unable to read and write | 117 | 11.45 |
| | Able to read and write | 195 | 19.08 |
| | Primary school | 70 | 6 .85 |
| | Secondary School | 172 | 16.83 |
| | College and above | 468 | 45.79 |
| Occupational status | Merchant | 271 | 26.52 |
| | Government employed | 428 | 41.88 |
| | Housewife | 132 | 12.92 |
| | Private employed | 141 | 13.80 |
| | Unemployed | 50 | 4.89 |

**Table 2** Clinical characteristics of the study participants in Debre Berhan town, North Shewa, Ethiopia, 2023 (n=1022)

| Variables | Categories | Frequency | Percent |
|---|---|---|---|
| History of eye examination | Yes | 491 | 48.04 |
| | No | 531 | 51.96 |
| Self-reported reduction of vision | Yes | 542 | 53.03 |
| | No | 480 | 46.97 |
| History of spectacle use | Yes | 285 | 27.89 |
| | No | 737 | 72.11 |
| History of cataract surgery | Yes | 207 | 20.25 |
| | No | 815 | 79.75 |
| History of ocular trauma | Yes | 96 | 9.39 |
| | No | 926 | 90.61 |
| History of training on eye | Yes | 137 | 13.41 |
| | No | 885 | 86.59 |
| Family history of spectacle | Yes | 424 | 41.49 |
| | No | 598 | 58.51 |
| History of DM | Yes | 81 | 7.93 |
| | No | 941 | 92.07 |
| History of HTN | Yes | 43 | 4.21 |
| | No | 979 | 95.79 |

**Table 3** Factors associated with knowledge towards spectacle use among adults in Debre Berhan Town, North Shewa, Ethiopia, 2023 (n =1022)

| Variables | Knowledge towards spectacle use | | | | |
|---|---|---|---|---|---|
| | Adequate | Inadequate | COR (95% CI) | AOR (95% CI) | P-value |
| **Sex** | | | | | |
| Female | 253 | 82 | 0.30(0.20-0.43) | 1.03(0.58-1.85) | 0.897 |
| Male | 626 | 61 | 1.00 | 1.00 | |
| **Age(years)** | | | 1.22(1.18-1.26) | 1.21(1.17-1.26) | <0.0001 |
| **Marital status** | | | | | |
| Not married | 120 | 15 | 1.00 | 1.00 | |
| Married | 698 | 114 | 0.76(0.43-1.35) | 1.03(0.46-2.29) | 0.937 |
| Divorced | 41 | 7 | 0.73(0.27-1.92) | 0.23(0.04-1.23) | 0.087 |
| Widowed | 20 | 7 | 0.35(0.12-0.98) | 0.74(0.17-3.10) | 0.686 |
| **Educational status** | | | | | |
| Unable to read and write | 86 | 31 | 1.00 | 1.00 | |
| Able to read and write | 142 | 53 | 0.96(0.57-1.62) | 0.81(0.38-1.70) | 0.581 |
| Primary school | 51 | 19 | 0.96(0.49-1.88) | 0.66(0.25-1.68) | 0.385 |
| Secondary School | 152 | 20 | 2.73(1.47-5.09) | 1.62(0.65-4.02) | 0.293 |
| College and above | 448 | 20 | 8.07(4.39-14.82) | 2.65(1.06-6.60) | 0.035 |
| **Occupational status** | | | | | |
| Merchant | 222 | 49 | 0.53(0.34-0.82) | 0.98(0.51-1.86) | 0.956 |
| Government employed | 383 | 45 | 1.00 | 1.00 | |
| Housewife | 100 | 32 | 0.36(0.22-0.60) | 0.85(0.39-1.81) | 0.677 |
| Private employed | 132 | 9 | 1.72(0.82-3.62) | 2.77(0.95-8.07) | 0.061 |
| Unemployed | 42 | 8 | 0.61(0.27-1.39) | 0.56(0.13-2.32) | 0.428 |
| **History of training on eye** | | | | | |
| Yes | 128 | 9 | 2.53(1.25-5.11) | 1.36(0.52-3.53) | 0.517 |
| No | 751 | 134 | 1.00 | 1.00 | |
| **History of eye examination** | | | | | |
| Yes | 465 | 26 | 5.05(3.23-7.88) | 1.33(0.64-2.75) | 0.431 |
| No | 414 | 117 | 1.00 | 1.00 | |

| | | | | | |
|---|---|---|---|---|---|
| **History of spectacle use** | | | | | |
| Yes | 277 | 8 | 7.76(3.75-16.06) | 3.20(1.31-7.83) | 0.010 |
| No | 602 | 135 | 1.00 | 1.00 | |
| **Self-reported reduction of vision** | | | | | |
| Yes | 508 | 34 | 4.38(2.92-6.59) | 0.91(0.45-1.82) | 0.795 |
| No | 371 | 109 | 1.00 | 1.00 | |
| **History of cataract surgery** | | | | | |
| Yes | 197 | 10 | 3.84(1.98-7.44) | 1.14(0.44-2.94) | 0.775 |
| No | 682 | 133 | 1.00 | 1.00 | |
| **Family history of spectacle use** | | | | | |
| Yes | 411 | 13 | 8.78(4.89-15.76) | 4.75(2.31-9.75) | <0.0001 |
| No | 468 | 130 | 1.00 | 1.00 | |

**Note:** n-sample size, COR-Crude odds ratio, AOA-Adjusted odds ratio and CI-Confidence interval

**Table 4** Factors associated with attitude towards spectacle use among adults in Debre Berhan town, North Shewa, Ethiopia, 2023 (n=1022)

| Variables | Attitude towards spectacle use | | | | |
|---|---|---|---|---|---|
| | Favorable | Unfavorable | COR (95% CI) | AOR (95% CI) | P-value |
| **Sex** | | | | | |
| Female | 252 | 83 | 0.32(0.23-0.46) | 0.65(0.41-1.02) | 0.065 |
| Male | 620 | 67 | 1.00 | 1.00 | |
| **Age(years)** | | | 1.06(1.04-1.07) | 1.00(0.98-1.02) | 0.575 |
| **Marital status** | | | | | |
| Not married | 111 | 24 | 1.00 | 1.00 | |
| Married | 700 | 112 | 1.35(0.83-2.19) | 1.41(0.79-2.48) | 0.235 |
| Divorced | 42 | 6 | 1.51(0.57-3.96) | 1.86(0.61-5.61) | 0.270 |
| Widowed | 19 | 8 | 0.51(0.20-1.30) | 0.88(0.30-2.54) | 0.815 |
| **Educational status** | | | | | |
| Unable to read and write | 85 | 32 | 1.00 | 1.00 | |
| Able to read and write | 146 | 49 | 1.12(0.66-1.88) | 1.03(0.57-1.83) | 0.915 |
| Primary school | 50 | 20 | 0.94(0.48-1.81) | 0.85(0.41-1.77) | 0.675 |
| Secondary School | 149 | 23 | 2.43(1.34-4.43) | 1.76(0.87-3.58) | 0.113 |
| College and above | 442 | 26 | 6.40(3.62-11.28) | 2.56(1.26-5.21) | 0.009 |
| **Occupational status** | | | | | |
| Merchant | 218 | 53 | 0.44(0.28-0.69) | 0.65(0.38-1.08) | 0.102 |
| Government employed | 386 | 42 | 1.00 | 1.00 | |
| Housewife | 104 | 28 | 0.40(0.23-0.68) | 0.89(0.48-1.67) | 0.733 |
| Private employed | 124 | 17 | 0.79(0.43-1.44) | 0.52(0.26-1.05) | 0.069 |
| Unemployed | 40 | 10 | 0.43(0.20-0.93) | 0.41(0.16-1.01) | 0.053 |
| **History of training on eye** | | | | | |
| Yes | 122 | 15 | 1.46(0.83-2.58) | 0.56(0.28-1.10) | 0.096 |
| No | 750 | 135 | 1.00 | 1.00 | |
| **History of eye examination** | | | | | |
| Yes | 454 | 37 | 3.31(2.23-4.92) | 1.04(0.58-1.88) | 0.873 |
| No | 418 | 113 | 1.00 | 1.00 | |

| | | | | | |
|---|---|---|---|---|---|
| **History of spectacle use** | | | | | |
| Yes | 274 | 11 | 5.78(3.08-10.87) | 3.22(1.58-6.55) | 0.001 |
| No | 598 | 139 | 1.00 | 1.00 | |
| **History of ocular trauma** | | | | | |
| Yes | 87 | 9 | 1.73(0.85-3.52) | 1.22(0.52-2.84) | 0.638 |
| No | 785 | 141 | 1.00 | 1.00 | |
| **Self-reported reduction of vision** | | | | | |
| Yes | 496 | 46 | 2.98(2.05-4.32) | 0.85(0.49-1.47) | 0.566 |
| No | 376 | 104 | 1.00 | 1.00 | |
| **History of cataract surgery** | | | | | |
| Yes | 192 | 15 | 2.54(1.45-4.43) | 0.94(0.47-1.89) | 0.873 |
| No | 680 | 135 | 1.00 | 1.00 | |
| **Family history of spectacle use** | | | | | |
| Yes | 397 | 27 | 3.80(2.45-5.89) | 1.89(1.13-3.16) | 0.015 |
| No | 475 | 123 | 1.00 | 1.00 | |
| **Knowledge towards spectacle use** | | | | | |
| Adequate | 798 | 81 | 9.18(6.15-13.70) | 4.63(2.69-7.98) | <0.0001 |
| Inadequate | 74 | 69 | 1.00 | 1.00 | |

**Note:** n-sample size, COR-Crude odds ratio, AOA-Adjusted odds ratio and CI-Confidence interval

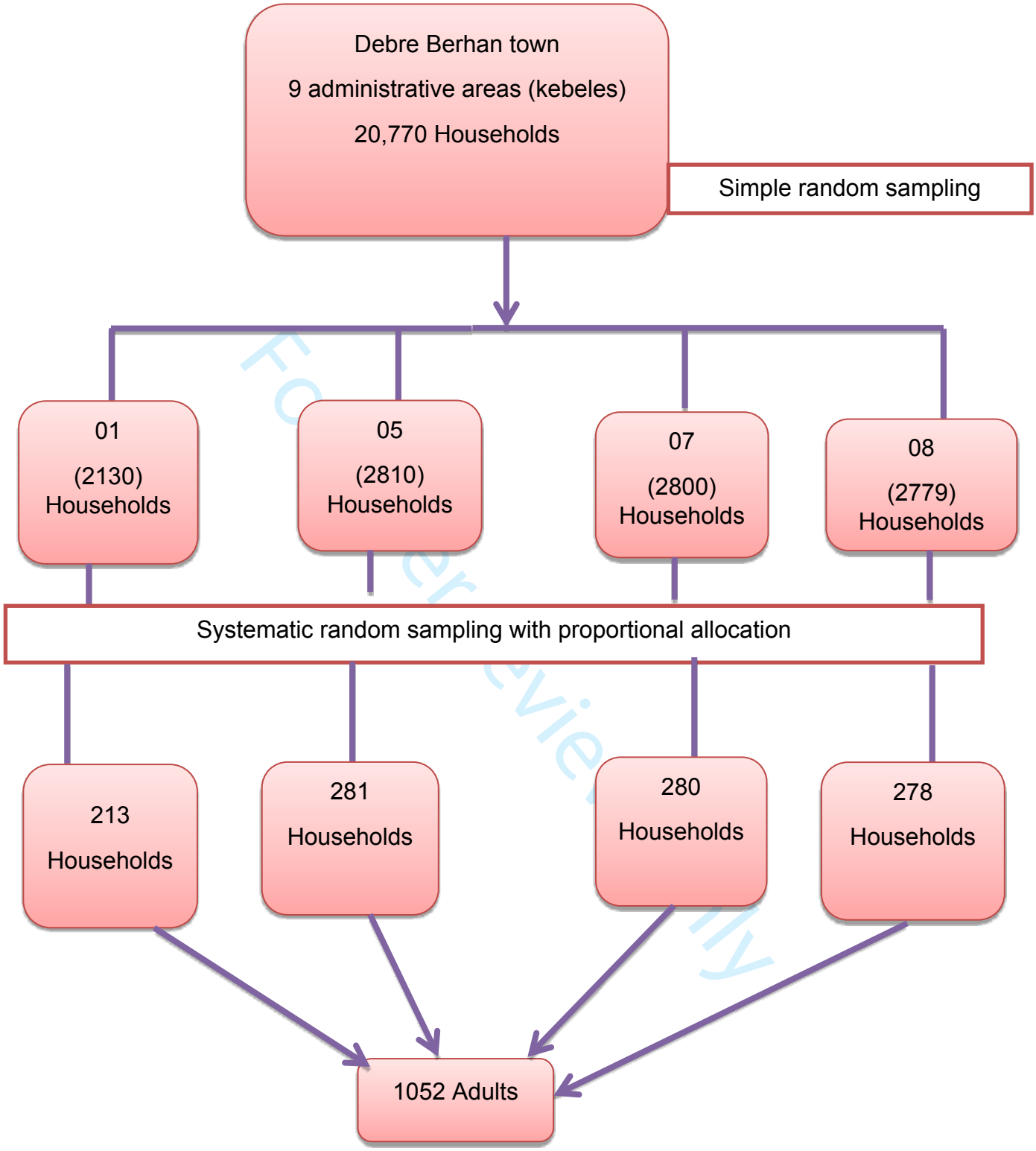


**Figure 1** Diagrammatic representation of the sampling procedure in Debre Berhan town, North Shewa, Ethiopia, 2023

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# Knowledge, Attitude, and Its Associated Factors towards Spectacle Used among Adults living in Debre Birhan Town, North Shewa, Ethiopia, 2023: Community based Cross-Sectional Study



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# Knowledge, Attitude, and Its Associated Factors towards Spectacle Used among Adults living in Debre Birhan Town, North Shewa, Ethiopia, 2023: Community based Cross-Sectional Study

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## Abstract

**Objective:** This study aimed to assess the knowledge, attitude, and its associated factors towards spectacle use among adults living in Debre Birhan town, North Shewa, Ethiopia.

**Design:** A community-based cross-sectional study was conducted using a multistage sampling method.

**Setting:** The study was conducted in Debre Birhan town, North Shewa, Ethiopia.

**Participants** The study included 1022 adults with aged ≥18 years who lived in Debre Birhan town for more than 6 months.

**Main outcome measures**: Data were collected using face to face interview completed by an interviewer.

**Results:** The study included 1022 adults with a median age of 45 years. Of 1022 participants, 86.01% (95% CI: 83.88, 88.14) had adequate knowledge and 85.32% (95% CI: 83.15, 87.50) had favorable attitude towards spectacle use. Older age (AOR = 1.21, 95% CI: 1.17, 1.26), higher educational status (AOR = 2.65, 95% CI: 1.06, 6.60), a history of spectacle use (AOR = 3.20, 95% CI: 1.31, 7.83) and a family history of spectacle use (AOR = 4.75, 95% CI: 2.31, 9.75) were positively associated with adequate knowledge of spectacle use. Higher educational status (AOR = 2.56, 95% CI: 1.26, 5.21), a history of spectacle use (AOR = 3.22, 95% CI: 1.58, 6.55), family history of spectacle use (AOR=1.89, 95%CI: 1.13, 3.16) and adequate knowledge about spectacle use (AOR= 4.63, 95%CI: 2.69, 7.98) were positively associated with favorable attitude towards spectacle use.

**Conclusion:** This study revealed that the proportion of adults with adequate knowledge and favorable attitude towards spectacle use was good. Higher educational status, history of spectacle use and family history of spectacle use were significantly associated with adequate knowledge and favorable attitude towards spectacle use.


**Keywords:** Spectacle use, knowledge, attitude, Debre Birhan town, Ethiopia

## Strengths and Limitations of This Study

- This study offered current information on the proportion and associated factors with knowledge and attitude toward spectacle use among adults living in Northeast Ethiopia to reduce UV radiation-related ocular hazards and visual impairment from refractive error and presbyopia.
- As a cross-sectional study, it can demonstrate the temporal relationship between associated factors and knowledge and attitude towards spectacle use rather than establish a cause-effect relationship.
- The study results did not specifically address the attitudes and knowledge of adults who use spectacles to correct refractive errors or presbyopia, or the parents/guardians of children who use them for the same purpose, even though it involved the general population

# Introduction

Spectacles are optical devices consisting of a frame with lenses used to correct distance and/or near vision, for protection and to gain self-confidence.[1, 2] Spectacle is the world's most cost-effective method of correcting refractive errors (REs).(3) The proportion of adults who could benefit from spectacles to correct RE but do not yet own or use them is high in many countries: 60% in rural China.(4) and 71.58% in Finote Selam town, Ethiopia.(5) The prevalence of inadequate knowledge and an unfavorable attitude towards spectacle use among adults worldwide ranges from 8% to 80% and 0.8% to 69%, respectively.(6-9)

Evidence have shown that knowledge towards spectacle use was positively associated with male sex, college and above educational status, history of spectacle use, history of eye examination, self-reported reduction in vision, and family history of spectacle use(10-13), and a favorable attitude towards spectacle use was significantly associated with older age, college and above educational status, urban residency, a positive history of spectacle use, and knowledge about spectacle use.(8, 14, 15)

Adults' knowledge and attitude towards spectacle use play an important role in encouraging people to seek treatment to correct refractive errors and improve eye

health seeking behavior.(15-17) In addition, wearing glasses for refractive errors helps to minimize the burden of visual impairment.(6, 15)

In contrast, inadequate knowledge and an unfavorable attitude towards spectacle use lead to visual impairment and blindness due to uncorrected refractive error, which hinder education, productivity, limited social participation, psychological impact and reduced quality of life(18-24) This also leads to an enormous burden on the healthcare system.(6, 25-28)

Although numerous studies have been conducted to determine the prevalence of refractive error, there is comparatively insufficient data on the knowledge and attitude towards spectacle use. Providing update information on knowledge and attitude towards spectacle use is very crucial for policy maker and stakeholders' works on reduction of refractive to design the platform in awareness creation in spectacle use. The main objective of this study was to investigate the knowledge, attitude and associated factors towards spectacle use among adults in Debre Berhan town in North Shewa, Ethiopia.

# Methods and Materials

## Study Design and Setting

A community-based cross-sectional study was conducted in Debre Birhan town, North Shewa, Ethiopia, between May 8 and June 8, 2023. The town is located in North Shewa, Amhara National Regional State Government, 130 kilometers away from Addis Ababa, the capital city of Ethiopia, and 688 kilometers away from Bahir Dar, the capital city of Amhara National Regional State. The total population who are living in the town have 88,375 (39,961 males and 48,414 females), of which 56,914 are adults aged ≥18 years.(29) It has nine administrative kebeles. There is a tertiary eye care center with ophthalmologists, optometrists, ophthalmic nurses and nurses serving more than 3 million people in the catchment area, as well as a private eye clinic in the town. There are also more than three optical workshops in the town.

## Study Population and Eligibility Criteria

All adults aged ≥ 18 years who lived in Debre Birhan town for more than 6 months and available during the data collection period were included in the study. However, adults who were unable to respond the questionnaire due to serious illness or mental impairment were excluded.

## Patient and public involvement

Patients and/or the public were not involved in the study design, conduct of the study or plan to disseminate the result of this study to the study participants

**The sample size Determination for Objective One**

The sample size was determined using single proportion formula that n $=\frac{(Z\,\alpha/_2)^2 x\ P\ (1-P)}{d^2}$ with the following consideration (n=sample size, Z- the value of z statistic at 95% confidence level = 1.96, P=the expected proportion of adequate knowledge and a favorable attitude towards spectacle use were 90.6% and 90.4%,respectively which were taken study done in Gondar, Ethiopia.(9)and d=margin of error of 5%. According to this, the calculated sample sizes were 131 and 134 for adequate knowledge and favorable attitude towards spectacle use, respectively.

**The sample size Determination for Objective Two**

Educational status was consistently associated with knowledge about spectacle use(9) used for determine sample size for the second objective of knowledge about spectacle using the software EPI INFO version 7, considering a confidence level of 95%, power of 80%, a ratio of unexposed to exposed patients of 0.989, an odds ratio of 0.31, and the proportion of case in exposed and unexposed groups were 83.2% and 94.1%, respectively. The computer-generated sample size was 300.

In contrast, occupational status was consistently associated with attitudes towards spectacle use(9) used for determine sample size for the second objective of knowledge about spectacle using the software EPI INFO version 7, considering a confidence level of 95%, power of 80%, a ratio of unexposed to exposed patients of 1.00, an odds ratio of 0.376, and the proportion of case in exposed and unexposed groups were 86.6% and 94.5%, respectively. The computer-generated sample size was 478. Finally, the sample size calculated on the basis of occupational status was selected because it was sufficient to meet both objectives. And, by considering a design effect of 2, and a non-response rate of 10%, the final planned sample size was 1052.

## Sampling Procedures and Techniques

Multi stage sampling procedure was applied to obtain the sampling unit. First, four kebeles were selected from nine kebeles using the lottery method. The sample size was proportionally allocated to the size of the population in each selected kebeles. Finally, a systematic random sampling method was applied to select households using a constant interval of 10. The interval was calculated as the total number of households in the selected kebeles divided by the sample size (K=N/n=10,519/1052=10). We then randomly chose a number between 1 and 10 to select the first household to be included in the sample, and every 10th household was randomly selected. Moreover, if more than one eligible adult aged ≥18 years was found in the selected household, study participants were recruited by lottery. If the eligible person could not be found during data collection, the household was visited again. If no eligible person meeting the inclusion criteria was found in the selected household, an adjacent household was surveyor **(Figure 1).**

## Operational Definitions

**Knowledge about spectacle use** was assessed using 15 “yes” or “no” questions. The participant who answered correctly (Yes) was scored 1 and those who answered incorrectly (No) were scored 0. The sum score ranges from 0 to 15 points and the median score for knowledge was 11. Participants who answered median score or above of knowledge-related questions were considered to have adequate knowledge about spectacle use, otherwise, inadequate knowledge about spectacle use.

**Attitudes towards spectacle use** was assessed by fifteen attitude related questions using a 5 point Likert scale. The responses were: strongly agree =1, agree =2, neutral =3, disagree =4 and strongly disagree =5. The sum of the score points range from 15 - 75 points and the median attitude score value was 57. Thus, respondents who answered more than or equal to the median score of the attitude-relate questions had a favorable attitude towards spectacle use while respondents who answered less than the median score had an unfavorable attitude.

**History of eye examination:** the study participants had performer an eye examination at least once in the last 2 years.(17)

**History of eye training** in this study means that the study participant received eye health-related education from an eye care professional at least once times before the data collection period.

## Data collection procedures

The data was collected through face-to-face interviews using pretested structured questionnaires adapted from previous similar studies.(7, 13) the questionnaires included questions on socio-demographic characteristics, previous ocular history, personal medical history, and knowledge and attitude related questions (supplementary file1). Four optometrists had participated to collect the data. Inter examiner reliability was assessed, and Cohen’s kappa statistic was 0.79 and 0.81 for knowledge and attitude towards spectacle use, respectively. After the interviews were completed, the participants' distance visual acuity was measured in each eye using a Snellen visual acuity chart at a distance of 6 meters. If a participant couldn't see a letter at 1 meter, other measures like counting fingers, hand motion, light perception, and no light

perception were used to assess visual acuity. The visual acuity status was classified as follows: normal vision (presenting visual acuity (PVA) in the better eye ≥ 6/12), mild visual impairment (PVA in the better eye <6/12 to 6/18), moderate visual impairment (PVA in the better eye <6/18 to 6/60), severe visual impairment (PVA in the better eye <6/60 to 3/60), and blindness (PVA in the better eye <3/60) based on the International Classification of Diseases 11th definition of visual impairment. (30)

## Statistical Analysis

After checking the completeness and consistency of the data were entered into Kobo Collect version 2021.4.4 and exported to Stata version 14 for analysis. Both descriptive and analytical statistics were performed. Multicollinearity was checked using variance inflation factor (VIF) and tolerance. A bivariable logistic regression followed by a multivariable binary logistic regression was fitted to identify possible predictors of knowledge and attitude towards spectacle use. The strength of the association between predictors and outcome variables was shown using an adjusted OR (AOR) with a 95% CI. The model of fitness was ensured through the Hosmer and Lemeshow goodness of fit. A variable with a p value of 0.05 in multivariable binary logistic regression was considered statistically significant.

# Results

## Socio-Demographic Characteristics of the Study Participants

A total of 1022 study participants were included with a response rate of 97.15%. The median age of the study participants was 45 years, with an IQR of 37–54 years Of the 1022 study participants, 687 (67.22%) were male, 812 (79.45%) were married and 468 (45.79%) had college and above educational status (Table 1).

## Clinical Characteristics of the Study Participants

Out of 1022 participants, about 285 (27.89%) of the participants had worn spectacles at least once in their life, 542 (53.03%) had self-reported visual deterioration, 137 (13.41%) had a history of eye training, and 424 (41.49%) had a family history of spectacle use (Table 2).

## Knowledge about Spectacle Use among Study Participants

In this study, the proportion of adequate knowledge about spectacle use was 86.01% (95% CI: 83.88, 88.14).

Regarding detail knowledge about spectacle use, out of 1022 participants, 249 (24.36%) said that eye drops can be an alternative to spectacles correction, 238 (23.29%) thought that spectacles prescribed for one person can be used for another, 241 (23.58%) assumed that you get spectacles once and then they always have the same meaning for the rest of your life, and only 637 (62.33%) assumed that spectacle wearers must wear them regularly (supplementary file 2).

## Attitude towards Spectacle Use among Study Participants

Eight hundred and seventy-two (85.32%; 95% CI: 83.15, 87.50) of the total 1022 study participants had a favorable attitude towards spectacle use. Of those who had a favorable attitude, 71.10% were male.

Of the study participants, 102 (9.98%) strongly agreed that wearing spectacles can lead to activity limitations, 230 (22.50%) agreed that wearing spectacles is fashionable, 128 (12.52%) strongly disagreed that wearing spectacles makes you look better, 108 (10.57%) agreed that wearing spectacles worsens vision, and 111 (10.86%) agreed that wearing spectacles is uninteresting (supplementary file 3).

## Factors associated with knowledge about spectacle use

In bi-variable binary logistic regression analysis, female sex, increasing age, marital status (being widowed), higher education status (secondary school and college and above), occupational status (being a merchant and housewife), history of training on the eye, history of eye examination, history of spectacle use, history of self-reported reduction in vision, history of cataract surgery, and family history of spectacle use were associated with knowledge about spectacle use. However, multivariable binary logistic regression analysis revealed that age, educational status, history of spectacle use, and family history of spectacle use were significantly associated with knowledge of spectacle use.

This study revealed that as age increases by one unit, the odds of adequate knowledge towards spectacle use increase by 1.21 times (AOR=1.21, 95%CI: 1.17, 1.26). The odds of adequate knowledge among participants with a higher level of education (college and above) were 2.65 times higher as compared to those who cannot read and write (AOR = 2.65, 95%CI: 1.06, 6.60).

The odds of adequate knowledge among participants with a positive history of spectacle use were 3.20 times higher as compared to those who had no positive history of spectacle use (AOR=3.20, 95%CI:1.31, 7.83). The odds of adequate knowledge among participants with a positive family history of spectacle use were 4.75 times higher as compared to those who had no family history of spectacle use (AOR= 4.75,95%CI: 2.31, 9.75) (Table 3).

## Factors associated with attitude towards spectacle use

By applying bivariable binary logistic regression analysis, female gender, older age, higher education level (secondary school and college and above), occupational status (being a merchant, housewife or unemployed), history of eye examination, history of spectacle use, history of self-reported vision reduction, history of cataract surgery, family history of spectacle use and knowledge about spectacle use were significantly associated with attitude toward spectacle use. However, multivariable logistic regression analysis revealed that educational status, history of spectacle use, family history of spectacle use and knowledge of spectacle use were significantly associated with attitudes towards spectacle use.

The odds of a favorable attitude among those who had higher education levels (college and above) were 2.56 times higher as compared to those who could not read and write (AOR=2.56, 95%CI: 1.26, 5.21). The odds of a favorable attitude among those who had a positive history of spectacle use were 3.22 times higher than those who had no history of spectacle use (AOR =3.22, 95% CI=1.58, 6.55). The odds of a favorable attitude among those who had a positive family history of spectacle use were 1.89 times higher as compared to those who had no family history of spectacle use (AOR = 1.89, 95% CI=1.13, 3.16). The odds of a favorable attitude among those who had adequate knowledge towards spectacle use were 4.63 times higher than those who had inadequate knowledge towards spectacle use (AOR=4.63,95%CI=2.69, 7.98) (Table 4).

## Discussion

In this study, about 86.01%(95%CI:83.88, 88.14) of the study participants had adequate knowledge towards spectacle use. This result is lower than in the studies in Gondar,Ethiopia(90.6%),(9) South Africa (94%),(22) and India (92%).(16) The difference could be due to the fact that the socio-demographic characteristics, past ocular history and inclusion of the study population vary from country to country. For instane, in the study done in Gondar, Ethiopia the number of spectacle users was higher than in the current study,(9) which led to an overestimation of the proportion of adequate knowledge in Gondar. The use of spectacles has been shown to have a major impact on knowledge of spectacle use.(13, 31) Furthermore, the studies conducted in India and South Africa were conducted by participants with high educational status, with the Indian study including secondary school students and the South African study including university students. Therefore, The different levels of education of the study participants could therefore lead to different levels of knowledge about spectacle use. Knowledge about spectacle use was influenced by the participants' level of education.(8, 9, 16, 22, 32)

However, this result is higher than the studies in Egypt (67%),(33) Ghana (38.5%),(13) Nigeria (38%),(34) Saudi Arabia (23%),(14) China (33.3%),(31) and Indonesia (20%).(8) The difference could be due to the different in the study setting and study population. The study conducted in Saudi Arabia was conducted among women. However, in the present study, most of the participants were males who easily obtain information about spectacles from colleagues and trainings compared to females, resulting in a high proportion of adequate knowledge about spectacle use in this study.(34, 35)

The odds of adequate knowledge towards spectacle use among study participants who had a higher level of education (college and above) were 2.65 times higher than those participants who were unable to read and write. This finding is consistent with the findings of studies conducted in Gondar, Ethiopia,(9) and Indonesia.(8) This association might be because individuals with a high level of education are more likely to attend health education programs, understand written and visual documents, and approach different sources of information that builds knowledge about spectacle use.(36).

It was suggested that all stakeholders, particularly the ministers of health and education, should collaborate on implementing a plan to educate students about eye health issues at all levels of education. The aim is to reduce the impact of visual impairment caused by presbyopia and refractive errors by ensuring the appropriate use of spectacles.

Age was significantly associated with adequate knowledge towards spectacle use. As age increases by one unit, the odds of adequate knowledge towards spectacle use increase by 1.21 times. This finding is in line with other research conducted in Nigeria(37) and Indonesia.(8) This association might be due to older people are more likely to be presbyopic;(38, 39) they need spectacles for near vision. This exposes to those population to get enough information about their spectacles.(8)

The odds of adequate knowledge towards spectacle use among study participants who had a positive history of spectacle use were 3.20 times greater than those among participants who did not use spectacles. This finding is supported by studies conducted in Ghana(13) and China.(31) This might be due to spectacle users seeing the advantage of spectacle use as improving their vision or providing protection. The methods of wearing spectacles may be explained to patients before dispensing them, so respondents may understand what spectacle use is. This implies the need for eye care education, especially regarding the use of spectacles when providing them to certain individuals.

The odds of adequate knowledge towards spectacle use among study participants with a family history of spectacle use were 4.75 times higher as compared to those who had no family history of spectacle use. This result is in line with the findings of studies conducted in Nigeria(12) and Swaziland.(40) This might be due to the chance of obtaining information from family experiences about the advantages of spectacle use.(12) This implies the need for eye care education, particularly regarding spectacles, when providing them to certain individuals.

In the present study, the proportion of favorable attitude towards spectacle was 85.32% (95% CI: 83.15, 87.50). This finding is lower than other studies conducted in Gondar (90.4%)(9) and India (99.2%).(6) This may be due to the higher knowledge of spectacle use among the population in those studies, as attitude is influenced by knowledge,(8, 9) easily accessible information, and eye care centers in India,(41) which can affect people's attitude towards spectacle use, facilitating an affirmative attitude.

In contrast, the finding of the present study was higher than the studies performed in Nigeria (36%, 61.62%),(34, 42) India (23.5%)(43) Oman (53.5%),(15) and Indonesia (50%).(8) The difference could be due to variation in the study population; in previous studies, participants were between 15 and 35 years old, whereas in this study, most of the participants were older than 35 years old and were more likely to be presbyopic and more likely to use spectacles for near vision. As a result, their attitude towards spectacle use became favorable as practice changed.(38, 39)

The odds of having a favorable attitude among participants with a higher level of education (college and above) were 2.56 times higher than to those who cannot read and write. This finding is supported by studies in Gondar,(9) Oman,(15) and Indonesia.(8) This might be because when people's educational levels increase, they might be highly concerned about their vision, and they may use spectacles to improve it. They also had a good attitude towards spectacles. Moreover, their visual needs may also be a factor for these educated groups, which prompts them to be spectacle users.(44). This showed that stakeholders, especially the Minister of Health and Education, will develop a plan to provide eye health education at all levels of education. This is aimed at reducing the impact of visual impairment caused by refractive error and presbyopia by ensuring adequate information about spectacles and their proper usage.

The odds of having a favorable attitude among participants with a positive history of spectacle use were 3.22 times higher as compared to those who did not have a positive history of spectacle use before. This result is supported by studies performed in Ghana(13) and Saudi Arabia.(14) This might be because when individuals use spectacles, they have improved vision, and they receive advice when the spectacle is

dispensed. This finding implies that properly distributed spectacles for correction or protection can result in a positive attitude towards their use.

The odds of having a favorable attitude among participants with a family history of spectacle use were 1.89 times higher as compared to those who did not have a family history of spectacle use. This result is supported by studies that were performed in Nigeria(12) and Indonesia.(8) Parents who were spectacle-wearers were more likely to allow their families to wear spectacles.(12) This result indicates that optometrists or opticians should devote extra effort to provide the required corrective or protective glasses, and establish trust between individuals' needs for spectacles and the professionals who provide them.

The odds of having a favorable attitude among participants with adequate knowledge towards spectacle use were 4.63 times higher as compared to those who had inadequate knowledge towards spectacle use. This result is in agreement with the findings of studies conducted in Gondar(9) and Indonesia.(8) This might be due to individual knowledge improvement, which can positively change the attitude of participants towards spectacle wear.(8, 15) This further implies that having sufficient information is necessary to develop a positive attitude toward using spectacles and requires a multidisciplinary approach to raise awareness about spectacles and their usage.

## Strengths and limitations of this study

This study provided up-to-date evidence on proportion and associated factors with knowledge and attitude towards spectacle use among adults living in Northeast Ethiopia to reduce ocular hazarder related ultraviolet ray and visual impairment due to refractive error and presbyopia. Being a cross-sectional study, this study can show the temporal relationship between associated factors and knowledge and attitude towards spectacle use rather than the actual cause-effect relationship. This study results did not specifically address the attitudes and knowledge of adults who use spectacles to correct refractive errors or presbyopia, or the parents/guardians of children who use them for the same purpose, even though it involved the general population. Furthermore, this

study also mainly focuses on quantitative but limited information on the on the qualitative aspects and their impact relationship.

## Conclusion

This study revealed that the proportion of adequate knowledge and a favorable attitude towards spectacle use was good. Increasing age, higher level of education, positive history of spectacle use, and family history of spectacle use were significantly associated with adequate knowledge of spectacle use. In addition, higher educational status, positive history of spectacle use, family history of spectacle use, and adequate knowledge of spectacle use were positively associated with a favorable attitude towards spectacle use. We recommend that strengthening the existing knowledge and attitudes towards spectacle use by disseminating information at community meetings for individuals with a low level of educational status. And also, it was recommended to conduct both large-scale qualitative and quantitative comparative cross-sectional studies to better estimate the knowledge and attitude towards spectacle use and related factors.

## Declarations

## Ethical approval

This study was conducted in accordance of accordance with the Declaration of Helsinki. Ethical approval was obtained from the Ethical Review Committee at University of Gondar, College of Medicine and Health Sciences, Comprehensive and Specialized Hospital, and School of Medicine. A letter of support was provided by the administration of Debre Berhan. Verbal informed consent was obtained from all participants after detailed explanation of the purpose of the study. Verbal informed consent was approved by the ethical review committee at University of Gondar, and the ethical approval number was 622/05/2023.

All included participants were informed of their right to withdraw from the study at any time during the interview. No risk was taken for the selected study participants. Confidentiality was maintained by not using personal identifiers in the data collection tools and by password-protecting the data on a computer.

## Consent for publication

Not applicable.

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## Conflict of interests

All authors declared that there is no conflict of interest in this research work.

## Data availability of statement

Data are available upon reasonable request

## Authors' contributions

Matiyas Mamo Bekele conceptualized the research design, formulated the research questions, takes full responsibility for the work, designed and implemented the research methodology, and conducted extensive reviewers of the manuscript. Nebyat Feleke Adimasu and Avel Sinshaw Assem contributed to refining the research objectives and conceptualization of the study, conducted statistical analyses and interpreted the results. Nebyat Feleke Adimasu, Avel Sinshaw Assem and Tarekegn Chaklie Zeleke assisted in refining the methodological approach and methodological decisions, led the data collection efforts, organized and managed datasets, and ensured data quality and integrity. Melkamu Temeselew Tegegn and Abebech Fikade Shumye conducted statistical analyses, interpreted the results, drafted the initial manuscript, outlining the research background, methodology and results, and reviewed the manuscript. Matiyas Mamo Bekele acts as a guarantor.

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**Table 1:** Socio-demographic characteristics of the study participants in Debre Birhan town, North Shewa, Ethiopia, 2023 (n = 1022)

| Variables | Categories | Current spectacle wearer (%) | Not current spectacle wearer (%) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **Overall** | | **285(100)** | **737(100)** |
| **Age(in year)** | ≤37 | 50(17.5) | 209(28.4) |
| | 38-45 | 80(28.1) | 184(24.9) |
| | 46-54 | 93(32.6) | 192(26.0) |
| | ≥55 | 62(21.8) | 152(20.6) |
| **Sex** | Male | 230(80.7) | 457(62.0) |
| | Female | 55 (19.3) | 280(38.0) |
| **Marital status** | Not married | 33(11.6) | 13.21(13.8) |
| | Married | 238(83.5) | 79.45(77.9) |
| | Divorced | 11(3.9) | 4.70(5.0) |
| | Widowed | 3(1.0) | 2.64(3.3) |
| **Educational status** | Unable to read and write | 13(4.6) | 104(14.1) |
| | Able to read and write | 24(8.4) | 171(23.2) |
| | Primary school | 6(2.1) | 64(8.7) |
| | Secondary School | 52(18.3) | 120(16.2) |
| | College and above | 190(66.7) | 278(37.7) |
| **Occupational status** | Merchant | 57(20%) | 214(29.0) |
| | Government employed | 139(48.8) | 289(39.2) |
| | Housewife | 18(6.3) | 114(15.5) |
| | Private employed | 55(19.5) | 86(11.7) |
| | Unemployed | 16(5.6) | 34(4.6) |

**Table 2**: Clinical characteristics of the study participants in Debre Birhan town, North Shewa, Ethiopia, 2023 (n=1022)

| **Variables** | **Categories** | **Current spectacle wearer (%)** | **Not current spectacle wearer (%)** |
|---|---|---|---|
| **Overall** | | 285(100) | 737(100) |

| | | | |
|---|---|---|---|
| **History of eye examination** | Yes | 239(83.9) | 252(34.2) |
| | No | 46(16.1) | 485(65.8) |
| **Self-reported reduction of vision** | Yes | 247(86.7) | 295(40.0) |
| | No | 38(13.3) | 442(60.0) |
| **History of cataract surgery** | Yes | 105(36.8) | 102(13.8) |
| | No | 180(63.2) | 635(86.2) |
| **History of ocular trauma** | Yes | 38(13.3) | 58(7.9) |
| | No | 247(86.7) | 679(92.1) |
| **History of training on eye** | Yes | 63(22.1) | 74(10.0) |
| | No | 222(77.9) | 663(90.0) |
| **Family history of spectacle** | Yes | 158(55.4) | 266(36.1) |
| | No | 127(45.6) | 471(63.9) |
| **History of DM** | Yes | 28(9.8) | 53(7.2) |
| | No | 257(90.2) | 684(92.8) |
| **History of HTN** | Yes | 11(3.9) | 32(4.3) |
| | No | 274(96.1) | 705(95.7) |
| **Distance visual acuity status** | ≥6/12 | 42(17.4) | 200(82.6) |
| | < 6/12 -- 6/18 | 203(30.8) | 457(69.2) |
| | < 6/18 -- 6/60 | 7(24.1) | 22(75.9) |
| | < 6/60 | 33(36.3) | 58(63.8) |

**Table 3**: Factors associated with knowledge towards spectacle use among adults in Debre Birhan Town, North Shewa, Ethiopia, 2023 (n =1022)

| | Knowledge towards spectacle use | | | | |
|---|---|---|---|---|---|
| **Variables** | **Adequate** | **Inadequate** | **COR (95% CI)** | **AOR (95% CI)** | **P-value** |

| | | | | | |
|---|---|---|---|---|---|
| **Sex** | | | | | |
| Female | 253 | 82 | 0.30(0.20-0.43) | 1.03(0.58-1.85) | 0.897 |
| Male | 626 | 61 | 1.00 | 1.00 | |
| **Age(years)** | | | 1.22(1.18-1.26) | 1.21(1.17-1.26) | <0.0001 |
| **Marital status** | | | | | |
| Not married | 120 | 15 | 1.00 | 1.00 | |
| Married | 698 | 114 | 0.76(0.43-1.35) | 1.03(0.46-2.29) | 0.937 |
| Divorced | 41 | 7 | 0.73(0.27-1.92) | 0.23(0.04-1.23) | 0.087 |
| Widowed | 20 | 7 | 0.35(0.12-0.98) | 0.74(0.17-3.10) | 0.686 |
| **Educational status** | | | | | |
| Unable to read and write | 86 | 31 | 1.00 | 1.00 | |
| Able to read and write | 142 | 53 | 0.96(0.57-1.62) | 0.81(0.38-1.70) | 0.581 |
| Primary school | 51 | 19 | 0.96(0.49-1.88) | 0.66(0.25-1.68) | 0.385 |
| Secondary School | 152 | 20 | 2.73(1.47-5.09) | 1.62(0.65-4.02) | 0.293 |
| College and above | 448 | 20 | 8.07(4.39-14.82) | 2.65(1.06-6.60) | 0.035 |
| **Occupational status** | | | | | |
| Merchant | 222 | 49 | 0.53(0.34-0.82) | 0.98(0.51-1.86) | 0.956 |
| Government employed | 383 | 45 | 1.00 | 1.00 | |
| Housewife | 100 | 32 | 0.36(0.22-0.60) | 0.85(0.39-1.81) | 0.677 |
| Private employed | 132 | 9 | 1.72(0.82-3.62) | 2.77(0.95-8.07) | 0.061 |
| Unemployed | 42 | 8 | 0.61(0.27-1.39) | 0.56(0.13-2.32) | 0.428 |
| **History of training on eye** | | | | | |
| Yes | 128 | 9 | 2.53(1.25-5.11) | 1.36(0.52-3.53) | 0.517 |
| No | 751 | 134 | 1.00 | 1.00 | |
| **History of eye examination** | | | | | |
| Yes | 465 | 26 | 5.05(3.23-7.88) | 1.33(0.64-2.75) | 0.431 |
| No | 414 | 117 | 1.00 | 1.00 | |
| **History of spectacle use** | | | | | |
| Yes | 277 | 8 | 7.76(3.75-16.06) | 3.20(1.31-7.83) | 0.010 |
| No | 602 | 135 | 1.00 | 1.00 | |

| | | | | | |
|---|---|---|---|---|---|
| **Self-reported reduction of vision** | | | | | |
| Yes | 508 | 34 | 4.38(2.92-6.59) | 0.91(0.45-1.82) | 0.795 |
| No | 371 | 109 | 1.00 | 1.00 | |
| **History of cataract surgery** | | | | | |
| Yes | 197 | 10 | 3.84(1.98-7.44) | 1.14(0.44-2.94) | 0.775 |
| No | 682 | 133 | 1.00 | 1.00 | |
| **Family history of spectacle use** | | | | | |
| Yes | 411 | 13 | 8.78(4.89-15.76) | 4.75(2.31-9.75) | <0.0001 |
| No | 468 | 130 | 1.00 | 1.00 | |

**Note:** n-sample size, COR-Crude odds ratio, AOA-Adjusted odds ratio and CI-Confidence interval

**Table 4**: Factors associated with attitude towards spectacle use among adults in Debre Birhan town, North Shewa, Ethiopia, 2023 (n=1022)

| | Attitude towards spectacle use | | | | |
|---|---|---|---|---|---|
| **Variables** | **Favorable** | **Unfavorable** | **COR (95% CI)** | **AOR (95% CI)** | **P-value** |
| **Sex** | | | | | |
| Female | 252 | 83 | 0.32(0.23-0.46) | 0.65(0.41-1.02) | 0.065 |
| Male | 620 | 67 | 1.00 | 1.00 | |
| **Age(years)** | | | 1.06(1.04-1.07) | 1.00(0.98-1.02) | 0.575 |
| **Marital status** | | | | | |
| Not married | 111 | 24 | 1.00 | 1.00 | |
| Married | 700 | 112 | 1.35(0.83-2.19) | 1.41(0.79-2.48) | 0.235 |
| Divorced | 42 | 6 | 1.51(0.57-3.96) | 1.86(0.61-5.61) | 0.270 |
| Widowed | 19 | 8 | 0.51(0.20-1.30) | 0.88(0.30-2.54) | 0.815 |
| **Educational status** | | | | | |
| Unable to read and write | 85 | 32 | 1.00 | 1.00 | |

| | | | | | |
|---|---|---|---|---|---|
| Able to read and write | 146 | 49 | 1.12(0.66-1.88) | 1.03(0.57-1.83) | 0.915 |
| Primary school | 50 | 20 | 0.94(0.48-1.81) | 0.85(0.41-1.77) | 0.675 |
| Secondary School | 149 | 23 | 2.43(1.34-4.43) | 1.76(0.87-3.58) | 0.113 |
| College and above | 442 | 26 | 6.40(3.62-11.28) | 2.56(1.26-5.21) | 0.009 |
| **Occupational status** | | | | | |
| Merchant | 218 | 53 | 0.44(0.28-0.69) | 0.65(0.38-1.08) | 0.102 |
| Government employed | 386 | 42 | 1.00 | 1.00 | |
| Housewife | 104 | 28 | 0.40(0.23-0.68) | 0.89(0.48-1.67) | 0.733 |
| Private employed | 124 | 17 | 0.79(0.43-1.44) | 0.52(0.26-1.05) | 0.069 |
| Unemployed | 40 | 10 | 0.43(0.20-0.93) | 0.41(0.16-1.01) | 0.053 |
| **History of training on eye** | | | | | |
| Yes | 122 | 15 | 1.46(0.83-2.58) | 0.56(0.28-1.10) | 0.096 |
| No | 750 | 135 | 1.00 | 1.00 | |
| **History of eye examination** | | | | | |
| Yes | 454 | 37 | 3.31(2.23-4.92) | 1.04(0.58-1.88) | 0.873 |
| No | 418 | 113 | 1.00 | 1.00 | |
| **History of spectacle use** | | | | | |
| Yes | 274 | 11 | 5.78(3.08-10.87) | 3.22(1.58-6.55) | 0.001 |
| No | 598 | 139 | 1.00 | 1.00 | |
| **History of ocular trauma** | | | | | |
| Yes | 87 | 9 | 1.73(0.85-3.52) | 1.22(0.52-2.84) | 0.638 |
| No | 785 | 141 | 1.00 | 1.00 | |
| **Self-reported reduction of vision** | | | | | |
| Yes | 496 | 46 | 2.98(2.05-4.32) | 0.85(0.49-1.47) | 0.566 |
| No | 376 | 104 | 1.00 | 1.00 | |
| **History of cataract surgery** | | | | | |
| Yes | 192 | 15 | 2.54(1.45-4.43) | 0.94(0.47-1.89) | 0.873 |
| No | 680 | 135 | 1.00 | 1.00 | |
| **Family history of spectacle** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **use** | | | | | |
| Yes | 397 | 27 | 3.80(2.45-5.89) | 1.89(1.13-3.16) | 0.015 |
| No | 475 | 123 | 1.00 | 1.00 | |
| **Knowledge towards spectacle use** | | | | | |
| Adequate | 798 | 81 | 9.18(6.15-13.70) | 4.63(2.69-7.98) | <0.0001 |
| Inadequate | 74 | 69 | 1.00 | 1.00 | |

**Note:** n-sample size, COR-Crude odds ratio, AOA-Adjusted odds ratio and CI-Confidence interval

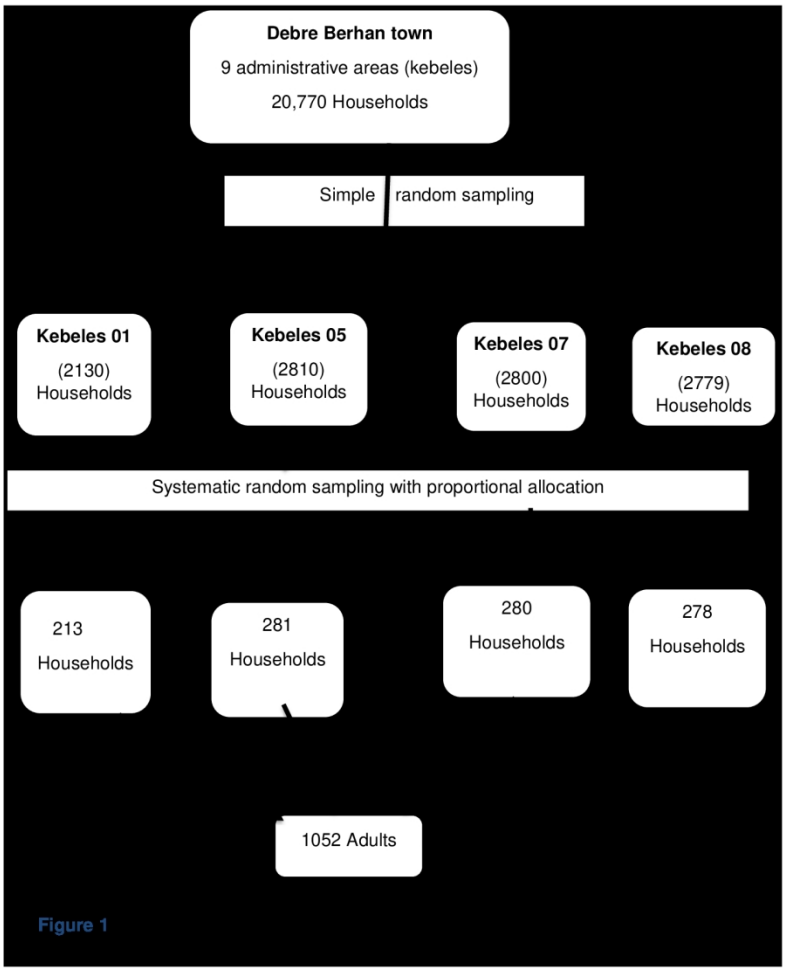


Figure 1 Diagrammatic representation of the sampling procedure in Debre Birhan town, North Shewa, Ethiopia, 2023

215x279mm (200 x 200 DPI)

**English version of the questionnaire that used to assess knowledge, attitude, and its associated factors towards spectacle used among adults living in Debre Birhan town, north Shewa, Ethiopia, 2023**

| **Section one: Socio-demographic and economic data** | | |
|---|---|---|
| **S N** | **Questions** | **Responses** |
| 101 | Sex? | 1. Male<br>2. Female |
| 102 | Age in years? | ---------- |
| 103 | What is your current marital Status? | 1. Not married<br>2. Married<br>3. Divorced<br>4. Widowed |
| 104 | What is your educational status? | 1. Unable to read and write<br>2. Able to read and write but have not received formal education<br>3. Primary school<br>4. Secondary School<br>5. Certificate and above |
| 105 | What is your occupational status? | 1. Merchant<br>2. Government employed<br>3. Housewife<br>4. Private employed<br>5. Unemployed<br>6. Others specify it_____ |
| **Section two: Information-related factors** | | |
| 201 | Have you heard about spectacles? If your answer is No pass it to Q. 203. | 1. Yes 2. No |
| 202 | What is your source of information? | 1. School<br>2. Mass media<br>3. Colleagues<br>4. Family<br>5. Reading materials<br>6. More than one source<br>7. Others specify it_____ |
| 203 | Do you have a history of training in eye health? | 1. Yes 2. No |

| | | | | |
|---|---|---|---|---|
| **Section three: Ocular condition-related factors** | | | | |
| 301 | Do you have a history of eye examinations in the past 2 years? | 1. Yes | | 2. No |
| 302 | Do you have a history of spectacle use? | 1. Yes | | 2. No |
| 303 | Do you have a history of ocular trauma? | 1. Yes | | 2. No |
| 304 | Do you have a history of self-reported reduction of vision? | 1. Yes | | 2. No |
| 305 | Do you have a history of cataract surgery? | 1. Yes | | 2. No |
| **Section four: Medical condition-related factors** | | | | |
| 401 | Do you have a known history of diabetes mellitus? | 1. Yes | 2. No | 3. I don't know |
| 402 | Do you have a known history of hypertension? | 1. Yes | 2. No | 3. I don't know |
| **Section five: Family-related question** | | | | |
| 501 | Does your family have a history of spectacle use? | 1. Yes | | 2. No |

| | | | |
|---|---|---|---|
| **Section six: Questions related to Knowledge towards spectacle use** | | | |
| 601 | Does wearing spectacles make distance vision clearer? | 1. Yes | 2. No |
| 602 | Does wearing spectacles make near vision clearer? | 1. Yes | 2. No |
| 603 | Does wearing a spectacle protect the eye from hazards? | 1. Yes | 2. No |
| 604 | Do timely and properly wearing spectacles decrease visual impairments? | 1. Yes | 2. No |
| 605 | Can spectacle-wearing make some eyes depend on it? | 1. Yes | 2. No |
| 606 | Can eye drops be an alternative for spectacle correction? | 1. Yes | 2. No |
| 607 | Can wearing spectacles weaken the power of the eye? | 1. Yes | 2. No |
| 608 | Can spectacles prescribed for one person be used for another? | 1. Yes | 2. No |
| 609 | Can you get spectacles from hospitals? | 1. Yes | 2. No |
| 610 | Can you get spectacles from a private eye clinic? | 1. Yes | 2. No |
| 611 | Can you get spectacles from private optical workshops? | 1. Yes | 2. No |
| 612 | If one gets spectacles once, is it always the same for the rest of one's life? | 1. Yes | 2. No |
| 613 | Can spectacles be worn at any age? | 1. Yes | 2. No |
| 614 | Does wearing a professionally not prescribed spectacle cause eye problems? | 1. Yes | 2. No |
| 615 | Do people who wear spectacles have to wear them regularly? | 1. Yes | 2. No |

| Section seven: Questions related to Attitude towards spectacle use | | | | | | |
|---|---|---|---|---|---|---|
| | | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| 701 | Wearing spectacles increases your confidence. | | | | | |
| 702 | Wearing spectacles makes you unattractive to the opposite sex. | | | | | |
| 703 | Both sexes can wear spectacles. | | | | | |
| 704 | Wearing spectacles is uncomfortable. | | | | | |
| 705 | Wearing spectacles can cause activity limitations. | | | | | |
| 706 | People who wear spectacles are visually impaired or have bad eyes. | | | | | |
| 707 | People who wear spectacles are intelligent or smart. | | | | | |
| 708 | People who wear spectacles are fashionable. | | | | | |
| 709 | People who wear spectacles look professional. | | | | | |
| 710 | People who wear spectacles are uninteresting. | | | | | |
| 711 | The spectacle makes you look better. | | | | | |
| 712 | Spectacles are socially unacceptable. | | | | | |
| 713 | Spectacles worsen your vision. | | | | | |
| 714 | If you wear spectacles, people will tease you. | | | | | |
| 715 | Spectacles cause the eyes to be sunken or pushed in. | | | | | |

**Response to Knowledge related questions among study participants in Debre Birhan town, North Shewa, Northeast Ethiopia (n=1022)**

| No | Knowledge related questions | Responses | Frequency | Percent |
|---|---|---|---|---|
| 1. | Does wearing spectacles make distance vision clearer? | 1. Yes | 866 | 84.7 |
| | | 2. No | 156 | 15.5 |
| 2. | Does wearing spectacles make near vision clearer? | 1. Yes | 850 | 83.2 |
| | | 2. No | 172 | 16.8 |
| 3. | Does wearing a spectacle protect the eye from hazards? | 1. Yes | 959 | 93.8 |
| | | 2. No | 63 | 6.2 |
| 4. | Do timely and properly wearing spectacles decrease visual impairments? | 1. Yes | 970 | 94.9 |
| | | 2. No | 52 | 5.1 |
| 5. | Can spectacle-wearing make some eyes depend on it? | 1. Yes | 831 | 81.3 |
| | | 2. No | 191 | 18.7 |
| 6. | Can eye drops be an alternative for spectacle correction? | 1. Yes | 773 | 75.6 |
| | | 2. No | 249 | 24.4 |
| 7. | Can wearing spectacles weaken the power of the eye? | 1. Yes | 233 | 22.8 |
| | | 2. No | 789 | 77.2 |
| 8. | Can spectacles prescribed for one person be used for another? | 1. Yes | 238 | 23.3 |
| | | 2. No | 784 | 76.7 |
| 9. | Can you get spectacles from hospitals? | 1. Yes | 163 | 15.9 |
| | | 2. No | 859 | 84.1 |
| 10. | Can you get spectacles from a private eye clinic? | 1. Yes | 996 | 97.5 |
| | | 2. No | 26 | 2.5 |
| 11. | Can you get spectacles from private optical workshops? | 1. Yes | 852 | 83.4 |
| | | 2. No | 170 | 16.6 |
| 12. | If one gets spectacles once, is it always the same for the rest of one's life? | 1. Yes | 241 | 23.6 |
| | | 2. No | 781 | 76.4 |
| 13. | Can spectacles be worn at any age? | 1. Yes | 219 | 21.4 |
| | | 2. No | 803 | 78.6 |
| 14. | Does wearing a professionally not prescribed spectacle cause eye problems? | 1. Yes | 826 | 80.8 |
| | | 2. No | 196 | 19.2 |
| 15. | Do people who wear spectacles have to wear them regularly? | 1. Yes | 635 | 62.1 |
| | | 2. No | 387 | 37.9 |

**Response to Attitude related questions among study participants in Debre Birhan town, North Shewa, Northeast Ethiopia (n=1022)**

| No | Attitude related questions | Responses | | | | |
|---|---|---|---|---|---|---|
| | | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| 1. | Wearing spectacles increases your confidence. | 749(73.3%) | 138(13.5%) | 10(1%) | 118(11.5%) | 7(7%) |
| 2. | Wearing spectacles makes you unattractive to the opposite sex. | 55(5.4%) | 881(86.2%) | 13(1.3%) | 58(5.7%) | 15(1.5%) |
| 3. | Both sexes can wear spectacles. | 845(82.7%) | 80(7.8%) | 15(1.5%) | 66(6.5%) | 16(1.6%) |
| 4. | Wearing spectacles is uncomfortable. | 19(1.9%) | 850(83.2%) | 12(1.2%) | 17(1.7%) | 124(12.1%) |
| 5. | Wearing spectacles can cause activity limitations. | 23(2.3%) | 868(84.9%) | 11(1.1%) | 102(10%) | 18(1.8%) |
| 6. | People who wear spectacles are visually impaired or have bad eyes. | 15(1.5%) | 884(86.5%) | 10(1%) | 93(9.1%) | 20(2%) |
| 7. | People who wear spectacles are intelligent or smart. | 22(2.2%) | 835(81.7%) | 12(1.2%) | 64(6.3%) | 89(8.7%) |
| 8. | People who wear spectacles are fashionable. | 230(22.5%) | 670(65.6%) | 35(3.5%) | 12(1.2%) | 75(7.3%) |
| 9. | People who wear spectacles look professional. | 87(8.5%) | 828(81%) | 31(3%) | 27(2.6%) | 49(4.3%) |
| 10. | People who wear spectacles are uninteresting. | 111(10.9%) | 806(78.9%) | 12(1.2%) | 64(6.3%) | 29(2.9%) |
| 11. | The spectacle makes you look better. | 14(1.4%) | 884(86.5%) | 12(1.2%) | 76(7.4%) | 36(3.5%) |
| 12. | Spectacles are socially unacceptable. | 827(80.9%) | 13(1.3%) | 16(1.6%) | 38(3.7%) | 128(12.5%) |
| 13. | Spectacles worsen your vision. | 108(10.6%) | 848(83%) | 13(1.3%) | 12(1.2%) | 41(4%) |
| 14. | If you wear spectacles, people will tease you. | 31(3%) | 864(84.5%) | 12(1.2%) | 7(6.8%) | 45(4.4%) |
| 15. | Spectacles cause the eyes to be sunken or pushed in. | 19(1.9%) | 945(92.5%) | 12(1.2%) | 23(2.3%) | 23(2.3%) |